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An Analysis of the Economic Factors and Changes in Land-Use Associated with the Transition to a Beef Feedlot System in Waterloo County

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AN ANALYSIS OF THE ECONOMIC FACTORS AND CHANGES IN LAND-USE ASSOCIATED WITH THE TRANSITION TO A BEEF FEEDLOT SYSTEM IN WATERLOO COUNTY

by

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TABLE OF CONTENTS

TABLE OF CONTENTS Cont'd

LIST OF TABLES

LIST OF ILLUSTRATIONS

INTRODUCTION

Agricultural Geography as a Field of Study

Agricultural geography in Canada has been largely neglected as a field of geography until relatively recently.[1] This is evidenced by several factors.[2] First, until the mid 1960's, there were only two different agricultural geography courses offered in Canadian universities. Secondly, in that same time period, there were less than forty members of the Canadian Association of Geographers who listed agriculture as their primary research interest. Thirdly, largely a result of the first two, the neglect is shown by the very noticeable lack of research material and published information available on Canadian agricultural geography.

In its broadest sense, agricultural geography seeks to describe and explain areal differentiation in agriculture, to understand the problems of agricultural land-use, land-man ratios, the conservation of agricultural resources, and rural-urban relationships.[3] Considering that agriculture has dominated the human landscape for several thousands of years, intensive research in the field of agricultural geography appears to have come relatively late.[4]

In considering the progress in agricultural geography in North America, particular attention must be given to the geographers of the American mid-west, for example, who proposed and tested methods of intensive field study and systems of categories of agricultural land use between 1910 and the late 1920's.[5] In their studies, the mid-west geographers stressed field observations and the appraisal

of the physical basis of agriculture by means of intensive studies of small areas. Many of the leaders in the early development of professional geography in the United States, such as Dodge, Jones, and Sauer, devoted considerable attention to the study of agriculture and soils, thereby providing important contributions to agricultural geography.[6] Efforts were also made by geographers, such as Whittlesey, to produce a world classification of agriculture.[7]

In the past, the environmental effects on agriculture were stressed, with the main emphasis being on climatic factors. Studies in this area were carried out by authors such as Rose, who analyzed the relationship between corn yields and climate in the Corn Belt, and Weaver, who investigated the relationship between barley and climate in South Dakota.[8] Similar studies dealt with the effect of temperature and moisture on the growth of crops as well as the suitability of specified crops for various regions. A considerably lesser amount of research has been developed showing the effects of climate on livestock. Davidson's work in the 1920's, was one of the major studies done in this connection.[9]

The study of agricultural geography has not yet advanced beyond a primitive stage in development simply because many studies have been superficial investigations of extensive areas.[10] The 'intensive-small region' approach which began in the early 1900's, subsided somewhat in the 1930's and 1940's, when research interests tended to follow the regional approach.[11] In many instances, these general studies of broad regions usually produced only a few significant conclusions. It has been suggested by Reeds, in his article

"Agricultural Geography: Progress and Prospects", that attention should be shifted from these general studies to more intensive studies of small areas, because the detailed micro-studies are essential in accumulating the facts which serve as the basis for valid generalizations about the larger regions.

Similar to Reeds, this author also feels that too much emphasis has been placed on description of extensive areas and on the amassing of data on areal differentiation, with too little attention being paid to the analysis of agricultural distributions and to the development of new methodology, techniques and principles. Toward these ends, this author has chosen as a study area, one specific facet of agriculture, namely, the economic aspects associated with the transition from, and the modification of, traditional general farming to a more specialized form of operation, the beef feedlot industry. The transition and modification processes will be examined in order to ascertain why the change is occurring, how the change is taking place, and what the economics involved are in such a transition. These aspects will be studied to gain insight and, a better understanding of the change itself. Only through this understanding, can one attempt to predict the long term ramifications of this type of transition. The scope of this study is limited to Waterloo County in order that a greater amount of detail may be included, in recognition of the previously mentioned need for more intensive research within smaller regions.

Specific Objectives of the Research

The first objective of this study is to examine the transition from the traditional system of agriculture to a relatively new type of

operation, the beef feedlot enterprise. This will include not only an examination of the actual transition but also the factors which were conducive to such a change. In this respect, the current, as well as the past position of beef in the agricultural economy, will be discussed as a contributing factor to the movement toward specialization. The views and attitudes of the farmers in the study group concerning their change in vocation will also be examined and evaluated as an important indicator concerning the relative success of the beef feedlot venture.

The second objective is to analyze the economics of the operations of a selected group of feedlot operations who are located in Waterloo County and who, recently, initiated the modification of their existing farm facilities to feedlot requirements. The economic situation of a system in transition is of major concern in determining the viability of the operation. The analysis will basically include a discussion and comparison of various resources common to a feedlot operation and the relative efficiency with which these resources are used by the study group members. Here also, an indication will be given concerning the possible effect that the size of operation has on the use made of the resources, contributing to the overall success of the operation.

The third objective of the study is to provide for the reader, some factual information on the beef feedlot system and to better acquaint the reader with this type of operation. This will involve a consideration of various methods of livestock production within the feedlot as well as an overview of some of the characteristics and functions of a beef feedlot operation.

Study Site

The study site chosen for this thesis is Waterloo County. The farm location for each operator is shown in Figure 1. Waterloo County was chosen as a study site since it is well suited to feedlot operations in respect to land capability for crop production, climatic conditions, and market opportunities. There is also a definite lack of research data available on many aspects of feedlot operations in the Waterloo County area. This fact was indicated by the Waterloo County Agricultural Representative who felt that a study such as this could prove beneficial to the agriculturalists in this area. The University of Guelph has conducted yearly studies on various types of farming operations. Only recently, however, they have included Ontario beef feedlot enterprises in their studies.[12] Cost studies for beef feedlots have been done in other areas such as Brant County in 1969, and are being continued on a yearly basis.[13]

A third reason for choosing Waterloo County was to facilitate the collection of data from the individual feedlots and to consequently reduce the amount of time involved in visiting and corresponding with the feedlot owners. Within Waterloo County there is a wide range in the size of operations which allows for an interesting comparison of scale among the various operations in the study group.

Methodology

The first step taken in initiating this study was to select a group of feedlot operators who met the research requirements as designated by this author. There were two main criteria used in choosing the operators for the study. The first criterion was that

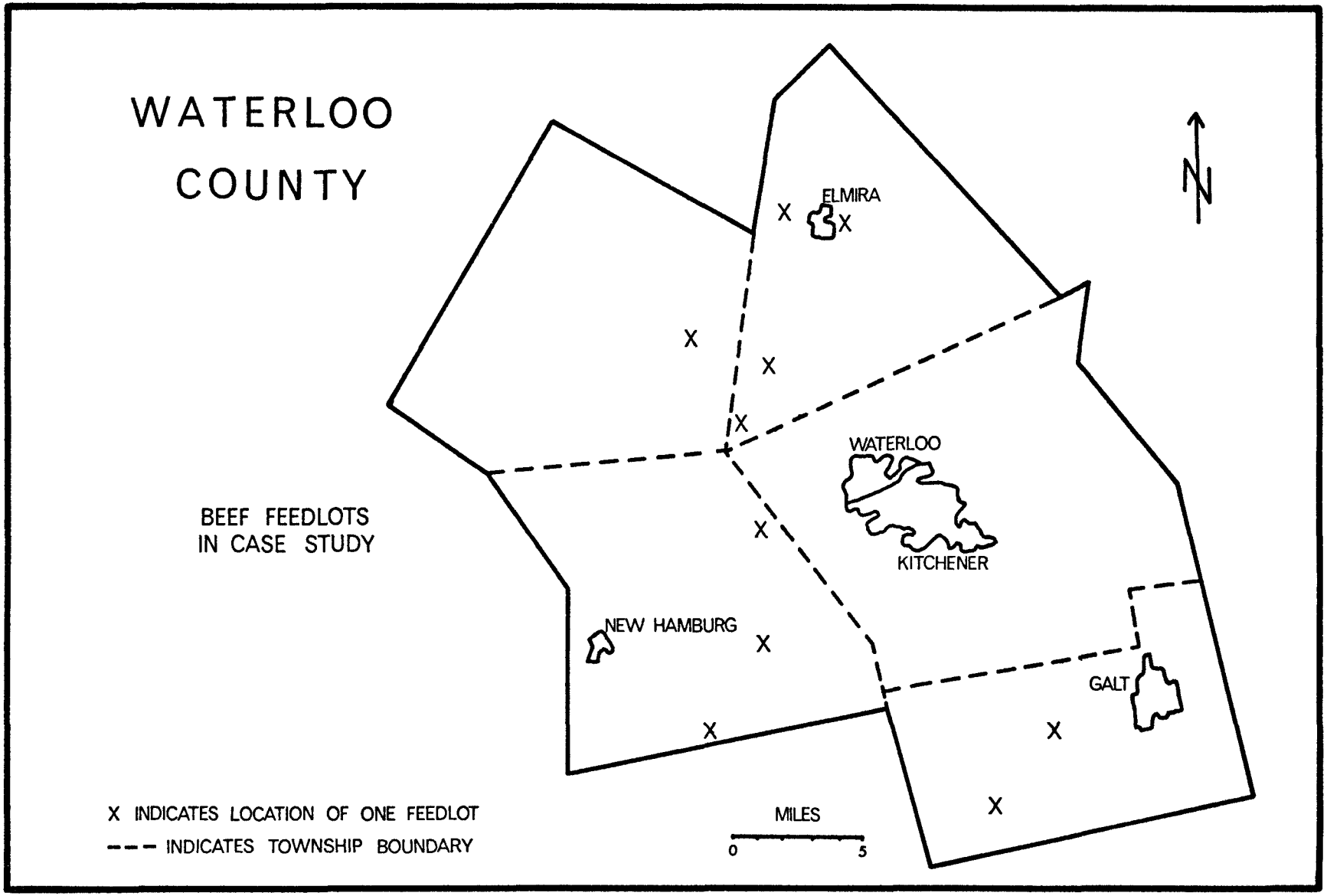
WATERLOO
COUNTY
ELMIRA
WATERLOO
KITCHENER
NEW HAMBURG
GALT
BEEF FEEDLOTS
IN CASE STUDY
X INDICATES LOCATION OF ONE FEEDLOT
--- INDICATES TOWNSHIP BOUNDARY
MILES
0
5

Figure. 1

the feedlot enterprise was the main source of income for each operator. This was defined more specifically as those farmers who received a minimum of 75% of their gross income from the feedlot enterprise. According to the 1970 Ontario Farm Management and Accounting Project, this classified the operators as "Specialized Beef Feeder Farms".[14] The second prerequisite was simply that the operator wished to be part of the study. This was an important aspect since the relative success of the study depended upon the extent and depth of data provided by each operator. This could only be achieved through the cooperation of the individual group members.

The names of all beef farmers in Waterloo County were obtained from the office of the Agricultural Representative. The list included all the farmers who raised beef cattle, either as a primary or secondary enterprise. The Agricultural Representative greatly assisted the author at this point, by specifying those operators who produced beef as a primary enterprise and further, by denoting those individuals who operated feedlots, either large or small. At this point, an initial correspondence with the specified farmers was made by mail (See Appendix A). From this correspondence, the author was able to obtain the following essential information:

1. the approximate percentage the feedlot contributed to the operator's income.
2. The size (number of head) of the feedlot.
3. The exact location of the feedlot on a Waterloo County map.
4. An indication by the operator to be a part of the study group.

A stratified sample of feedlot operators, based on enterprise size, was

selected from the original list of twenty-five operators supplied by the Department of Agriculture. The ten operators chosen for the study met the two criteria previously discussed. As well, these operators appeared to be most diagnostic of the total number of operators. The size of the sample was restricted to ten to allow sufficient personal communication in the limited time available for field research.

The author contacted each participating operator by phone after which he then made his initial visit to each farm. The visit was made at a time which was convenient for the operator and was, in most instances, of approximately one-half day duration. Each operator had received a questionnaire by mail from the author previous to the initial visit, thereby saving considerable time in gaining the required information.

The data derived from the initial visit attempted to encompass as many aspects of a feedlot operation as possible. Information was obtained from each operator concerning livestock, crops, buildings, feeding equipment and machinery as well as general items and expenses. (See Appendix for questionnaire). In order to obtain the desired results, it was necessary to carefully examine the financial situation of each operator. From the information obtained, the data was tabulated into a financial summary form which would allow for comparison of the operators according to the various areas of interest. The basic format of the cost study was similar to that used in the Brant County feedlot study mentioned earlier. This was done primarily to give the author a means of comparison as well as to provide additional information for the operators themselves. Follow-up visits to the sample farms were made to gain further data and recheck the accuracy

of the information previously collected. Telephone interviews were also used to obtain supplemental information, in certain instances.

From the information obtained in the cost study, the author was able to carry out a comparative analysis of the ten feedlot operations. Various measures of scale of the business were examined first, to demonstrate the size difference existing among the operations. This was especially necessary due to the large variation in size of operation which was seen to exist within the study group. The operators were ranked from one to ten according to the average amount of beef they produced in the two year period of 1969-1970. This ranking was used to compare the investment in each of the five resources common to the feedlots in the study group.

The resources which were examined in terms of capital investment were livestock, land, machinery, buildings, and feed. Each resource was examined mainly from the viewpoint of capital investment since, to a large extent, the success of a feedlot operation is determined by the allocation of capital among the various resources.

The success of a farm business cannot be truly assessed unless monetary returns, both to the farm operation and the farm manager, are considered. The two methods of discussing income most commonly used, and which will be used for the purposes of this study, are net farm income and labour income. Although each by itself is meaningful, a truer picture is presented when the two measures of income are considered together. By this method, the overall success of a farm operation can be more readily considered.

After the data collection for the cost study was complete and

in tabular form, the author again visited each operator. The purpose of this visit was to discuss the results of the cost study with the operators and to receive suggestions from them concerning the apparent completeness as well as accuracy of the data. Several valuable suggestions and comments were offered to the author by the operators at that time. During the second visit, the author also discussed with the operators, several factors pertaining to their decision to enter the feedlot business. In this respect all the operators offered valuable information on such aspects of the decision-making process as, the incentives which prompted their decision, the actual conversion of facilities, and the problems associated with the transition. The primary purpose was to attempt to ascertain how closely the operators' thoughts and attitudes on feedlot operations corresponded to what the operators were actually doing in practice. For most aspects of the discussion, it would only be possible to do this for the group as a whole but where feasible, the author attempted to consider the operators on an individual basis.

Thus, by the methods described, the author was able to view the feedlot industry in a local area according to the use made of resources by a chosen study group. The reader must bear in mind that this study is based on the results of one group of feedlot operators only and that the author has not attempted to generalize the results to apply to areas other than the study group of Waterloo County.

In the chapters which follow, the beef feedlot enterprise will be discussed in terms of the transition process, economic viability, and the factors associated with the conversion of facilities. Chapter I will consider the role and importance of beef production in Ontario's

agricultural economy leading up to, and supporting the transition to the beef feedlot activity.

NOTES

[1]L.G. Reeds, "Agricultural Geography: Progress and Prospects", The Canadian Geographer, VIII:2, (1964), 51.

[2]Ibid.

[3]Ibid.

[4]H.F. Gregor, Geography of Agriculture: Themes in Research, (N.J.: Prentice-Hall, Inc., 1970), 1.

[5]W.D. Jones and V.C. Finch, "Detailed Field Mapping in the Study of the Economic Geography of an Agricultural Area", Ann. Assoc. Am. Geog., (XV, 1925), 259.

[6]H.H. McCarty, American Geography: Inventory and Prospects, (N.Y.: Syracuse University Press, 1954), 259.

[7]D.S. Whittlesey, "Major Agricultural Regions of the Earth", Ann. Assoc. Am. Geog., (XXVI, 1936), 199-240.

[8]Gregor, 31.

[9]F.A. Davidson, "Relation of Taurine Cattle to Climate," Economic Geography, III, (1927), 466-485.

[10]Reeds, 52.

[11]McCarty, 259.

[12]Department of Agricultural Economics, Preliminary Summary--Ontario Farm Management and Accounting Project, 1970, (University of Guelph, 1971).

[13]F. Abraham and D. Graham, Beef Feedlot Cost Study--Brant County, 1969, (University of Guelph: Ontario Department of Agriculture and Food).

[14]Department of Agricultural Economics, Preliminary Summary, 4.

I. THE TRANSITION TO BEEF FEEDLOT SPECIALIZATION

Beef production has been a relatively important aspect of agriculture in Southern Ontario for many years.[1] One indication of why the trend to specialization in beef production has occurred is given by a brief examination of the relative position and role of beef in the Ontario agricultural economy.

The Role of Beef in Ontario Agriculture

Consumer demand for beef in all areas of Ontario has been rising steadily during the past several years.[2] This preference for beef is unparalleled by any other type of meat and its popularity is steadily increasing, especially for the better cuts from higher quality carcasses.[3] The following table provides an indication of the relative importance of beef production to the various sectors of Ontario.

TABLE 1: THE RELATIVE IMPORTANCE OF COMMERCIAL BEEF IN ONTARIO

	Total Commercial Beef Animals		Total of all Cattle		Percentage Commercial Beef of Total Cattle	
Region	Number of Head	Total Value ($)	Number of Head	Total Value ($)	Number of Head %	Total Value %
Northern Ontario	26,000	4,661,100	151,600	26,145,000	17.2	17.8
Central Ontario	109,000	22,094,700	474,000	100,024,000	23.0	22.1
Eastern Ontario	68,000	13,163,400	617,900	135,496,400	11.0	9.7
Southern Ontario	231,000	49,427,400	679,400	150,797,600	34.0	32.8
Western Ontario	506,000	104,553,400	1,281,100	269,989,000	39.5	38.7
Ontario Total	940,000	193,900,000	3,204,000	682,452,000	29.3	28.4

Source: Agricultural Statistics Ontario 1969.

From the table, it is evident that beef production is an important part of the total cattle industry in several sections of Ontario. This is particularly the case in Southern and Western Ontario, in which commercial beef cattle account for approximately thirty-three percent and thirty-nine percent, respectively, of the total value of all cattle.

Beef producers are important to Ontario agriculture as users of locally produced feed, the value of which depends primarily on a large and growing beef industry. Strong consumer preference for beef has been a major factor contributing to the increase in beef feedlot production. There has been a gradual shift in consumer expenditure away from carbohydrate foods in favour of animal proteins, mainly meats, of which quite a large proportion has been beef.[4] Although beef prices to the consumer have increased some twenty-eight percent in the last decade, consumer preference has remained with beef, and per capita consumption has also increased, by approximately eleven percent.[5] In comparing beef with pork, the situation appears to be such that if the price of one meat gets too far out of line with the other, some consumers will substitute the relatively cheap meat for the more expensive. However, past trends have shown that most consumers are quite reluctant to substitute pork for beef to any great extent.[6]

Overall, the future demand for beef appears strong, indicating the relative stability of the beef industry in Ontario. Bearing in mind this favourable position of the beef industry, attention will now focus on the actual transition in land-use, from traditional general

farming to the beef feedlot operation.

The Transition in Land-Use to a Beef Feedlot System

Traditionally, in Waterloo County, as in all of Southern Ontario, a generalized system of livestock farming has been carried out. Due to variations in climate, natural vegetation, topography, and market conditions and demands, specialized forms of crop production have existed in certain areas.[7] In general, however, mixed farming has been the rule, with particular emphasis on dairying.[8] In terms of crop production, the principle grain crops have been wheat, oats, and barley, over most of Southern Ontario.[9] Only relatively recently, corn is being grown in much greater quantities upon recognition of its true value as a feed. These changes in land-use are having a pronounced effect upon agriculture in Southern Ontario.

Agricultural land-use patterns are being revolutionized in Southern Ontario. No longer are the densest livestock populations found in the dairy regions; among others, the beef cattle areas centred in Waterloo, Perth, and Oxford Counties have far surpassed them.[10] This fact can be recognized from an examination of Figures 2 and 3, in which a more recent emphasis on specialization in livestock, has become evident in the Waterloo-Perth-Oxford area. This aspect of the land-use change is particularly important to this study since it is directly concerned with Waterloo County.

The most significant development in field crops, which should be apparent to even the most casual observer, is the vast increase in the amount of corn being grown. Not only have higher yielding hybrids and good, short-season hybrids resulted in much more corn in the old

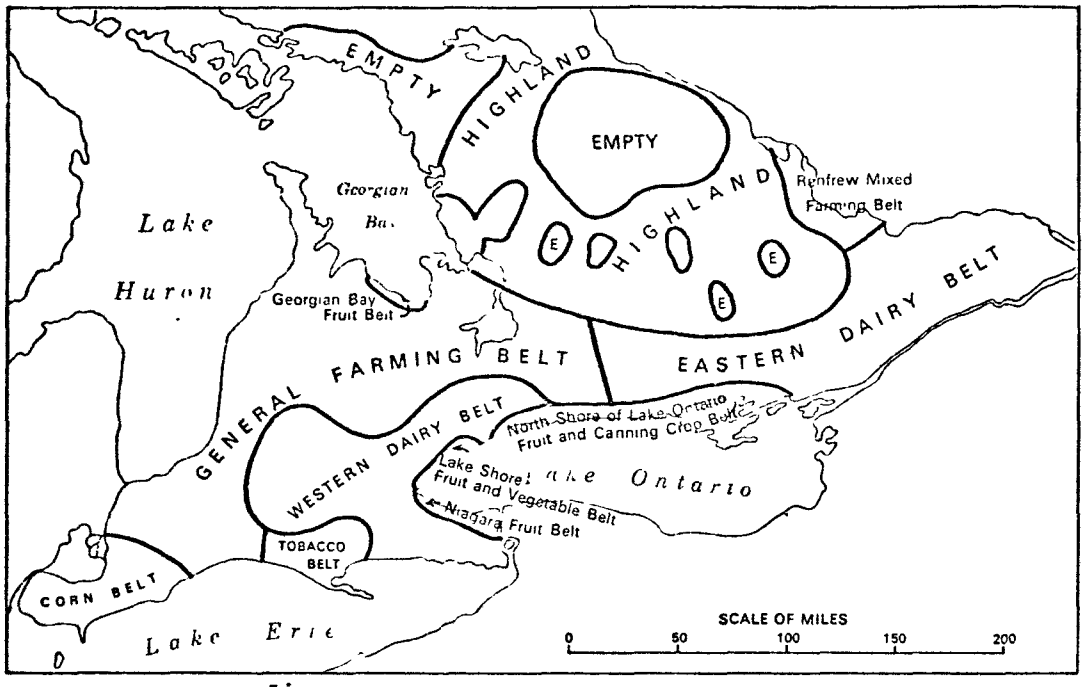

Fig. 2 Agricultural Regions of Southern Ontario, 1940

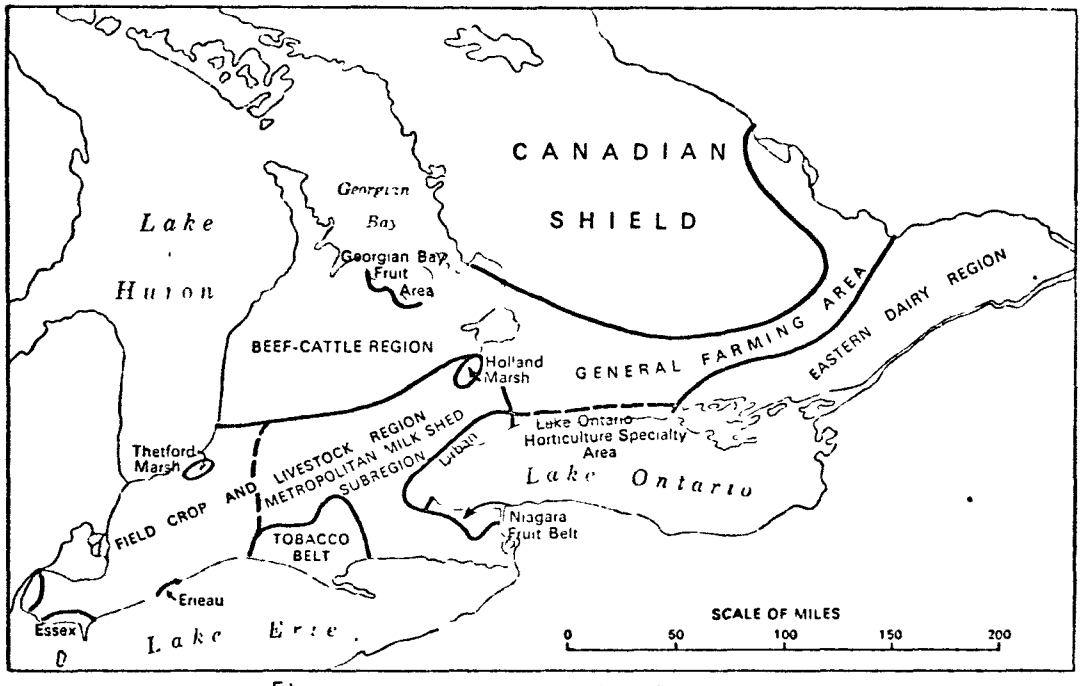

Fig. 3 Agricultural Regions of Southern Ontario, 1960

SOURCE: Putnam and Putnam, Canada: A Regional Analysis, 212

Kent-Essex corn belt but also, the corn area has shown considerable expansion northward.[11] This northward expansion and development of corn has played a very important role in the shift away from the traditional mixed farming to specialized beef production since, a beef feedlot operation relies heavily on both grain corn and silage as the basic feed requirements.

In the post-war years, the raising of beef has been gaining over dairying.[12] This is seen to be true not only in the counties with access to feed shipments from Lake Huron, but in several interior counties as well. The northwestern sector of Ontario has maintained its interest in grazing, whereas cattle feeding has increased in those areas which have found it possible to grow more corn.

Factual information dealing with how the trend to specialization in beef began is, however, very scanty at best. From the personal experience of the author in this area of agriculture, there appear to be certain factors which have had some effect on the trend to specialization. One of these has been a definite movement away from general mixed farming toward enterprise specialization.[13] In the past, many farmers were able to spread their labour and managerial ability over several enterprises at one time, on a small scale. More recently, however, many of these same farmers have been forced, from the viewpoint of economics, to concentrate their efforts and technical knowledge on one, or perhaps two enterprises only. In this way, they are placing a much greater emphasis on the production of one commodity rather than several commodities. From the viewpoint of labour and management, this is a much more efficient manner of production.

Specialized beef feedlot operations have tended to appeal to many farmers for a variety of reasons. In the last decade, market prices for slaughter steers have remained relatively steady compared to other forms of market animals, and have shown a fairly uniform price increase. On the other hand, hog production, for example, has not been as stable and has been subject to greater market price fluctuations. This is apparent in Table 2.

TABLE 2: MARKET PRICES, (TORONTO), FOR SLAUGHTER STEERS AND HOGS

Year	Average Price for Good Slaughter Steers (per 100 lbs.)	Average Price for Grade A Hogs (per 100 lbs.)
1969	$29.35	$35.70
1968	26.90	30.80
1967	27.65	30.70
1966	25.83	35.90
1965	24.00	33.40
1964	22.70	27.30
1963	23.65	27.80
1962	25.75	29.60
1961	22.75	28.30
1960	22.65	24.30

Source: Agricultural Statistics Ontario 1969, 79,81.

Besides consumer demand for beef and a relatively stable market, the nature of feedlot operations has appeared favourable to many farmers. Labour requirements have been an important influencing factor for many farmers, such as dairymen, in switching to a feedlot operation. In this respect, the amount of labour required for milking and other chores in a dairy operation is quite extensive and many operators have changed to beef production for this reason alone.[14]. Labour has become a very important aspect of farming today and more and more emphasis is being placed on the efficient use of this labour.

In the traditional land-use system, farming was a way of life, most often passed down from 'father to son'. Today, however, under the new form of land-use, farming is a vocation rather than a way of life and a farmer's goals are shifting to those of more economic concern. Whereas, the traditional land-use was relatively stable and changed little over time, the new systems are such that they respond often almost immediately to such factors as price changes and market demands. However, just as the land-use is in a state of transition, so is the farmer himself who is attempting this new type of endeavour. In a feedlot situation, a farmer can adjust his operation more readily to adapt to changing conditions than could a farmer involved in a more traditional type of operation such as general farming or dairying.

Along with the advantage of flexibility, there are certain hazards connected to such an operation as the beef feedlot. Saturated market conditions, a drop in market prices, and adverse climatic conditions for crop production are examples of hazardous conditions with which a feedlot operator might be faced. In many cases, however, these are often short-term conditions which can generally be overcome by the flexible nature of the feedlot enterprise.

It would appear, therefore, that specialization in beef production, which has evolved as a new form of land-use, has shown strong appeal to many farmers who were traditionally engaged in a more general system of farming. This appeal has not been limited to the traditional farmers alone, since many relatively newcomers to the field of agriculture have been strongly influenced in this direction as well. Before dealing with the actual conversion process

and the economics of a beef feedlot operation, an examination of some of the general characteristics and processes involved in a beef feedlot would be in order.

General Characteristics of a Beef Feedlot System

In any farming situation, the term 'enterprise' denotes the production of a particular commodity or group of commodities for direct sale.[15] Thus, a beef feedlot enterprise implies the production and sale of beef but does not specify the actual method of production. In a specialized beef feeder operation, cattle are purchased, fed for a period of time, and then normally sold for beef on the finished cattle market. The methods of buying, selling and feeding cattle vary among operators depending on such factors as operator preference, facilities, feeding program, and purchase and sale prices. There are several systems for finishing cattle for market.[16] Three of the more common systems are based on finishing calves, yearlings, and two-year old animals. Each of these systems has its own characteristics which distinguish it from the others. The following chart provides some of the differences which may exist according to the rate of gain, length of feeding period, and feed conversion ratio.[17]

CHART I

Age	Expected Daily Gain (lbs.)	Length of Feeding Period	Feed Per Pound of Gain
Calves (6-8 mos.)	2.2-2.4	180-210	7-9 (lbs)
Yearlings (12-18 mos.)	2.3-2.7	120-150	8-10 (lbs)
Two-year olds	2.5-3.0	90-120	9-11 (lbs)

Source: Canadian Department of Agriculture, Finishing Beef Cattle, 2.

The figures in the chart could vary according to the type of feeding program being employed, as well as the quality and sex of the animals. These particular values were based on a grain, supplement, and roughage feeding program for good quality steers. In the case of a corn-based diet, the expected daily gain might be somewhat higher, whereas the length of the feeding period as well as the feed conversion ratio might be somewhat lower. Individual consideration will now be given to the three finishing systems previously mentioned.

Calves[18]

Finishing calves is normally a good method by which the beginner to the feedlot operation can reduce his risk. Since they are usually purchased between 400 and 500 pounds, calves are more efficient in terms of feed conversion than any other class of animal. Because they are purchased at light weights, more pounds are added in the feedlot than are actually bought.

Calves normally provide cheaper gains and a better feed margin than larger cattle because of their greater feed efficiency. The initial purchase cost of a calf is usually lower than that of heavier animals, even though the price per pound may be higher. Calves can eat large amounts of roughage and make good use of grass. This can prove very advantageous to the operator with pasture-land available, enabling him to buy calves in the spring, pasture them throughout the summer, and put them into the feedlot in the fall.

The main disadvantage in feeding calves would appear to be their slow turnover. It may take from 200-400 days to finish calves for market, depending on the quality of cattle and the desired

market weight. The long feeding period may be a disadvantage because it means the feedlot is tied up for a long period of time and the turnover is reduced.

Ontario depends fairly heavily on western calves to meet feedlot demand. Prices of western calves have been high relative to local units of similar quality, in part due to travel expenses.[19] In periods of excessively high costs and low marginal returns, some operators have tended to switch to an alternative finishing system in place of calves. This was the situation in Waterloo County in 1969 and 1970, according to several members of the study group.

Yearlings[20]

Yearlings are the preferred type of replacement cattle and are generally in constant demand. They are purchased at weights of 500 to 700 pounds and their feed conversion is good, although not normally as high as for calves. Yearlings may take 100 to 150 days in the feedlot, which would allow a turnover of two or three groups per year. In order to recognize a maximum profit, yearlings should be purchased as close to the expected, eventual selling price as possible. This was an important factor for several study group members in the past two years, when the price of replacement cattle remained relatively high.

Two-Year Olds[21]

Two-year olds are best suited to "short keep" situations and are not finished in Canada to the same extent as the previous two classes of animals. They are normally suitable only for finishing on high energy rations. Their overall feed conversion is considerably

lower than that of either calves or yearlings. This makes it necessary to purchase two-year olds at lower than market price if at all possible, from the viewpoint of economy.

The three systems just discussed apply basically to steers. However, in recent years, the number of heifers being finished has increased. This is partly due to the fact that there has been a shortage of steers and secondly, heifers can often be bought at lower prices. In general, heifers will gain slower and make slightly less efficient gains than steers. Chart 2 shows some differences in performance which could be expected between beef steers and heifers.

CHART 2

Animal	Probable Buying and Selling Prices	Expected Market Weight	Expected Rate of Gain	Likely Feed Conversion
Steers	1-3¢ per lb. higher for steers	900-1100 lbs.	2.0 - 2.5 lbs per day	8-10 lbs.
Heifers		800-950 lbs.	1.8 - 2.2 lbs per day	9-11 lbs.

NOTE: (This is a generalized picture assuming both types of animal are of similar quality and handled under similar conditions.)

Although they can often be bought at lower prices they will also normally sell for one to three cents per pound below steers on the finished market. Heifers are generally sold 100-200 pounds lighter than steers because they tend to put on excess fat if kept too long.

Dairy steers are another form of feedlot animal with significant popularity. These are generally of Holstein breeding due to the larger size of the animal. They can be bought at lower prices than

beef animals of the same weight. However, they generally gain well, and their feed conversion has been shown to be good. Their main disadvantage is that they are usually heavier than preferred market weight by the time they are finished out to a good grade. This normally results in a lower selling price but despite this, some feedlot operators prefer dairy steers because of their initial lower purchase price, fairly efficient use of feed, and rapid growth.

Although cows are not usually considered feedlot animals, on occasion, thin cows can be fed up to a better grade and return a reasonable profit. Generally, though, there are very few cows that lend themselves to fattening in the feedlot and are generally a poor risk because of disease, age, or other problems. The number of cows purchased and fattened in the feedlot is, therefore, fairly insignificant to the feedlot industry.

In this chapter, the role and importance of beef production in Ontario agriculture was discussed. The strong demand for beef was noted as being a contributing factor toward the rapid increase in specialized forms of beef production. The transition in land-use, from general mixed farming to the beef feedlot operation was also examined as well as the characteristics of the various finishing systems within the beef feedlot enterprise. The next chapter will deal with various factors associated with the decision, on the part of the study group members, to convert their existing facilities to a beef feedlot operation. Also, a discussion of the actual conversion process which has taken place, will be included.

NOTES

[1]Ontario Department of Agriculture and Food, Marketing of Beef and Pork in Ontario, 1969, Research Report No. 11, 4.

[2]Manitoba Department of Agriculture, Guidelines for Beef Production, (June, 1970), 2.

[3]Manitoba Department of Agriculture, Finishing Beef Cattle, (Winnipeg, Manitoba, 1968), 1.

[4]O.D.A.F., Marketing of Beef and Pork in Ontario, 1969, 5.

[5]Ibid., 6

[6]Ibid., 9

[7]L. Chapman and D. Putnam, Physiography of Southern Ontario, (University of Toronto Press, 1966), 172.

[8]G. Kish, An Introduction to World Geography, (N.J.: Prentice-Hall Inc., 1956), 30.

[9]Ibid.

[10]Chapman and Putnam, 367.

[11]Ibid.

[12]D. Putnam and Putnam, Canada: A Regional Analysis, (J.M. Dent and Sons Ltd., 1970), 206.

[13]Census of Canada, 1966, Agriculture Ontario, V. IV, (June 1968), Table 3.

[14]According to several feedlot operators, the average amount of time and labour in relation to chore time for a dairy operation is approximately twice that of a feedlot operation. The actual hours, in both instances, will vary according to the size of operation.

[15]J.C. Flinn, "Gross Margin Analysis", Agricultural Economics 02-645, (University of Guelph, Department of Agricultural Economics, 1971), 1.

[16]'Finishing' refers to the process whereby feeder cattle are raised and prepared for market as slaughter cattle.

[17]'Feed conversion ratio' is the amount of feed (in pounds), which an animal requires to produce a pound of beef.

[18]Manitoba Department of Agriculture, Guidelines for Beef Production, (Publication 513, June 1970), 4.

[19]Transportation costs from Alberta to Ontario generally add at least three cents per pound to the purchase price, depending on the means of transportation being used.

[20]Manitoba Department of Agriculture, Guidelines For Beef Production, 5.

[21]Ibid.

II. A DISCUSSION OF THE CONVERSION PROCESS IN RELATION TO THE STUDY GROUP

Factors Associated With the Decision to Convert

It has been previously noted that a transition to a new form of land-use is taking place, that being from a general, mixed-farming land-use to a more specialized form, the beef feedlot enterprise. What has not been discussed as yet are the personal and economic factors which were influential in the decision-making processes and the actual conversion itself. In the communication with the beef feedlot study group, the author attempted to determine the basic reasoning behind their change to a feedlot system. The author feels that the operators in the study group are the best source of information available on this subject since they, themselves, are in the midst of this current transition. Since these individuals are directly involved in the land-use transition, they are in a position to look at their past experiences in farming, as well as their present position and the future of their new operations. Equally important is the fact that these men have their own attitudes and expectations concerning their present operations as well as their future endeavours.

The attitudes or views expressed in this section will not be directly related to the size of operation. In some instances, however, the views of the group members will be largely dependent on the size of their existing operation and would, therefore, become an important part of the discussion. The views and attitudes of the operators will be presented in relation to the

study group as a whole wherever possible. The nature of the topics is such, however, that this may not be possible at all times and reference will be made to individual views where necessary.

There are basically three factors contributing to the land-use transition according to the study group operators. The first of these is associated with the economic advantages of a beef feedlot enterprise, the second, with the labour requirements, and the third, with the desirability of a corn economy.

Economic Factors

In terms of economic returns most operators agreed that careful management was a key factor in successful beef operation. The ability to make the right decision at the appropriate time could often make the difference between realizing a profit or loss on their operation. The flexible nature of a beef feedlot also especially appealed to the study group. Favourable comments were made concerning the wide range of options that are available to feedlot operators in such matters as buying, selling, feeding programs, finishing systems and feedlot facilities. A feedlot operation is relatively short-termed in relation to some other enterprises and satisfactory changes can generally be instrumented with a minimum of time and expense.

Since most of the study group members were relatively new to the beef feedlot business, they were able to compare their new venture with the type of farming in which they had been engaged in the past. In most cases, their old operations had been a form of mixed farming or dairying. In this respect, the attitude of the group as a whole was nicely exemplified by the views expressed by the

operator managing the largest beef feedlot in the group. In 1963, this single largest operator was faced with the situation of choosing between dairying, as his father had done, starting into general beef farming, or concentrating his managerial ability on one enterprise rather than a mixed operation. At the time of his decision, milk prices in the dairy industry did not look too promising. On the other hand, the future for beef production appeared relatively strong along with his desire to specialize in beef production rather than generalize in a mixed type of operation. Thus, as was the case with other group members, the beef feedlot enterprise appeared to be favourable, both in terms of aesthetic value as well as economic returns.

Labour Requirements

The overall labour requirements in a beef feedlot operation appeared very favourable to the study group compared to various other enterprises. For those in the study group who had previously been engaged in dairying, the daily labour required for the feedlot was considerably less than that to which they had been accustomed. Most of these operators estimated that approximately twice the amount of chore time was necessary in a dairy operation in order to recognize a similar profit from the operation. In actual figures, this would vary from between four to six hours daily for a dairy operation as compared to two to three hours daily for a beef feedlot enterprise. This is not intended to give the impression that the feedlot enterprise can be handled in a slovenly manner because careful attention to feeding and other chores must be given on a daily

basis. On a yearly basis, the element of labour becomes an important factor since, depending on the type of finishing system being employed by any one operator, the farmer can devote additional time to other farm activities with the possibility of improving the quality of his work. For example, one operator in the group was particularly satisfied with his system whereby his feedlot was full in the fall and relatively empty by the following summer. This allowed him extra time to devote to harvesting his crops of grain in the late summer and corn in the early fall.

Also in terms of labour, some operators had experienced difficulty in combining two enterprises namely dairying and cash cropping and had, therefore, abandonned them in favour of beef production. Thus, the study group felt that the labour requirement was an important factor behind their decision to enter the feedlot enterprise.

A Corn Economy

Several operators indicated that they had started into the feedlot business to make more economical use of home grown crops. At the time of their decision, cash cropping was not as lucrative as the beef industry and they felt that feeding cattle would yield a greater return than marketing their crops. Many of the operators were interested in maintaining a corn economy and were convinced that corn produces higher returns per acre than the cereal grains which they had previously produced for selling purposes.

Among these operators also were those who had been influenced quite strongly by the relative success of beef feedlot operations in other parts of Canada and the United States, such as Lakeside Feeders

Ltd. in Alberta and Montfort's Feedlots in Colorado, to mention only a couple. They had been impressed by the outcome of corn feeding under feedlot conditions and the satisfactory results that could be obtained. To several operators, the idea of crop specialization was also appealing in that they felt it nicely complemented their primary interest--specialized beef production. From the preceding discussion, it appears that the potential beef market, lower labour requirements, and a preference to growing corn for feed are factors which were instrumental in causing the study group operators to move from general farming activities to a feedlot program.

Factors and Problems Associated With the Conversion Process

Closely related to a system which is undergoing a form of transition is the concept of conversion. Although the farmers in the study group are actually in the midst of a state of transition, the actual transition itself is a fairly gradual process. Granted, the operators are moving from a slower-paced traditional life-style to a faster, more competitive position but the approach to the transition itself is fairly cautious on behalf of the farmers involved. In most cases the operators are not willing to totally abandon their existing facilities and equipment, but rather prefer to initiate a process of conversion of their existing facilities to suit their needs in the new way of life. To fully investigate this land-use transition process it is necessary to examine the types of necessary modifications to existing facilities as well as the limitations on the facilities. Again, the author feels that this can best be accomplished by referring to the operators in the study group.

The majority of operators in the group possessed the traditional, two-tier enclosed system of housing when they began the transition. Since then they had at least partially modified this system to suit a beef feedlot operation. In most cases, the modifications consisted of converting the lower level of the barn into an enclosed loafing area with open access to an outside yard. Several operators had also removed parts of the lower walls or at least enlarged the doorways to allow for manure handling by means of a tractor and loader. This style of housing was adequate in terms of providing shelter for the cattle but, in many cases, was less than adequate from the viewpoint of convenience. Although the manure could be removed with a tractor and loader, it was usually a much more difficult task than it would be with an open pole-type loafing barn. The above section illustrates the problems of conversion. Here, labour and time requirements to offset the lack of proper facilities tends to surpass the gains made by shifting from the dairy operation.

The study group was fairly evenly divided between the use of upright silos and bunk or pit silos, concerning the type of basic feeding equipment and storage facilities they preferred. For those who preferred the upright silo, it was usually because they had previously owned such a system and were already familiar with it. As well, they also felt that feeding was greatly facilitated by the use of automatic silo unloaders and that less spoilage and wastage was encountered with this type of equipment. On the other hand, those who were partial to the bunk silo, were so primarily because of its advantageous features which they had discovered since

beginning the feedlot operation. The bunk silos were, in all cases, new additions to their existing facilities and had proven to be more than satisfactory in terms of functionability and convenience. With the bunk silos, the operators were reporting minimal amounts of either spoilage or wastage of silage and were completely satisfied with using the tractor and loader as a means of distributing the feed. The greatly reduced cost of construction compared to the upright silo was also highly favoured by the operators. The operators with the bunk silos also preferred the fence-line bunk feeders as opposed to interior feeding systems.

Even with the modifications and/or addition to existing facilities which have just been described it is necessary to note at this time that, sooner or later, feedlot operators are going to have to make the types of modifications which will commit them more fully to the feedlot business. The author feels that this will be the case for all feedlot operators in a business which is becoming more and more competitive. Within the study group there were some operators who were in the midst of a very gradual conversion of existing facilities but who, at the same time, were very hesitant to commit themselves entirely to a beef feedlot operation. They had modified their old dairy barns only to the point of confined loose housing for the cattle. Within the barn, there were large areas where manure removal was done by hand because of the operators hesitation to remove parts of the bottom wall or enlarge a doorway to allow for tractor entry. Due to their hesitant nature, these operators were in a constant struggle against their facilities in

terms of inconvenience and additional labour. As this example would illustrate, there are often limitations on existing facilities, and after certain modifications have been carried out, the next step will, in most instances, be toward the construction of newer, more modern facilities.

Attitudes of the Study Group Operators Toward Required Facilities

It was especially interesting to note that in several cases, or in fact the majority of cases, the type of facilities which the operators preferred or thought to be ideal, were considerably different than that which they were actually using. In relation to housing requirements, most operators agreed that these should be based on climatic conditions. Results of experiments have shown that any form of adequate shelter increases returns by $1 - $2 per animal.[1] Based on this information alone, the operators generally agreed that a large investment in housing was not warranted by the only slightly increased returns. The operators also agreed that the Ontario climate was too moist to eliminate housing completely. The general opinion of the group was that wind and moisture rather than temperature were the two most critical factors affecting the production of beef feeders. Thus, they concluded that a suitable wind-break such as a board-fence accompanied by a roof to provide basic shelter, were all that were really necessary in terms of housing, to produce beef economically.

Within the five largest operators, two felt that a more confined system of housing was necessary, even to the extent of keeping the cattle indoors during the winter months and installing

an adequate ventilation system. On this subject, the author feels that the value of housing for beef has been overestimated in terms of the effect it has upon the rate of economic return. Recent trends in the feedlot industry are beginning to show less emphasis on extensive, confined housing under the realization that cattle do not need optimum comfort to make relatively efficient gains.[2] It is even felt that a roof over the animals twenty-four hours a day, depriving them of sunlight, is worse than no roof at all. Although most of the operators tended to agree with this view, all but two of the ten operators had some form of confined housing as their existing facilities. Once again, however, in most cases, this was more a matter of making use of the facilities which were present when they began their feeding operation rather than becoming involved with a more modern-style setup.

Related to the problems of converting existing facilities, is the issue of pollution, which could arise if the proper drainage and manure handling facilities were not provided. This problem was not discussed to any extent with the operators. Therefore, the author will merely mention it from the viewpoint of his own experience. Feedlot pollution can occur in the form of either water or air pollution. Both forms are very real hazards with which the operator must cope, since a feedlot is composed of a relatively large number of cattle in a fairly concentrated area. Farmers starting into the feedlot business must be aware of the possible problems associated with pollution and also, the necessary steps which should be taken when planning the feedlot layout.

In this section, the views and attitudes of the operators in the study group have been discussed concerning the factors associated with the decision to make the conversion to a feedlot operation. These factors were shown to be the economic advantages of a feedlot system, the labour requirements, and the desirability of a corn economy.

Most of the operators expressed very modern, up-to-date ideas concerning modification of existing facilities and the ideal type of feedlot setup. The author perceived, however, that within the group, some operators were expressing views which were inconsistent with what they were actually doing in their own situations. This appeared to be most evident among the smaller operations in the group. There was considerable hesitation on the part of the smaller operators to make a total conversion to a beef feedlot system. This hesitation is apparent by the almost unrealistic nature of the changes or modifications which some of the operators have made in terms of efficiency. Due to the dynamic competitive nature of the beef industry, the suggestion was made that the small operators will be forced to operate on a much larger scale than they are currently doing, an act which will require total conversion and commitment to the beef feedlot enterprise.

NOTES

[1] Cattlemen-The Beef Magazine, (Winnipeg, Manitoba, August 1970), 10.

[2] Ibid., 12.

III. ECONOMIC ANALYSIS OF THE STUDY GROUP FEEDLOTS

In the previous chapters, the transition from general farming to the beef feedlot operation was discussed, not only from the viewpoint of land-use change, but also, in terms of the advantages and disadvantages the new system appeared to offer. Consideration was then given to the factors which had been instrumental in the decision-making process when the study group members chose to enter the feedlot business. Associated with this discussion, was an examination of the actual conversion process which had been undertaken by the study group operators and which, in some instances, was still taking place at the time of this study. However, without actually investigating the economic aspects of the system, the reader cannot be certain as to the viability of the operation. By means of an economic analysis, the relative success of the various operations in the study group will now be considered. The analysis will be based primarily on the operators' use of resources in the beef feedlot operation in an attempt to determine the efficiency with which the resources are being handled. The relative scale of the ten feedlots will be examined to see what effect, if any, the size of operation has upon the use of resources.

Other methods of comparison will be used to indicate the relative success of the operations. These will include such items as total capital investment, number of acres owned and operated, corn silage yields, labour, and operator income. Collectively,

these items should provide a relatively sound indication of the success of the study group feedlots. Many of the feedlots in the study group are still currently in the midst of the transition to a feedlot operation. All the group operators are also at different stages in the transition process. Since feedlot operations are going through a transition period, there is very little time series data which can be used as a standard for the purposes of comparison. Therefore, in the context of this study, an economic analysis of the study group feedlots must necessarily be based on cross sectional data of the study farms.

The results of previous studies have shown that farm income is affected by several factors which include such items as climatic conditions, market demands and market prices.[1] The individual farmer has very little control over some of these factors, especially weather conditions and prices, but generally, however, within a specific area, farmers in similar types of operations are receiving much the same prices for their products in any one year. Weather and prices may be responsible for variations in incomes from year to year, but within any one year in one type of operation there are wide variations in labour incomes which cannot be explained by just prices and weather conditions.

Before becoming involved in studying the possible relationships between size of operation and the efficient use of resources, it is necessary to consider the alternative methods available for determining the size of a feedlot operation. It is true that the large size of an operation does not necessarily imply that profit will be

large although, in most business organizations, one can say that if the operation is large, then returns to scale might be expected in terms of profit. It may be said, therefore, that size is a fairly necessary condition of profit.[2] The effect of size on income will be discussed later when net farm income and labour income are discussed.

There are several ways by which the size characteristics of an operation can be measured. One method of denoting the scale of the operation is to determine the number of head of cattle which are marketed each year by an operator. This is a simple method in itself and is easy to calculate. It would be a particularly satisfactory method if all operators bought and sold their steers at the same weight. If operator A buys 100 head at 750 pounds and markets them at 1,050 pounds while operator B buys 100 calves at 450 pounds each and markets them at 1,050 pounds, it can be seen that operator B will have actually produced twice as much beef for market. A meaningful comparison of size can be made if a complete year is considered since, under normal conditions operator A can market two lots of shortkeep animals in the same length of time operator B requires to market one lot of finished calves. However, operator A must market twice as many cattle to produce the same amount of beef. Therefore, depending on the time period being considered, this method can yield a favourable measurement of size.

Another method of determining scale dealing with output is to measure the quantity of beef produced. This is a meaningful value since the feedlot operator has control over the amount of beef he produces according to the capacity of his facilities. This value is

simply the pounds of beef produced in the feedlot, and is given by the following formula.

Selling Weight	-	Purchase Weight	+	Inventory Change	=	Quantity of Beef Produced

Another method similar to the above using the value of beef produced is arrived at by calculating the difference between gross sales and gross purchases, taking into consideration any change in cattle inventory. This can be expressed as follows.

Gross Sales	-	Gross Purchases	±	Inventory Change	=	Value of Beef Produced

For the purposes of this study, the author has selected the quantity of beef produced as an indication of size of operator. The number of head of cattle marketed was not selected since, to be meaningful, it requires that all operators must be using the same system for finishing their cattle for market. This was not the case with the group of operators in the study since several finishing systems were being employed. The value of beef produced was also eliminated as a measure of size, as this method relies quite heavily on the system of finishing and assumes equal price among operators for both buying and selling. This was not the situation in the case of the study group operators. The method selected is based on the quantity of beef produced and is a purely physical value denoting the amount of beef produced by each operator in the designated time period. The results of this method are shown in Table 3, in order of size, from smallest to largest.

TABLE 3: QUANTITY OF BEEF PRODUCED BY STUDY GROUP OPERATORS

Operator	1969 (cwt.)	1970 (cwt.)	Average for 1969-1970 (cwt.)
1	750	800	775
2	420	1,280	850
3	711	1,074	893
4	870	1,014	942
5	1,106	1,111	1,109
6	1,270	1,024	1,147
7	1,868	1,536	1,702
8	3,750	1,410	2,580
9	1,170	5,750	3,460
10	8,040	11,780	9,910
Average	1,996	2,678	2,337

By using the average of the two year period, 1969-1970, it can readily be seen that a wide variation in operation scale exists within the study group. Since the operators are dealt with individually, this is quite favourable for the purpose of comparing size of operation with resource use.

From Table 3, it can be noted that operator ten is almost three times larger than operator nine in terms of quantity of beef produced. The first six operators are quite similar in terms of size. Among the first six operators, it is significant to note that operator one fed yearling heifers, from 600 pounds to 850 pounds, producing only 250 pounds of beef per animal. This accounts for him being lowest on the producer scale. The number two operator was low in production also, because he started his feedlot operation in 1968. and produced at a relatively low level throughout 1969, his first full year of production. These two operators tend to lower somewhat the overall quantity of beef produced. It is not the average production

SIZE OF OPERATION AS INDICATED BY QUANTITY OF BEEF PRODUCED (AVERAGE FOR 1969-70)

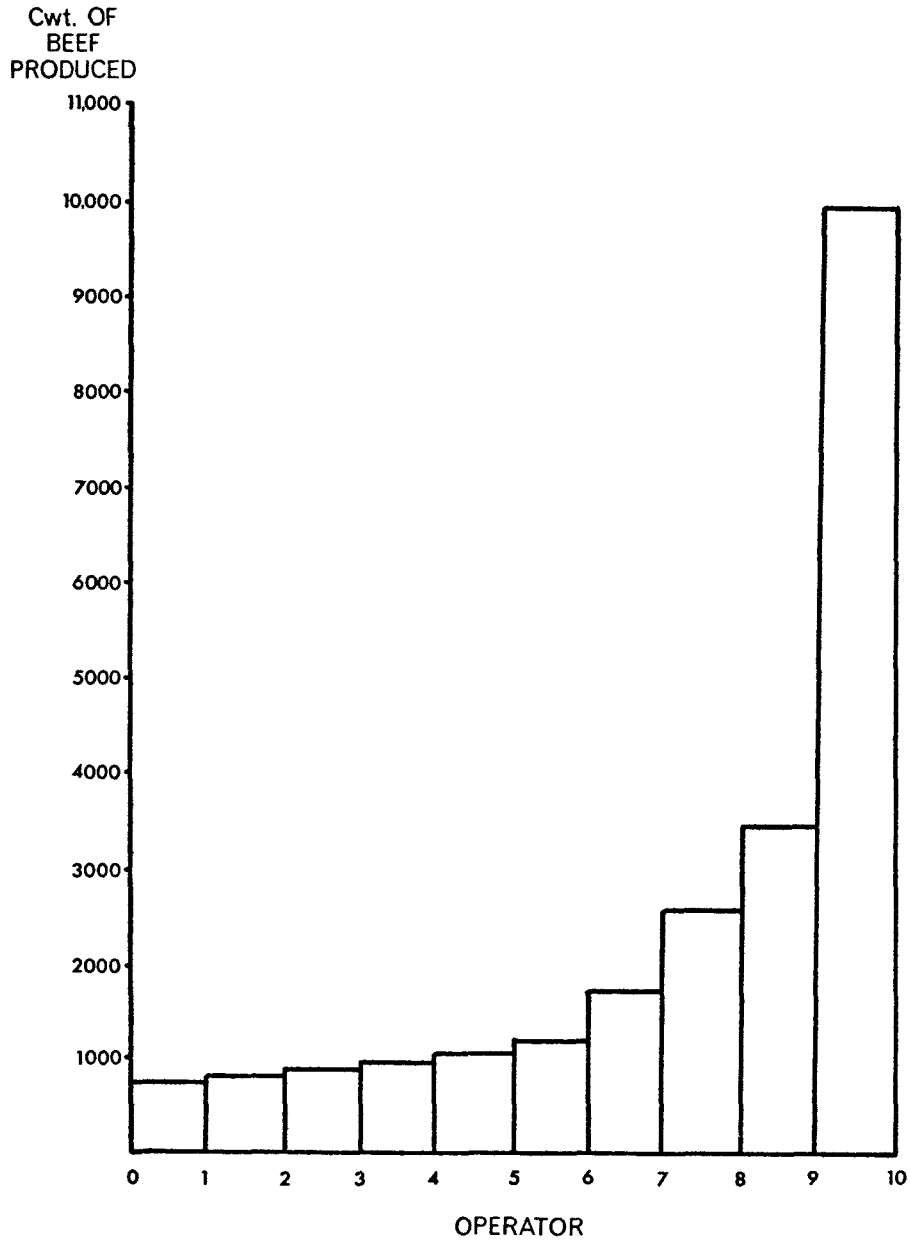

Figure. 4

which is of concern here, however, but rather each individual operator. Later in this discussion, use of each of the resources will be considered in relation to size to discover what, if any, effect size of operation has on how resources are used.

For discussion and comparison purposes, five categories of resources have been defined. These are all physical resources and when taken together, comprise the total farm capital. The use of each of these resources will be discussed in turn and the results for the ten study operators will be shown in table form.

Livestock

In a feedlot operation, the basic resource unit is the cattle which go into the feedlot. There is considerable variation in the quality of feedlot animals and to a large degree, performance or feed efficiency is dependent upon quality. The following table looks at the size of operation, capital allotment to livestock, and capital attributed to livestock as a percentage of total farm capital investment. The investment in livestock figures show an increase

TABLE 4: INVESTMENT IN LIVESTOCK IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced 1969-1970	Average Investment in Livestock 1969-1970	Percent of Total Capital Investment
	cwt.	$	%
1	775	28,088	24.19
2	850	32,713	19.45
3	893	35,003	28.56
4	942	36,032	27.55
5	1,109	51,103	32.05
6	1,147	36,098	24.34
7	1,702	61,364	25.87
8	2,580	109,755	37.46
9	3,460	65,197	31.36
10	9,910	313,177	44.55
		Average	29.54

corresponding roughly to the quantity of beef produced. There are two exceptions which are quite obvious to the observer. Operators five to eight appear to be out of place according to the figures given. Because of the careful manner by which the data was collected from these particular operators, the information itself is assumed to be correct and valid to the best of the author's knowledge. The remainder of their data was in keeping with the other group members. Both operators, however, bought all their cattle at one time and their average investment was therefore unusually high. Other group members bought and sold with replacement throughout the year so that their average investment at any one time was considerably less than their total livestock investment according to gross purchases.

It is difficult to determine a pattern or trend for the percentage distribution of livestock capital investment; however, it would be expected that investment in livestock would comprise a rather large percentage of the total capital investment due to the nature of the farming enterprise. In some cases, however, the actual investment was quite low as a percentage of total capital investment. There were four operators with an investment of greater than thirty per cent of the total capital investment. Three of the four are the largest operators in the group according to the quantity of beef produced. The largest operator in terms of production, operator ten, was also the largest in terms of average investment in livestock and the percentage of total capital investment by a considerable margin.

Livestock is considered to be a variable resource and the investment in livestock will vary according to the size of operation which the individual farmer wishes to achieve. The larger the percentage of total capital which is invested in livestock, the better

are an operator's chances of success, since he is then in a position to achieve a greater output for a lesser input of the other resources. In the study group, the smaller operations tend to have a smaller percentage of their capital invested in livestock, than do the larger operators. This would indicate that the smaller operations have a greater percentage of capital invested in the remaining four cost resources, which is undesirable from the viewpoint of efficiency in resource use.

Land

The next resource to be examined is land. The investment in land will, to a large degree, depend on the characteristic quality of the land. It was difficult to designate a value for land since market value can be affected by many factors. Depending on the area under consideration, the land might be valuable in terms of speculation, particularly if the farm is close to an urban area and is located suitably in connection with good roads, streams and topography. To put all ten operators on a common denominator, it was decided that the assessed value of land would be most suitable for this study.[3] Since several operators rented additional land, the actual amount paid as rent for this acreage was included in the total land value. The value of the rented land was obtained on a per acre basis from each operator. The investment in land, as well as the percentage that land comprises of the total capital investment, is shown for each operator according to size in Table 5. There is a great fluctuation in investment in land according to the figures in Table 5. There does not appear to be any obvious trend in the data; however, as might

TABLE 5: INVESTMENT IN LAND IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Investment in Land	Percent of Total Capital Investment
	cwt.	$	%
1	775	46,875	40.36
2	850	43,063	26.94
3	893	44,025	36.01
4	942	35,600	27.23
5	1,109	30,225	19.02
6	1,147	51,975	35.05
7	1,702	78,250	33.00
8	2,580	47,100	16.12
9	3,460	50,250	24.22
10	9,910	112,500	16.03
		Average	27.40

be expected, some of the smaller operators have a relatively large percentage of their capital tied up in land, while the three largest operators show a relatively small percentage investment in land. Comparison is made rather difficult by the variations in land quality which result in differences in assessed value from farm to farm. If all land in the county was of equal quality and therefore equal value, a comparison would be quite simple; however, in Waterloo County, the assessed value varied as much as $200 per acre with the extreme low being $225 per acre and the extreme high being $425 per acre.

Another factor with considerable influence is the amount of land rented by each operator. Some operators owned all the land they used while others owned as little as twenty-five per cent and rented the remainder. Thus, a better indication of land as a resource would be given by the number of acres owned, cropped, and rented by each operator. This aspect will be covered later in the discussion.

Land, as a resource, is a necessary expense to the operator of a feedlot. The investment in land should, therefore, be as small as possible, from the viewpoint of economics. More important, the investment in land as a percentage of the total capital investment should be kept small. In the study group, the three largest operators are well below the average percentage investment of 27.40%, while several smaller operations are considerably above the group average. This would indicate, therefore, that the smaller operations are less efficient, relative to the larger operations, in the use of the land resource.

Buildings

The next resource to be examined in terms of capital investment is the investment in buildings. It would be expected that considerable difference in the type and value of feedlot housing would exist among the various operators. The data indicating the value of housing and feeding equipment for the study group members is shown in Table 6. The value of housing includes the value of silos as well as

TABLE 6: INVESTMENT IN FEEDLOT BUILDINGS IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Investment in Buildings	Percent of Total Capital Investment
	cwt.	$	%
1	775	13,405	11.55
2	850	29,985	18.83
3	893	18,610	15.21
4	942	19,060	14.58
5	1,109	26,515	16.68
6	1,147	23,860	16.09
7	1,702	41,575	17.53
8	2,580	38,638	13.25
9	3,460	31,155	15.03
10	9,910	111,050	15.85
		Average	15.46

buildings. Only operator ten had completely modern housing. All other operators had modified old-style barns which had very little actual monetary value due to depreciation but which fulfilled the purpose for which they were being used. In some cases, most of the value of buildings was due to the value of the silos and feeding equipment that were in use. The value of the actual buildings was indicated by each operator, in most cases, from the value given for income-tax purposes.

Of the ten operators, only numbers five, eight, and ten had buildings which were specifically designed for a feedlot operation. These structures were more recent than the others resulting in a higher present value. Numbers two, seven and eight had modified old-style barns but in each case had a recent addition in the form of an open-style pole shed attached to the original structure. The housing for the remaining four operators consisted only of the older-style, two storey structures which had been suited to a feedlot operation. In these cases, the value was considerably less than the other six operators.

For the reasons previously discussed, it is difficult to derive any significant patterns of investment in buildings among the group operators. The four largest operators each have a higher investment in buildings than the first six operators with the exception of operator number two. This is to be expected since the larger operators require housing facilities for a larger number of cattle. Depending on the increased size, very often the operator is forced to expand beyond his existing facilities and either rebuild or erect

an addition to his present housing.

The investment in feedlot buildings, like the investment in land, should be as small as possible, from the viewpoint of economics. The smaller operations in the study group do not vary greatly from the group average of 15.46% for investment in feedlot building as a percentage of total capital investment. Operators eight and ten had invested in modern feedlot facilities whereas the majority of the remaining operators had traditional, enclosed structures. In terms of investment, therefore, the smaller operations are relatively efficient with respect to buildings but, are not so efficient in terms of the convenience and suitability of these structures to a feedlot situation which was discussed earlier in the paper.

Machinery

The fourth resource to be examined, in terms of investment, is machinery. Large variations can exist from farm to farm depending on whether the operator owns a complete line of machinery or just certain implements. Custom hiring will reduce the amount of investment an operator has in machinery and must be accounted for in his farm records, under expenses. Table 7 contains the results of the group operators. The value of the machinery was obtained from each operator at its present value. Machinery is considered to have a fairly high depreciation rate, approximately fifteen per cent per year on new machinery. Therefore, the best indication of machinery value would appear to be its present value, taking into consideration depreciation on used machinery and the purchase price of new machinery.

TABLE 7: INVESTMENT IN MACHINERY IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Investment in Machinery	Percent of Total Capital Investment
	cwt.	$	%
1	775	10,363	8.93
2	850	38,915	24.55
3	893	14,947	12.23
4	942	22,092	16.90
5	1,109	36,150	22.77
6	1,147	23,157	15.61
7	1,702	27,986	11.80
8	2,580	24,705	8.47
9	3,460	20,800	10.04
10	9,910	77,319	11.04
		Average	14.23

Many of the group operators had purchased new machinery since 1969 and therefore had a fairly high value. Also included in the value of machinery was the repair and maintenance costs of each operator as well as the cost of new parts for repair purposes.

From Table 7, the investment in machinery does not appear to increase with increased size of operation. Operator one owned the machinery in partnership with his brother which accounts for the relatively low investment figure. Operator two, with the second high dollar investment in machinery had made several purchases of new machinery since starting into the feedlot enterprise in 1968. The remainder of the group had a full line of equipment comprised of both used and relatively new machinery. On a percentage basis, the four largest operators had the smallest percentage values, with the exception of operator one, and were all well below the group average in this respect.

In the study group, the investment in machinery appears to constitute a lesser percentage of the total capital investment as the operations increased in size. This is more apparent for the larger operations than the smaller operations, since, in the latter instance, a considerable fluctuation in machinery investment is seen to exist. The smaller operations in the study group are generally less efficient in terms of machinery investment since machinery is considered to be a fixed resource which does not depend on the scale of an operation. As long as crops are being produced, an investment in machinery is necessary, and generally, the investment would not be much greater for one hundred acres of crops as opposed to fifty acres. For this reason, the larger operators are able to recognize a greater efficiency in terms of machinery and equipment.

Feed and Supplies

The last resource to be considered in terms of capital investment is the feed and supplies used in a feedlot operation. Included under feed are both home-grown and purchased feed, as well as additional purchased diet supplements such as beef concentrate, salt, and mineral. The value of the feed was derived by determining the market value of all purchased feeds and then applying the same value to home-grown crops.[4] Naturally, not all operators are going to incur exactly the same costs of production in connection with crops. Some operators can plant their crops considerably cheaper than others. The exact costs, however, involved in planting a crop are rather difficult for many operators to determine accurately. Moreover, the dollar value of home-grown feed varies greatly among

individuals. Thus, by using market value for all feeds, both purchased and home-grown, all the operators are put on the same standard, the difference in value being a result of the quantity of feed used by each operator. Table 8 shows the investment in feed and supplies for the ten operators. The dollar investment in feed was fairly

TABLE 8: INVESTMENT IN FEED AND SUPPLIES IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Investment in Feed and Supplies	Percent of Total Capital Investment
	cwt	$	%
1	775	17,442	15.02
2	850	16,201	9.82
3	893	9,788	8.00
4	942	17,964	13.74
5	1,109	15,093	9.50
6	1,147	13,188	8.90
7	1,702	28,043	11.81
8	2,508	72,095	24.74
9	3,460	40,650	19.60
10	9,910	88,215	12.53
		Average	13.37

uniform for the study group as a whole, particularly in the cases of the first six operators. The investment increased for operators seven through ten, at a rate seemingly consistent with the size of operation. Apparent anomalies in the group are operators three and eight. Operator three was lowest in the group and it is felt that this could be in part due to an underestimation of feedlot consumption. An overestimation of feed used is also very likely in the case of the eighth operator, in order to obtain such a high value. This operator did not have accurate data concerning the quantity of corn silage harvested in terms of wagon loads transported and due to the

"above-ground storage method" being used on his farm, he could not arrive at a value with any significant degree of accuracy.

There does not appear to be any visible trend associated with the feed investment as a percentage of total capital investment. In this area, operators 2, 3, 4, 5, 7 and 10 were below the group average of 13.37% while the remaining four operators, 1, 4, 8 and 9 were above the average.

Feed, like livestock, is a variable resource which will vary according to the scale of operation. which the operator wishes to achieve. It would be expected, therefore, that the investment in feed should increase with size of operation. In the study group, this is true in some instances, but not in others. For example, operators one and four are above the group average, while several larger operations are below the group average. The larger operations appear, therefore, to be making more efficient use of the resource of feed, as compared to the smaller operations in the study group. The resources of livestock, land, buildings, machinery, and feed will now be discussed in greater detail.

Discussion and Summary of Resources in Terms of Capital Investment

Size of operation is a topic of considerable discussion and controversy among feedlot operators in Ontario. The pros and cons of large and small operations are constantly under review. The importance of size is not only considerable for future feedlot owners, but also for those operators currently engaged in feedlot operations. It is generally believed that the smaller farm operation can compete successfully with the larger unit. Under good management, smaller

farm operators should be able to get the same rate of gain and feed efficiency as the larger operation.[5] In many cases, the smaller farm feedlot has the advantage of using labour that has no alternative value during the winter months. Also, by using existing facilities, or making slight modifications, smaller feedlots can have lower overhead per year.

Another advantage of the smaller farm feedlot is the ability to use home-grown grain, thus providing a good market for grain produced on the farm. Larger feedlots, on the other hand, can usually market beef more efficiently, since normally, they would buy and sell several times during the year to offset the risk of price changes. Feed can also be processed more economically due to the large quantities involved. Larger operators are often faced with a large investment in terms of buildings since their existing buildings are not adequate. However, once established, fixed overhead costs will be spread over a greater number of livestock units.

Labour can often be substituted for machinery in the case of large operators. This can also apply to feeding equipment. Once a full line of equipment is established, the limiting factors on crop production then become time and labour and if a large farm operator has available labour, additional acreage can be worked, without any significant addition of machinery or equipment. Overall, the larger lots appear to have the advantage of critical limits, for once a certain level of production is reached, economies of scale can be realized.

From the viewpoint of production, the study group showed a

wide variation in size. In terms of classifying the farms according to family farm[6] as opposed to larger commercial operations[7], the first nine operators would fit the family farm category while operator ten would come under the latter classification. Operator ten made use of two fulltime employees as well as his own labour, making his feedlot a three-man salaried operation, while all other operations were basically family-labour oriented. A further discussion of labour will come later in the paper. A second look at the five resources will now be taken in order to bring to light certain points. This will, in fact, serve as a preliminary summary to the foregoing discussion.

The study group livestock investment averaged 29.5% of the total capital investment. This corresponded exactly to the value of 30% given in the 1970 Ontario Preliminary Summary for ten specialized beef feeders in Ontario.[8] The author expected the values to be similar but the fact that there was such a strong similarity is probably coincidental. The important aspect is that, as a group, the Waterloo County operators' livestock investment compared favourably with the Ontario livestock investment average.

Within the group itself, there were two apparent anomalies. These exceptions which included operators five and eight, were noted in the earlier discussion. In terms of livestock investment as a percentage of the total investment, with the exception of operator five, the three largest operations only are above the group average. Operator ten is particularly high indicating that livestock investment is very significant in terms of total capital investment. On the other hand, the larger operations are able to invest a lower

percentage of capital in the other resources. It would appear then that, in the study group, as the size of operation increases, so does the investment in livestock. This is to be expected since, as previously mentioned, livestock is considered to be a variable resource. From an examination of livestock investment alone, the relative success of the smaller operations cannot be determined. Within the group, the investment in livestock has increased with increased production; however, the fact that the smaller operations have invested a lesser percentage of their total capital in livestock does not necessarily infer that they are inefficient in this respect, but rather that they are over-invested in the other resources. There does not appear to be, therefore, a definite relationship between the investment in livestock, the size of an operation, and the success of an operation. There is, however, a relationship between the size of operation and the investment in livestock since, livestock is a variable resource, and varies according to the scale of operation which the individual operator wishes to achieve.

There are certain problems concerned with comparing the dollar values for investment in land. Since these were discussed earlier, it will not be necessary to restate the problems. Several operators rented additional land, in some cases rather large amounts, thereby making it necessary to include the value of the rented land and in the total land investment figure. The results of this addition are therefore somewhat deceiving. Operator eight's investment in land, for example, is roughly forty per cent that of operator ten, based strictly on the figures given in Table 3. However, without additional

information, the reader does not know that both operators are working approximately the same acreage. The large difference in value is due to the fact that operator eight owns one hundred and ten acres and rents the remaining three hundred and ninety acres while operator ten owns the entire five hundred acres. Thus, from Table 5 alone, it is difficult to suggest any significant trends. The investment in land appears to be somewhat larger in the cases of the larger operations. As a group, the investment in land by the Waterloo County operators compared very favourably with the results of the study for all of Ontario; 27.4% for the Waterloo County study group, compared to 27% for the Ontario study group. There is no apparent trend, however, toward a gradual increase in land investment as was the case with the investment in livestock. Expressing investment in land as a percentage of total capital investment, does not yield any noticeable pattern among the ten operators except, that some of the smaller operators had a relatively high percentage of capital invested in land while the three largest operators of the group were relatively low and well below the average of 27.4%. From Table 5, it may be noted that there is a trend toward a lesser percentage of capital investment in land with increased size of operation. This trend is, however, fairly weak and there are several exceptions within the study group itself. Later in the paper, a discussion of crop acres and yields will be given for the study group. This will hopefully provide a better method of comparison for land as a resource than the actual dollar investment in land.

Some of the smaller operators are, however, quite heavily

invested in land as compared to the larger operations. Certain of the larger operators rented additional acreage which, in most instances, was more economical than buying extra land. Land is considered to be a fixed resource and once the initial purchase is made, increased production can very often occur without any significant additional investment in land. The smaller operations in the group do not appear to have reached that critical level of production and as a result are not using their land resource as efficiently as possible. There appears to be a relationship between the investment in land, the size of an operation, and the success of an operation.

The group average for building investment as a percentage of the total capital was approximately 15.5%, which was lower than the average for Ontario of 22%. The difference, although not great, can be explained by the fact that in the Waterloo County study group, most operators had modified existing facilities to fulfill their needs. This resulted in a relatively low investment in feedlot buildings as compared to the Ontario study group which had a greater number of more modern, higher priced facilities. In terms of actual dollar savings on building investment, the group average was $34,163 at fifteen per cent of total capital investment as compared to $50,106 at twenty-two per cent of the total capital investment. The savings are fairly large, therefore, being approximately $16,000.

An interesting feature concerning buildings is that to a large extent the expenditure an operator has in housing and feeding facilities is largely dependent on his personal preference and desires. There was much variation in opinion among the ten operators

as to the amount and type of housing and shelter as well as feeding equipment that is most beneficial to a successful operation. This discussion will be dealt with later in greater detail, however, at present, it is sufficient to note that within the study group there are several variations in housing and facilities all of which affect the investment in buildings as seen in Table 6.

As far as actual dollar investment in buildings is concerned, each of the four largest operators had a larger investment than the first six operators. There was a gradual increase in investment among the first seven operators with the exception of operators two and six. Operator two was considerably larger but this can be explained by the fact that he had installed considerable new housing and feeding equipment in 1968 when starting into the feedlot business. If operator two had been producing beef to the capacity of his facilities in 1969, he would have ranked higher in the group in terms of production of beef and the investment, in terms of buildings, would not have appeared as being out of place, as it presently does.

The building investment, as a percentage of total capital, is fairly uniform throughout the entire study group. It would appear, therefore, that the investment in buildings was in keeping with the size of operation of the group members, with the noted exceptions. The range of the percentage figures was very small, (11.55% - 18.83%), with most operators falling close to the group average of 15.46%. The fact that all the operators were considerably less than the average for Ontario feedlot operators, (22%), would suggest that either the study group operators were hesitant in terms of building expenditures

or all the operators undervalued their buildings and feedlot facilities. The author estimates that the former situation is actually the case. Although the smaller operations in the study group do not appear, in most instances, to be over invested in buildings and facilities, it must be kept in mind that many of these smaller operators were using facilities which were relatively inadequate in terms of convenience. It can be concluded, therefore, that although their investment in buildings is reasonable, the smaller operations are making less than efficient use of their facilities from the viewpoint of labour, capacity, and convenience. There appears to be a relationship between the investment in buildings, the size of an operation, and the success of an operation.

As a percentage of total investment, the group average of 14.23% for machinery investment compared favourably with the Ontario average of twelve per cent. Operator ten was again the largest in this category but it is felt that his investment was in keeping with the size of his operation and the fact that there were three full-time men to operate the machinery. With the exception of operator two and five, who both had relatively recent purchases of new machinery, the remaining operators were fairly uniform in their investment in machinery. The largest operators, seven through ten, were not as heavily invested in machinery as might be expected, based on their size of operation.

Machinery investment, like building investment, is considered a fixed cost, after the initial investment is made. Once a full line of machinery and equipment is accumulated, the limiting factor

on how much use is made of the machinery becomes something else, usually available labour or climatic factors. The smaller operators are, therefore, forced to invest in a full line of machinery the same as the larger operators, even though they are generally concerned with a much smaller acreage. The four larger operators were somewhat more heavily invested in corn machinery than the smaller operators. This increased investment was however, offset by the lack of investment in cereal crop equipment, since none of the four largest operators grew any type of feed grain other than corn. Several (4) of the first six operators grew some form of cereal grain as a secondary crop which added to their machinery investment. Thus, in the study group, investment in machinery does not show a significant increase with size of operation. As a percentage of total capital, the four larger operators are well below the group average of 14.23% indicating that as a percentage, machinery investment decreases with increased size of operation. In the case of the smaller operations, the investment in machinery indicated that the resource was not being used as efficiently as possible, nor was it contributing to the relative success of the small operations. There does appear to be a relation between machinery investment, the size of operation, and relative success of the operation.

Taken as a percentage of total capital, the investment in feed and supplies for the study group of 13.37% was somewhat higher than the results of the Ontario study at 8%. There were four operators in the group which corresponded closely to the Ontario average. The higher group percentage might have been a result of an overestimation

of feed used or on hand by certain operators. For example, operators eight and nine were considerably higher than the average. The omission of the above cited operators would yield a group average of 11.16% which is more in keeping with the Ontario average. Considerable variation can exist, however, in the amounts and type of feedlot rations. In the case of several smaller operators, grain was used as a secondary feed, particularly in the latter stages of the finishing process. In such cases, the expenditure on corn and beef supplement was considerably lower than it was for certain of the larger operators who grew no grain or fed very little in the form of purchased grains. The efficiency of the used feed is questionable in certain instances, particularly in the case of operators eight and nine. To determine the accuracy of feed efficiency it would be necessary to look closely at rate of gain and feed conversion for each operator which would be beyond the intended scope of this study.

However, in this respect, it can be noted that the two operators in question as well as operator one were involved mainly with shortkeep cattle which have a lower feed conversion rate than either calves or yearlings, thus accounting at least partially for the relatively high investment in feed.

A visible trend or pattern in the amount of feed used does not readily appear largely a result of the variation in feeding programs and finishing systems which existed in the study group. There does not appear to be a direct relationship between the investment in feed, the size of the operation, or the relative success of the operation. There is, however, some relationship between size

and investment in feed since, like livestock, feed is a variable resource and will vary according to the size of the feedlot the individual is operating. The next section will examine other aspects of a beef feedlot enterprise which need to be considered in an economic study which is attempting to determine the relative success of an operation.

Additional Factors for Analysis

There are several other factors which need to be considered in an evaluation and discussion of beef feedlots in terms of success and efficiency. In keeping with the foregoing discussion, a look at total capital investment for the study group would be useful. The total capital investment will be the sum of the five resources previously discussed and will indicate any existing relationship between the capital invested and the size of operation within the study group.

TABLE 9: TOTAL CAPITAL INVESTMENT IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Total Capital Investment	Capital Investment Per cwt. Produced (Average of 1969-70)
	cwt	$	$
1	775	116,122	149.83
2	850	161,626	190.15
3	893	122,372	137.03
4	942	130,747	138.80
5	1,109	159,085	143.45
6	1,147	148,277	129.27
7	1,702	237,218	139.38
8	2,580	292,292	113.29
9	3,460	207,552	59.98
10	9,910	702,261	70.86
		Average	127.20

Re: Capital Investment per Cwt. of Beef Produced

Operators one and two were highest in the investment per cwt. of beef produced, although operator two was considerably higher in the three fixed resources of land, buildings and machinery, as well. As was previously explained, this was due to his low production in his first year of operation, 1969. Operator seven incurred higher costs per cwt. mainly as a result of his high investment in land. Operator nine, the lowest in this respect, perhaps warrants a word of explanation. In 1969, this operator was involved in several different finishing systems and types of cattle with the result that his production of beef was only an estimate. It is felt that the estimate was somewhat higher than reality which gave him a rather low cost of production figure. Keeping in mind the above mentioned instances, the author feels that the cost of production figures are fairly constant for operators one through seven. There is an apparent decrease in cost in the case of operators eight, nine and ten. A division would seem to exist in the group between operators seven and eight which produced 1702 cwt. and 2580 cwt. of beef respectively. With the number of operators in the group being relatively small, it is difficult to state more precisely at what point the costs of production begin to diminish. It does appear, however, based on the given data, that production costs do decrease after a certain level of production has been obtained. It would appear that there is a relationship between total capital investment, the size of an operation and the success of an operation. The costs of production are definitely lower for the three largest operators in the group.

In terms of physical resources, one of the most important to a feedlot operation is land. Even within an area the size of Waterloo County, there are great variations in land quality and productivity. The amount of land used in crop production showed a considerable difference among study group operators as did the number of acres owned by each operator.

TABLE 10: ACRES OWNED AND CROPPED IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced (cwt)	Number of Acres Owned	Total Crop Acres
1	775	125	95
2	850	100	110
3	893	143	135
4	942	97	142
5	1,109	93	65
6	1,147	169	149
7	1,702	313	150
8	2,580	110	490
9	3,460	126	200
10	9,910	500	525

In terms of the number of acres owned by each operator, the results show considerable variation. The most noticeable feature of the results is that operator ten, owns the largest acreage. However, this in itself does not suggest anything concerning the amount of land which an operator owns in relation to the size of his operation. In the case of operator ten, although he owned five hundred acres, much of this was poorer quality land with the result that he was still forced to rent an additional two hundred and twenty acres in order to grow five hundred and twenty-five acres of crops. Operators 2, 4, 8 and 9 also rented additional acreage.

Some of the farms of the study group are actually quite small for an operation which relies on the production of crops. Farms two four and five are one hundred acres or less. However, operator five did not rent additional land even though only sixty-five acres of the ninety-three owned was suitable for crops. The availability of rentable land was a limiting factor to this operator as it was to others as well, with the result that a larger proportion of their feed was purchased.

In terms of crop acres, operators three through seven are fairly constant with the exception of operator five who bought much of his feed. Operator eight appears to be an anomaly in this case. The results derived from operator eight in terms of crop acres, and value of crops and feed are felt by the author to be somewhat higher than would be expected for his level of production. There are two alternatives which could account for the apparent discrepancy. The record of corn acres could be incorrect and yields could be overstated. It is most likely that the record of acreage planted is fairly accurate, since most of the land is being rented, although, it is possible that the yields of corn on a per acre basis were over-estimated by the operator and he did not have as large an investment in feed and supplies as he indicated. Secondly, it is also possible that the operator has made relatively inefficient use of the corn silage derived from the four hundred and ninety acres, in terms of both storage and feeding. Upon inspection of operator eight's facilities, the author was able to ascertain that storage facilities were con-dusive to much spoiled and wasted silage, but without delving deeper

into his rate of gain and feed conversion data, a decision concerning the relative efficiency of his feeding program cannot be reached.

For the study group, as a whole, the amount of land owned did not reveal any trend in relation to size and was largely dependent on the size of the original farm when the feedlot was begun. In terms of crop acres, however, it would appear that the acreage increased with increased size of operation with the exception of operator five and eight.

Corn Silage Yields

Corn formed the basis of the feeding program for all operators of the study group. Keeping in mind what was said earlier concerning the variation in land quality in the study group, it could be expected that corn yields would also vary according to the quality of the land.

TABLE 11: CORN ACREAGE AND YIELD IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Acreage of Corn	Yield of Corn in Tons per Acre
	cwt		
1	775	50	17.5
2	850	75	18.0
3	893	35	15.0
4	942	91	15.0
5	1,109	43	14.0
6	1,147	45	15.2
7	1,702	125	18.0
8	2,580	490	14.5
9	3,460	200	18.0
10	9,910	430	13.8
		Average	15.9

In terms of acreage of corn, the four largest operators planted considerably more corn than the remaining operators (See Table 11).

The first six operators all produced less than one hundred acres of corn, in most cases, considerably less. The yields of corn do not appear to show any direct relationship to either the acreage or size of the operation. The largest operator, ten, reported the lowest yield of the group and was well below the group average of 15.9 tons per acre. This low yield was previously discussed in connection with the quality of land where it was pointed out that operator ten rented two hundred and twenty acres of land despite the relatively large acreage he already owned.

The accuracy of the data reported concerning corn yields was dependent on each operator's ability to evaluate his own yields, either according to the total amount stored or else on the basis of each load harvested. The average corn yield for Waterloo County for 1970 was not available at the time when this report was compiled. However, for 1969 the average yield for Waterloo County was 13.8 tons per acre[9]. The average of the study group was found to be 14.9 tons per acre. Although somewhat higher, this figure is felt to be in keeping with the Waterloo County average since many of the operators were specialized in the production of corn. The 1970 average for this group was 16.9 tons per acre. The author assumes that this yield is reasonable since it was generally agreed among the operators that 1970 yields were particularly good and above that of the previous year. Based on the given data of Table 9, the author does not perceive any direct relationship between corn yield and size of operation. There does not appear to be a relationship between the size of operation and corn yields. Rather than size, good corn yields are dependent on such factors as land quality, climatic

conditions, and the technical knowledge of the operator.

Labour

A resource which, as of yet, has not received any direct attention is labour. A useful measure of labour is given by "productive man work units".[10] It is determined by dividing the total yearly hours of feedlot labour by ten. Productive man work units or P.M.W.U., is the number of ten hour days that would be required to do the work on the farm, under average conditions.[11] It is not the number of days that men were actually working on the farm as a man may be more efficient or less efficient than others. It is, however, an indication of the amount of work to be done which makes it a good measure for comparing farms according to the size. The number of P.M.W.U. for the study group is shown in Table 12. The results for the study group show a

TABLE 12: NUMBER OF P.M.W.U. IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced (cwt.)	P.M.W.U. (Average of 1969-1970)
1	775	302
2	850	310
3	893	351
4	942	313
5	1,109	322
6	1,147	350
7	1,702	367
8	2,580	392
9	3,460	399
10	9,910	717
		Average 382

definite trend. With the exception of operator 3, the number of productive man work units shows a steady increase with increase in

size of operation. In the case of operator three, chore time and manure handling was relatively high compared to similar size operations. This was, for the most part, due to the inconvenient manner in which his old-style barns and facilities were laid out and situated. Certain of the other smaller operators experienced similar inconveniences but it did not show up in the individual labour inputs. The increase in P.M.W.U.'s was not great between the first nine operators but did increase considerably with operator ten. However, operator ten required considerably less than two times the P.M.W.U. than did operator nine, while the quantity of beef produced by operator ten was approximately three times that of operator nine. There would appear to be a definite relationship between the size of operation, labour, and efficiency. In terms of labour, the smaller operators are much less efficient in beef production than those operators which are producing the largest amounts of beef.

Income

The factors involved in the foregoing discussion do not take on their full meaning until they are related to feedlot returns. Like any other businessman, a feedlot operator is basically interested in showing a profit. Each operator will normally attempt to combine his resources in such a manner that his returns will be maximized. There are many combinations of resources which can be effectively used in a feedlot operation but some are more efficient than others. In the study group, there were many variations in finishing systems and feeding programs all of which combined resources differently.

In view of the objectives of this study, more important than the individual receipts and expenses, are the returns to the business or incomes of the group operators. This will be examined by the following methods:

1. Capital Turnover
2. Net Farm Income, and
3. Labour Income

Capital Turnover

Capital Turnover refers to the number of years it takes for cash farm receipts to equal the total capital investment.[12] This can be an important indicator of overinvestment by an operator. This turnover can be relatively high in some cases, or quite low in others depending on both the investment in the various resources and the farm receipts from production. A low capital turnover figure is preferred to one which is relatively high. The nature of the beef feedlot enterprise is such that considerable fluctuation in capital turnover can occur from operator to operator and from year to year. The capital turnover for the study group is shown in Table 13.

TABLE 13: CAPITAL TURNOVER IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced (cwt.)	Capital Turnover (Average 1969-70)
1	775	1.5
2	850	4.4
3	893	2.2
4	942	1.7
5	1,109	1.7
6	1,147	1.8
7	1,702	2.0
8	2,580	1.5
9	3,460	1.1
10	9,910	0.7
		Average 1.9

As a group, the study operators yielded an average capital turnover of 1.9 years. This corresponded exactly with the value in the Ontario Preliminary Summary for Ontario operators. The results are fairly constant throughout the first six operators with the exception of operator two who, in 1969, had a relatively high investment in the fixed resources compared to his income from production. The last four operators experienced a fairly uniform decrease in turnover time which would indicate a tendency toward lower capital turnover with increased size in operation. There is, therefore, a direct relationship between the size of the operation and the period of capital turnover. The smaller feedlot operations were faced with relatively high fixed costs compared to the larger operators who were able to recognize economies of scale, and had a lower input per unit of output.

Net Farm Income

The net farm income is the amount of payment an operator receives for his labour, management, and interest on his investment.[13] For the purposes of this study, it is the difference between the value of production and the variable and fixed costs plus depreciation, and as such gives insight into the differences in efficiency which may occur between large and small operations. In equation form this would appear as[14]

Value of Farm Products	-	Supplies Used & Variable Services Used	-	Fixed Services & Depreciation Used	=	Net Farm Income

Variable services refers to such expenses as purchasing and marketing costs, and vetinarian and medicine use. On the other hand, fixed services refer to such items as interest on investment in livestock and buildings as well as feedlot labour and general expenses. It has been argued that for net farm income, fixed costs should not be included at all, while others argue that they should be included but only under the appropriate enterprise.[15] In this study, only those fixed costs which pertain directly to the feedlot operation have been included. If the same service was used for more than one enterprise, the approximate use attributable to the feedlot operation was estimated by the operator. The net farm incomes for the study group are shown in the following table.

TABLE 14: NET FARM INCOME IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Net Farm Income (Average for 1969-1970)
	cwt.	$
1	775	(-) 19,812
2	850	(-) 2,097
3	893	(-) 10,805
4	942	(-) 2,540
5	1,109	(-) 5,852
6	1,147	4,979
7	1,702	17,670
8	2,580	34,662
9	3,460	19,032
10	9,910	134,409
		Average $16,965

In terms of net farm income, a successful farm business should accomplish the following:

1. It should pay all farm expenses including depreciation charges, decrease in inventory and all operating expenses.

2. It should return interest on the money invested.

3. It should maintain the productivity so that the current production will be maintained over an indefinite period.[16]

From Table 14 it is quite obvious that the five smallest operations have not fulfilled the requirements of a successful business whereas, the largest five operations in the group show varying degrees of success. On an individual basis, the group operators showed considerable variation in net income.

In relation to feedlot size, there does not appear to be any visible trend among the first five operators, all of which showed negative net farm incomes. Among the last five operators, however, there is a successive increase in net farm income with the exception of operator nine. In the case of this operator, there was a large decrease in livestock inventory between 1969 and 1970, resulting in a lowered net farm income. In a feedlot operation, livestock inventory can play a major role in determining income on a yearly basis. Two years is not an adequate time period to assess an operation in terms of returns to the business;[17] however, a two year period does give some indication of the trends and influences affecting income.

Looking at the operators on a group basis indicates that the relative success of a feedlot operation is, at least in part, dependent on the size of the operation. As the size of operation increased, in terms of production, so did the net farm income. Labour income will be examined in the next section. Since labour income is primarily dependent on net income, similar results might be expected for the group.

Labour Income

In addition to covering farm expenses and returning interest on the money invested, a successful farm operation should also provide the operator with a reasonable living in return for his labour and management.[18] What designates a "reasonable" living will vary according to the aspirations of each individual operator. The important aspect is, however, that the operator receives some level of payment for his hours of labour and management. It is fairly obvious that in the study group, those operators with a negative net farm income have no chance of obtaining any payment for their labour and management ability. The labour income is calculated by deducting from the net farm income an eight per cent interest charge on the average farm capital.[19] This figure will place all the farm operators on the same basis whether they are in debt or not. If in debt in relation to net farm income, the amount actually paid in interest is deducted from the eight per cent charge for interest as it has already been taken into consideration in the farm expenses. If he is not in debt, he has this money as interest on his capital which is considered equivalent to what he could get on his money invested in some other business or industry.[20] The labour incomes for the study group are presented in the following table. The net farm income for operators six and seven was not large enough to give an eight per cent return on invested capital. It can be seen from Table 15, that operators one through seven were not able to recognize a labour and management income. Only the three largest operators show a return for their labour and management. These

TABLE 15: LABOUR INCOME IN RELATION TO SIZE OF OPERATION

Operator	Quantity of Beef Produced	Labour Income (Average of 1969-1970)
	cwt	$
1	775	(-) 27,497
2	850	(-) 13,061
3	893	(-) 16,728
4	942	(-) 8,533
5	1,109	(-) 12,344
6	1,147	(-) 6,883
7	1,702	(-) 1,308
8	2,580	11,279
9	3,460	2,428
10	9,910	78,228
		Average $558

three values by themselves are not overly meaningful except that one might suspect that the labour income received by operator ten was very good, despite the fact it is a three man operation. If the labour income was divided by the number of feedlot hours, an hourly wage could be shown which would be a much more significant value. An hourly wage for operators eight, nine and ten is shown in Table 16.

TABLE 16: HOURLY WAGES FOR THE THREE LARGEST STUDY GROUP OPERATORS

Operator	Quantity of Beef Produced (cwt.)	Total Feed-lot Hours (hrs.)	Hourly Wage ($/hour)
8	2,580	4,050	2.79
9	3,460	3,790	0.64
10	9,910	7,170	3.64

Operators eight and ten received a very favourable hourly income and would compare with that paid by many facets of industry. Although considerably lower than the other two operators, the $0.64 received

by operator nine is a wage not uncommon to farming. It would appear then, that considerable scale of operation, in terms of production, is required to permit returns on labour and management. Only the three largest operators were able to realize a positive labour income. All the other group members were considerably less successful and were faced with a negative labour income.

The exact level of production which is required for a successful farm business based on labour income, is difficult to determine but, from the study group, it would seem to occur at a point somewhere close to the two thousand cwt. of beef produced. Based on net farm income the minimum level of production would appear to be roughly eleven hundred cwt. of beef. These observations are based on the results of the study group only.

In general it has been found that the larger businesses give better labour incomes.[21] There are certain economies associated with these larger businesses which are responsible for the higher returns. The fixed costs, for example, are spread over a larger number of units with the result that the greater output from a large feedlot can often be accomplished with a relatively small increase in inputs. Many farm chores require a certain amount of preparation before, and finishing up after, whether or not much work is actually done with a machine. Also, on some farms, the situation may arise where the business is just not large enough to keep the labour fully employed.

The nature of the feedlot enterprise is such that a relatively large capital investment is necessary when the operation is initially

started. In terms of livestock and feed, which are variable resources, the investment in each generally increased with an increase in size of operation. There was not, however, a direct indication that a relationship existed between investment (in livestock and feed), relative efficiency of use, and success of the operation. On the other hand, in terms of land, buildings, and machinery, the fixed resources, a relationship was apparent between investment, size of operation, efficiency of use, and success of the operation. The smaller operations in the group were generally overinvested in these resources to the extent that their costs of production were much higher than for the largest operations and as a result, the five smallest operators received a negative farm income while the seven smallest operators received a negative labour income. It was apparent from the analysis that the use of resources was directly affected by the size of the operation; to this end, the smaller operations were less efficient in resource use relative to the large operations and as a result, showed a considerably lesser degree of success than the larger beef producing units.

NOTES

[1]Department of Agricultural Economics, Farm Management and Accounting Reports, (Guelph, 1946-1953).

[2]L. Bauer, Farm Business Analysis--Its Methods and Objectives, Guelph, 42.

[3]Land values were obtained from each municipal office in Waterloo County on a per acre basis. This value was then multiplied by the number of acres owned by each operator.

[4]Brant County Feedlot Cost Study, 1969-1970.

[5]Manitoba Department of Agriculture, "Systems for Finishing Cattle", Guidelines For Beef Production, 4.

[6]"Family Farm" is meant to include those operations owned, managed, and worked by one operator, in terms of full-time labour.

[7]"Commercial Operation" refers, not only, to a greater quantity of beef produced, but, more important, to more than one full-time operator.

[8]Department of Agricultural Economics, Preliminary Summary, 17.

[9]Ontario Department of Agriculture and Food, Agricultural Statistics for Ontario, 1969, 56.

[10]Farm Management and Accounting Report, 1953, 7.

[11]Ibid., 7.

[12]Ibid.

[13]Ibid., 9.

[14]L. Bauer, Farm Business Analysis--Its Methods and Objectives, 33.

[15]Ibid., 34.

[16]Farm Management and Accounting Report, 1953, 9.

[17]The two year period, 1969-1970, in this study, refers to calendar years, when in reality, most operators do not operate on the calendar year, but rather on a year dependent on their purchasing and marketing habits. As a result, unusually large livestock inventory changes were common in the study group.

[18]Farm Management and Accounting Report, 1953, 9.

NOTES Cont'd

[19]A value of eight per cent was obtained from banking officials as being the average interest charge on farm loans. This indicates the interest which might have been received by the operator, had the borrowed capital been invested in some other form of business.

[20]Farm Management and Accounting Report, 1953, 10.

[21]Ibid.

CONCLUSIONS

In recent years, agriculture has undergone a transition in land-use in many areas of Southern Ontario. This transition has taken the form of a shift away from the traditional mixed-farming type of operation to other, more specialized forms. One such form is the beef feedlot enterprise, upon which this thesis is based. The quantitative and qualitative analysis of the beef lot feeding system was based on the returns of questionnaires and interviews presented to a selected, stratified sample of Waterloo County feedlot operators.

One factor basic to the study is that whereas, the traditional land-use systems were basically a way of life to the farmer, and were passed down from generation to generation, the beef feedlot enterprise is a specialized, keenly competitive economic vocation. Operation data gained from this study indicates that only the most efficient and well-organized enterprises can survive the present level of competition. Because of this competition, several operators in the Waterloo County study group have shown a reluctance to fully commit themselves to this new type of farming venture. The hesitation which was evident both in terms of the economic aspects of the feedlot operations as well as in the personal attitudes expressed by the study group operators may prove to be a disruptive factor which will offset their chances of success and retard the stabilization of the new land-use system.

The economic analysis of the study group feedlots revealed the effects of the size of operation upon the relative efficient use

of resources. In terms of the relative efficient use of the variable resources, which in this study were investments in livestock and feed, the smaller operations in the study group did not appear to differ greatly from the larger operations in the group. This was largely a result of the variable nature of these two resources, which will vary according to the size of the operation which the farmer wishes to develop. On the other hand, in terms of investments in land, buildings, and machinery, which are considered to be resources of a fixed nature, substantial differences appeared between the small and large operations. In these fixed resources, a considerable initial investment is necessary by all operators, independent of the amount of beef produced by each individual. Thus, the larger operators were able to take advantage of economies of scale, since they could produce a greater amount of beef for a relatively small additional capital investment.

The effects of size were further demonstrated in terms of monetary returns to the business in relation to both net farm income and labour income. A positive net farm income was realized, over the study period, by only the five largest operations and the number was further reduced to the largest three operations in terms of a positive labour income. The author paid particular attention to the importance of labour income in the economic analysis of the feedlots as a means of evaluating an operator's relative economic position. Too often, a farmer will tend to ignore this aspect of his economic situation when, in reality, the returns which an operator receives for his labour and management are probably the best indication of the relative

success of his business.

In the discussion of converting existing facilities to suit a feedlot-style operation, the study emphasis was again placed on the similarities and differences displayed by the sample group. It became evident, in this section of the discussion, that the approach to the conversion of buildings and other facilities was considerably more cautious and gradual by the operators producing the smallest amounts of beef. Their hesitation to go beyond basic modifications was revealed by their only slightly modified old-style, conventional barns. In several instances, these facilities were of considerable inconvenience to the operator resulting in less efficient use of time and machinery, a fact which most of these farmers admitted in their discussions with the author. Most of these same operators were producing to capacity within the restraints of their existing set-up, but were unwilling to further commit themselves towards the establishment of fully modern facilities. Therefore, the limitations of existing facilities coupled with the hesitant nature of the smaller operators, were shown to be the primary factors contributing to the economic differences which appeared to exist among the various group operators. The combination of minimal operation scale and converted facilities will restrict the small operator's economic viability to the extent that diminishing marginal returns may force him from the market completely.

Ramifications

What then will be the end result of the trend toward beef feedlot specialization? Based on the apparent strong consumer

demand for high quality beef, the author feels that the inevitable result will be the initiation of a greater number of larger, more highly competitive beef feedlots and the eventual demise of the small-scale converted establishments. It was evident in the study group that the increase in size of operation was accompanied by an increase in resource-use efficiency contributing to a relatively more successful operation. This could eventually result in the phasing out of those feedlots of less than a certain size. Based on the study group investigation, it would appear that at the present time, a yearly beef production of less than a minimum of 100,000 pounds would not be economically feasible. This minimum value could be considerably higher in just a few years time, as a result of increases in competition, efficiency, and scale of operation. It is not the author's intent to place great emphasis on the economic implications of the study, although they are an important aspect accompanying any land-use transition. The point to be stressed is, however, that those operators who have hesitated to fully commit themselves to the feedlot business, can no longer afford to do so. Maximum efficiency in the use of resources is vitally important in any industry, none-the-less so in the production of beef. Those operators, such as the study group, who are currently in the midst of this transition to a relatively new form of land-use must become fully aware of its potentiality and the advantages which it has to offer.

As the full value of good quality corn silage becomes more readily recognized, and corn yields are increased by technological advances, there will probably be an almost continuous inward flow of

small, would-be operators entering the beef feedlot industry. This movement will be facilitated by other factors such as more stable beef prices and the easily adaptable nature of the feedlot enterprise. The potential for success, however, would tend to be relatively low (as based on this study). The probable result of this will be an outward flow of small operators of nearly the same magnitude as those entering the field. The most important repercussion of this inward-outward migration of operators will be the influence it will have on the stabilization of the beef feedlot enterprise. At the same time that the small operations are striving to be successful, the already established operations are becoming even larger and more efficient, thereby, continuously adding to the seemingly overbearing, competitive situation facing the small operator. The short term effect of the rise and fall of the small scale, convert-a-farm endeavour will be the retardation of the stabilization of a corn-based, beef feedlot enterprise system.

BIBLIOGRAPHY

Acton, B.K. et al., "Observations on the Cattle Feeding Industry of the Northwestern U.S. and Western Canada.", Canadian Farm Economics, pg. 28, April 1967.

Arda, Land Use Capability For Agriculture, Canada Land Inventory-Arda Branch, Ontario Department of Agriculture and Foods, January 1970.

Bauer, L., Farm Business Analysis--Its Methods and Objectives, Guelph, March 1971.

Blalock, H., Social Statistics, New York: McGraw-Hill Book Co. Ltd., 1960.

Boswell, A.M., "Beef Feeding in Eastern Ontario", Canadian Farm Economics, pg. 23, August 1967.

Bulletin, Finishing Beef Cattle, Manitoba Department of Agriculture, Winnipeg 1, Manitoba, Publication no. 394, April 1968.

Bulletin, Guidelines For Cow-Calf Production, Manitoba Department of Agriculture, Publication no. 512, May 1970.

Canada Department of Agriculture, Beef Cattle Housing and Equipment, Canada Farm Building Plan Service, Ottawa, 1966.

Canada Farm Building Plan Service, Beef Cattle Housing and Equipment, Canada Department of Agriculture and Provincial Department of Agriculture, Queen's Printer, Ottawa, 1970.

Chapman, L. and Putnam, D., Physiography of Southern Ontario, University of Toronto Press, 1966.

Editors, "A Shed Will Save You $1-$2 or More Per Head Per Winter Says Moocow", Cattlemen--The Beef Magazine, pg. 10, August 1970.

BIBLIOGRAPHY Cont'd

Editors, "West Coast Feeding Good Business", Cattlemen--The Beef Magazine, pg. 18, January 1971.

Furniss, I.F., "The Importance of Agriculture to the Canadian Economy", Canadian Farm Economics, pg. 1, October 1969.

Furniss, I.F. and Yorgason, V., The Economics of Beef Production, Canada Department of Agriculture, Publication 1356, 1968.

Gentilcore, R. Louis, Canada's Changing Geography, Toronto: Prentice-Hall of Canada Ltd., 1967.

Gilson, J.C. et al., Development of the Livestock Industry in Canada by 1975 and Implications for the Meat Processing Industry in Manitoba. A study prepared for the Committee on Manitoba's Economic Future, July 1962.

Gilson, J.C. and Yeh, M.H., Productivity of Farm Resources in the Carman Area of Manitoba. Winnipeg: Faculty of Agriculture and Home Economics, University of Manitoba, 1959.

Gracey, C.A., "Beef Imports--They Kept Coming", Cattlemen--The Beef Magazine, pg. 17, January, 1971.

Gregor, Howard F., Geography of Agriculture: Themes in Research. Prentice-Hall Foundations of Economic Geography Series 1970.

Henderson, W.T., Beef Production Facts. Manitoba Department of Agriculture, Publication 494, June 1969.

James, P. and Jones, C., American Geography Inventory and Prospects. Syracuse University Press, 1954.

Johnson, L.M., "Beef Cattle Production in West Central Manitoba", Canadian Farm Economics, pg. 9, April 1969.

Kish, George, An Introduction to World Geography, New Jersey, Prentice-Hall Inc., 1956.

BIBLIOGRAPHY Cont'd

Mage, J. and Murdie, R., "The Mennonites of Waterloo County", Canadian Geographical Journal, pg. 12, January 1970.

Manitoba Department of Agriculture, Guidelines for Beef Production, Publication 513, June 1970.

Metcalf, David, The Economics of Agriculture, Penguin Modern Economics Texts, 1969.

Miles, V.J. et al., "Economic Aspects of Slotted-Floor Confined Beef Feeding", Canadian Farm Economics, pg. 12, December 1967.

Miller, G., Beef Cattle Housing, Ontario Aberdeen-Angus Handbook, pg. 40, 1969.

Purnell, G.R. et al., "Expected Patterns and Practices in Agriculture in 1980", Canadian Farm Economics, pg. 1, August, 1969.

Purnell, G.R. and Heighton, V.A., "The Agricultural Situation in Canada", Canadian Farm Economics, pg. 1, December 1970.

Putnam, D. and Putnam, R., Canada: A Regional Analysis, J.M. Dent and Sons, Canada Ltd., 1970.

Putnam, Donald, Canadian Regions: A Geography of Canada, Toronto: J.M. Dent and Sons, Canada Ltd., 1952.

Reeds, L.G., "Agricultural Geography: Progress and Prospects", The Canadian Geographer, Volume VIII, 2, 1964.

Rokosh, L.M.L. et al., "Resource Use Efficiency as Related to Farm Business Size in the Red Deer Area of Alberta", Canadian Farm Economics, pg. 24, February 1970.

Sinclair, S., Elements of Land Utilization as they Affect Real Estate Value, Address to the Second Annual Conference, Association of Assessing Officers of Manitoba, Friday 25, April 1958.

BIBLIOGRAPHY Cont'd

Stutt, R.A., "Farm Management in Canada", Canadian Farm Economies, pg. 12, August 1967.

Wright, P.A., Findings From a Survey of Ontario Beef Feedlot Operations, Department of Agricultural Economics, University of Guelph, 1964.

Yankowsky, Z., "Agricultural Demand and Supply Projections for 1980", Canadian Farm Economics, pg. 11, February 1969.

Yankowsky, Z., "The Intermediate and Long-Term Outlook for Beef", Canadian Farm Economics, pg. 1, August 1970.

Yeates, M., An Introduction to Quantitative Analysis in Economic Geography, New York: McGraw-Hill Book Co. Ltd., 1968.

APPENDIX A

19 High Street, Apt. 12
Waterloo, Ontario
November 12, 1970

Dear Sir:

I am presently in the Geography Graduate Program at Waterloo Lutheran University. My interests are primarily connected with beef farming, more specifically, beef 'feedlot operations'. For my Master's Thesis I have chosen to do a study on 'feedlot operations' which will include: a) optimum use of resources; b) costs and returns in beef feedlots in Waterloo County. The latter part of this study will be basically similar to the beef feedlot study carried out in Brant County for the year 1969 under the direction of Mr. Don Graham, Ag. Rep. for Brant County. The Brant study has been continued for the current year on a larger scale.

Mr. G. Thompson, your Agricultural Representative, has indicated to me that this could prove to be a worthwhile project in that a significant study of this type has not previously been carried out in Waterloo County. Should you choose to participate in the study, I would gladly make any results and/or conclusions available to you, that you might apply these, either directly or indirectly, to you particular situation, thus drawing some benefit from them.

Since I have a farm background I realize this is a busy time of the year in regards to the corn harvest and plowing, both of which, in many cases, have been delayed due to the wet weather. We are experiencing the same conditions on my father's beef farms in Wentworth County. However, should you choose to participate in this study I will arrange to visit you at a time which is convenient for you and which will not take up more of your time than is absolutely necessary.

If you have any questions or doubts concerning this study, please contact Glenn Thompson or myself so that these might be cleared up as quickly as possible. You will find enclosed a self-addressed envelope. Please use this to indicate your preference in regards to participation in this study. If you wish to participate please enclose your phone number so that I might contact you to arrange for a convenient meeting time. I will then send you a copy of the questionnaire I am using in the study, so that you will be aware of the type of necessary information, prior to my visit. I might also mention here that all information you give me will be kept strictly confidential and will be revealed to no other persons.

Hoping for your co-operation in this matter.

Yours truly,

Please reply to the following questions and return this sheet in the envelope I have provided:

1. Do you wish to be a part of the study as I have outlined it in the letter?

   Yes

   (Please check one)

   No

2. Is your feedlot the main source of income?

   Yes

   No

3. Do you raise 150 or more steers per year?

   Yes

   No

   Approximately how many? _____ (steers)

4. Your telephone number is? _____

5. Mark the location of your (main) farm(s) as accurately as possible on the enclosed township map.

Your consideration and cooperation is greatly appreciated in this endeavour.

My telephone number is: 579-0424

APPENDIX B

A STUDY OF RESOURCE USE AND BEEF FEEDLOT OPERATIONS IN WATERLOO COUNTY

by: G. Griffith

Waterloo Lutheran University

1970-71

Waterloo County Beef Feedlot Study - 1970

The data for this study should be based on a one year period, but not necessarily a calendar year. For example, if you buy your feeders in the late summer or early fall and sell in the late spring or early summer, your crop year might be from August to June (as opposed to the customary January to December year). This will involve records from two consecutive years, rather than just a single calendar year.

The data questions habe been grouped into sections and in most cases the subject headings are self-explanatory. I would like to obtain data for the past year (1969-70), as well as for two or three years previous to this, where available. The purpose of this is to have sufficient data to be able to make comparisons from one year to the next rather than speaking only in terms of one specific year. This, of course, will all depend on the type of farm records you have kept. We will be able to discuss this more fully when I make my initial visit with you.

I will contact you by phone a few days after you receive this questionnaire. At that time we can decide on a meeting time which will be convenient for you. I have again included my phone number in case you might have any questions concerning the questionnaire. I am sending you the questionnaire ahead of time just so you might become familiar with the type of information I am looking for. However, as far as actually completing the data, you might prefer to wait until I visit you since I do not wish to take up any more of your time than is necessary, and the two of us working together might prove more efficient in terms of interpretation.

Gary Griffith
19 High Street, Apt. 12
Waterloo, Ontario
Phone - 579-0424

General Information

1) When do you do your buying (feeders)?
   i.e. time of year
   - replacement throughout the year?

2) Feeding program:
   i.e. all corn silage?
   -ration of concentrate/head
   -ration of grain/head

3) Type of feeders usually bought
   i.e. purebreds
   - crossbreds
   - % of each

4) Where do you usually - buy) your feeders?
   - sell)

5) Type of feeding equipment:
   i.e. silos - what type?
   - what size? (capacity)

Sales: (feeders)

			1970	1969	1968
1)	No. of feeders sold	(No.)	.....	.....	.....
2)	Total gross sales	($)	.....	.....	.....
3)	Selling value per head (average)	($)	.....	.....	.....
4)	Selling price per pound (average)	($)	.....	.....	.....
5)	Selling weight per head (average)	(lb.)	.....	.....	.....
6)	Yield (average)				
	% - Red		.....	.....	.....
	- Blue		.....	.....	.....
	- Other		.....	.....	.....

Purchases: (feeders)

			1969	1968	1967
1)	No. of feeders purchased	(No.)	.....	.....	.....
2)	Total gross purchase value	($)	.....	.....	.....
3)	Purchase price per pound (average)	(¢)	.....	.....	.....
4)	Purchase cost per head (average)	($)	.....	.....	.....
5)	Purchase weight per head	(lb.)	.....	.....	.....
6)	Size of cattle purchased				
	under 400 lbs	(No.)	.....	.....	.....
	400-599 lbs	(No.)	.....	.....	.....
	600-799 lbs	(No.)	.....	.....	.....
	800 lbs & over	(No.)	.....	.....	.....
7)	Average no. of steers on feed				

Note: (This assumes here that the feeders sold in 1970 (previous page) were bought in 1969--likewise for the preceding years.)

Expenses: (Purchased Feed)		1970	1969	1968
1) Concentrate				
amount purchased (total)	(lb.)	.....	.....	.....
price per pound	($)	.....	.....	.....
total value	($)	.....	.....	.....
2) Grain				
a) barley - amount		.....	.....	.....
- value	($)	.....	.....	.....
b) wheat - amount		.....	.....	.....
- value	($)	.....	.....	.....
c) oats - amount		.....	.....	.....
- value	($)	.....	.....	.....
d) other - amount		.....	.....	.....
- value	($)	.....	.....	.....

			1970	1969	1968
3)	Salt and Mineral				
	- amount purchased (total)	(lb.)	.....	.....	.....
	- total value	($)	.....	.....	.....
4)	Hay				
	- amount purchased (total)		.....	.....	.....
	- total value	($)	.....	.....	.....
5)	Straw				
	- amount purchased (total)		.....	.....	.....
	- total value	($)	.....	.....	.....
6)	- amount purchased		.....	.....	.....
	- total value	($)	.....	.....	.....

Note: (In this section "total value" refers to the total purchase price of each feed item).

(home-grown feed)

1)	Grain				
	a) barley				
	- total production	(bus)	.....	.....	.....
	- % used on farm	(%)	.....	.....	.....
	b) wheat				
	- total production		.....	.....	.....
	- % used on farm		.....	.....	.....
	c) Oats				
	- total production		.....	.....	.....
	- % used on farm		.....	.....	.....
	d) Other (specify) _____				
	- total production		.....	.....	.....
	- % used on farm		.....	.....	.....
2)	Silage				
	- total production		.....	.....	.....
	- % used on farm		.....	.....	.....
3)	Hay				
	- total production		.....	.....	.....
	- % used on farm		.....	.....	.....

			1970	1969	1968
4)	Straw				
	- total production		.....	.....	.....
	- % used on farm		.....	.....	.....
5)	Pasture				
	- total production		.....	.....	.....
	- % used on farm		.....	.....	.....

Note: ("% used on farm" is required in order to distinguish between the amount used and the amount sold (if any)).

Other Direct Expenses

1)	Marketing Costs	($)	.....	.....	.....
	- (includes trucking, commission, yardage, Association fees, etc.)				
2)	Purchase Costs	($)	.....	.....	.....
	- (includes freight, shipping charges, etc.)				
3)	Vet. and Medicine	($)	.....	.....	.....

Labor

1)	Chore Time				
	a) Feed preparation time - daily	(hrs.)	.....	.....	.....
	b) Feeding time		.....	.....	.....
	c) Bedding		.....	.....	.....
	d) Other		.....	.....	.....
2)	Hired Labour				
	a) full-time hired help	(no.)	.....	.....	.....
	b) Part-time hired help	(no.)	.....	.....	.....
	- no. of hours		.....	.....	.....
3)	Manure Handling				
	- hours daily		.....	.....	.....
OR	- total hours		.....	.....	.....

Procedure: (manure handling)

Other Indirect Expenses		1970	1969	1968
1) Investment in Steers	($)	.....	.....	.....
2) Investment in Feedlot Buildings	($)	.....	.....	.....
3) General Expenses				
a) taxes	($)	.....	.....	.....
b) hydro		.....	.....	.....
c) phone		.....	.....	.....
d) insurance		.....	.....	.....
e) other		.....	.....	.....

Additional Items

1) Inventory change				
a) Beginning inventory				
- no. of head (feeders)		.....	.....	.....
- average value	($)	.....	.....	.....
- total value		.....	.....	.....
b) Ending inventory				
- no. of head (feeders)		.....	.....	.....
- average value	($)	.....	.....	.....
- total value		.....	.....	.....
2) Pounds of beef produced - total		.....	.....	.....
3) Machinery and Equipment				
a) interest on capital expenditure (yearly)		.....	.....	.....
b) Yearly maintenance costs		.....	.....	.....
4) Value of land	($)	.....	.....	.....

Home Grown Crops

	Acres	Yield	Value	Labour	Fertilizer	Fuel
1) Grain						
a) wheat	.....	.....	.....	.....	.....	....
b) oats	.....	.....	.....	.....	.....	....
c) barley	.....	.....	.....	.....	.....	....
d) other	.....	.....	.....	.....	.....	....
2) Hay	.....	.....	.....	.....	.....	....
3) Silage	.....	.....	.....	.....	.....	....
4) Straw	.....	.....	.....	.....	.....	....
5) Pasture	.....	.....	.....	.....	.....	....

Note: This more extensive coverage of home-grown crops is designed to create a more complete picture in connection with expenses of home-grown feed.

NOTES AND COMMENTS

APPENDIX C

BEEF FEEDLOT COST STUDY

Operator No. .....

FINANCIAL SUMMARY		1969	1970
Income			
Sales	$	.....	.....
Cattle fed on gain	$	.....	.....
Inventory change	$	.....	.....
Purchases	$	.....	.....
Value of Beef Produced	$	.....	.....
Expenses			
Marketing costs	$	.....	.....
Purchase costs	$	.....	.....
Vet and medicine	$	.....	.....
Purchased feed-concentrate	$	.....	.....
-starter	$	.....	.....
-grain	$	.....	.....
-salt and mineral	$	.....	.....
-hay	$	.....	.....
-bedding	$	.....	.....
-pasture	$	.....	.....
Home-grown feed-grain	$	.....	.....
-hay	$	.....	.....
-silage	$	.....	.....
-bedding	$	.....	.....
-pasture	$	.....	.....
Total Direct Expenses	$	.....	.....
Interest on investment in steers	$	.....	.....
Feedlot labor	$	.....	.....
Building use for feedlot	$	.....	.....
Equipment use for feedlot	$	.....	.....
General expense	$	.....	.....
Total Indirect Expenses	$	.....	.....
Total Expenses	$	.....	.....
Net Income after Total Expenses	$	.....	.....

		1969	1970
Resources and Performance			
Investment in cattle	$	.....	.....
Investment in feedlot buildings	$	.....	.....
Investment in equipment for feedlot	$	.....	.....
Average no. of steers on feed	no.	.....	.....
Number of cattle sold	no.	.....	.....
Number of feeders died	no.	.....	.....
Cwt of beef produced	cwt.	.....	.....
Labor (8 hour days)			
Chore time	no.	.....	.....
Feed preparation	no.	.....	.....
Manure handling	no.	.....	.....
Total Feedlot Time	no.	.....	.....
The Sales Picture			
Number of cattle sold (82% steers)	no.	.....	.....
Selling value per head	$	.....	.....
Selling price per cwt	$	.....	.....
Selling weight per head	lb.	.....	.....
Yield (on cattle sold dressed)	%	.....	.....
Grade (where applicable) Red	%	.....	.....
The Purchase Picture			
Number of feeders purchased (75% steers)	no.	.....	.....
Purchase cost per head	$	.....	.....
Purchase cost delivered per cwt	$	.....	.....
Purchase weight per head	lb.	.....	.....
Size of Feeders Purchased			
Under 399 lb	no.	.....	.....
400 to 599 lb	no.	.....	.....
600 to 799 lb	no.	.....	.....
800 lb and over	no.	.....	.....
Feed Used per Farm			
Concentrate	lb.	.....	.....
Grain	lb.	.....	.....
Hay	tons	.....	.....
Silage	tons	.....	.....

		1969		1970
Average number of steers on feed	no.	.....		.....
Number of cattle sold	no.	.....		.....
Pounds of beef produced	lb.	.....		.....
Cwt of beef produced	cwt.	.....		.....
Costs per Cwt of Beef Produced	Lb.	$	Lb.	$
Concentrate	....	.....	.....	.....
Starter		.....		.....
Grain	....	.....	.....	.....
Hay	....	.....	.....	.....
Silage	....	.....	.....	.....
Salt and mineral		.....		.....
Total Feed Cost		.....		.....
Bedding and pasture		.....		.....
Marketing costs		.....		.....
Purchasing costs		.....		.....
Vet and medicine		.....		.....
Other Direct Costs		.....		.....
Labor costs @ $2.00 per hour		.....		.....
Interest average investment steers @ 9%		.....		.....
Building use (int on invest, rep, dep)		.....		.....
Equipment use (int on invest, rep, dep)		.....		.....
General expense		.....		.....
Indirect Costs		.....		.....
TOTAL COSTS PER CWT OF BEEF PRODUCED		.....		.....