MEASURING THE EFFICIENCY
OF
AGRICULTURE IN QUEBEC

by

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A Thesis

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PREFACE

Agriculture, the world over, has consistently been found to be relatively inefficient in comparison to other industries. This finding applies equally to the province of Quebec. By analysing the conditions existing in Quebec agriculture, ways and means will be revealed by which the standard of living of its farm people may be improved. The observations will have significance for other areas in which similar conditions prevail.

An interest in the circumstances surrounding this study developed from the close association of the writer with the problems of an under-developed area. Though far more advanced, the province of Quebec is in many respects confronted with similar problems. At Macdonald College further interest was stimulated by Professor David L. MacFarlane, to whom full credit goes for initiating the study.

In addition to that for guidance and direction, there is further indebtedness to Professor MacFarlane for making freely available the use of unpublished materials pertaining to the subject, on which the writer drew heavily.

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CHAPTER I

INTRODUCTION

The Problem and its Scope

The purpose of this study is to examine the agricultural production in the province of Quebec, and to evaluate in quantitative terms, in so far as the tools of analysis and availability of data permit, the degree of efficiency with which resources are being applied in the agriculture of this province.

The view has frequently been expressed that agriculture is a relatively inefficient industry, particularly that of Quebec. Unfavourable differences occur not only as between agriculture and other industries, but within agriculture there are differences between provinces and regions, and different types of farming within a region.

A time-space study will give some indication of the extent of these differences. Then, an examination of these indicators should reveal possible explanations for these discrepancies. These answers should then prove helpful in the framing of future policy relating to the agriculture of Quebec, and should also be valuable to persons who advise farmers. Thus, enterprising farmers may improve their position by applying the available labour and capital more efficiently to the natural resources at their

disposal. The standard of living enjoyed by a community depends upon the efficiency with which such applications are made.

In labelling the agriculture of Quebec as inefficient, many writers have attributed the relatively slow progress to factors mainly of a cultural nature. This study examines the problem from a more purely economic standpoint. The system of measurement employed, though lacking in precision, should be useful as a guide for gauging the efficiency of Quebec agriculture as additional and more reliable data become available, and as further structural changes necessitate a reconsideration of the problem. The study will also serve to reveal areas in which further research is required.

Historical Background

The earliest agricultural developmwnt in Canada took place in its largest province, Quebec. The history of this development has been written.[1/] The early agriculture was self-sufficient and unprogressive. Development took place along the St. Lawrence Valley, the waterways being the only means of transportation and communication in the absence of roads and railroads. Farms were

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1/ M.Q. Innis, An Economic History of Canada, Toronto, 1935; G.V. Haythorne, Land and Labour, Toronto, 1941; A.W. Currie, Canadian Economic Development, Toronto, 1942; J. Letourneau, Histoire de l' Agriculture (Canada Francais), Montreal, 1950; and other works cited in the bibliography.

therefore laid out in long narrow strips, under the French seigneurial system of land tenure along the St. Lawrence and its tributaries, each farm having a frontage on the river. These farms were reduced through sub-division into narrower strips, many of which still remain.

This pattern of settlement coincided with the occupation of the best agricultural lands of the province, the St. Lawrence Lowlands. This region covers a very limited area, however, nine-tenths of Quebec being underlain by the Great Canadian Shield, which except for isolated spots is non-agricultural, although it is valuable as a source of timber, minerals, furs and hydro-electric power. By the turn of the nineteenth century, Quebec had reached the point of optimum expansion of its agricultural area, with the exception of the Lake St. John and Abitibi regions. There are areas which were cleared for agriculture which should, in the opinion of the experts, have remained forested.

From the earliest days of settlement, agriculture had been the chief source of livelihood in Quebec. The beginnings of agriculture were, however, slow and difficult. The life of the habitant was a continuous struggle against the cold, the forest and the Indians. Colonists were also lured away from tilling the soil by the appeal of hunting and fishing. Farming was strictly

on a subsistence basis, the usually large French-Canadian family providing most of its food and clothing. The combination of forestry with farming has also been of great importance in the province. Fuel and lumber for local use were for a long time the principal forest products but later ship building became a large industry and then wood-pulp became of first impertance in forest production.

In having to provide almost all their own needs, the early settlers could not specialize in the production of a single product, and transportation facilities were too limited to enable organized exchange. Hence, the diversified agriculture which developed still persists in many regions, although specialized dairy, livestock, vegetable and fruit farms are becoming common in certain districts. Wheat had become an important cash crop during the nineteenth century but to a much lesser extent in Quebec than in Ontario. During this period farmers also produced large quantities of vegetables, milk, cheese, wool, hogs, beef, poultry and eggs but these were not generally on a commercial basis. Then, with the opening of the Western frontier, it became possible to produce a superior quality wheat more economically. Agricultural development in the Prairie Provinces also occurred in a period during which the railways provided transportation facilities linking all Canada. Grain growing was forced into decline in Eastern

Canada, this stimulating the pattern of livestock and mixed farming already in progress. By the end of the nineteenth century livestock products originating in Eastern Canada comprised an important part of the country's exports.

The development of the Canadian West also coincided with the declining relative importance of agriculture in the Eastern Provinces while manufacturing expanded. Early manufacturing consisted in the production of farm tools and simple machinery, and the processing of raw materials by sawmills, flour mills, creameries, cheese factories and distilleries. This development being based essentially on exploitation of the natural resources of the region. But industrialization which proceeded at a rapid pace, assisted by tariff protection was accompanied by a movement of people from the rural areas to the cities. This served to provide a larger domestic market for farm products, and gave the incentive for farming on a commercial scale. This in turn stimulated the introduction of new production techniques and improved practices in agriculture. The expansion of the livestock and dairy industries called for shifts from wheat production to coarse grains, hay, forage, and root crops.

Since the beginning of the present century, an expanding demand for farm products, accompanied by a declining percent-

age of the labour force engaged in agriculture, served to encourage the use of labour-saving machinery. And since the decade of the twenties, increased mechanization in farming has brought increased productivity to the industry, but this has meant greater need for capital inputs. Capital shortage has therefore become a crucial production problem. Quebec, not having experienced any shortage of labour in agriculture, has been slow in the mechanization process. Economical use of farm machinery also requires the operation of larger farming units and fewer people in agriculture. Generally, Quebec has been slow in making the shift from labour-intensive to capital-intensive techniques.

Unfortunately, Quebec did not share equally in the advantages arising from the rapid industrial expansion, based on coal and steel, which occurred after 1896 in the Great Lakes and lower St. Lawrence Valley regions. The economic activity accompanying this expansion favoured Ontario, due to its location with respect to the coal and steel producing regions of the United States. This is the major thesis of Professors Faucher and Lamontagne who claim that Quebec was by-passed by the industrialization, as a result of its unfavourable location.[1/] Professor

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1/ Albert Faucher and Maurice Lamontagne, "History of Industrial Development", Essays on Contemporary Quebec, Quebec: Laval University Press, 1953.

Schultz has also used a similar thesis to explain the poverty in certain rural areas of the United States.[1] With agriculture dependent upon development in other sectors for its own advancement, pressure was brought to bear on the agriculture of Quebec and its progress was retarded. But now with a new horizon in industrial development, based on mineral wealth, wood and hydro-electric power, speedy adjustment should be in sight.

The slow progress of Quebec agricultural development has also been attributed to social and cultural factors.[2] Professor Lamelin discusses in some detail the views of various writers, then suggests that the economic backwardness of Quebec results from the fact that it was by-passed by industrialization rather than from institutional and cultural factors.[3] Although opinions differ as to the forces of causation, the discussion of conflicting theories have aided greatly in giving an insight into the true nature of the Quebec problem. This is a necessary step

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1/ T.W. Schultz, "Reflections on Poverty within Agriculture", Journal of Political Economy, Feb. 1950; The Economic Organization of Agriculture, New York: McGraw Hill, 1953.

2/ Haythorne, op. cit.; F.M. Wade, The French-Canadian Outlook, New york: Viking Press, 1946; Miriam Chapin, Quebec Now, Toronto: Ryerson Press, 1955.

3/ Charles Lamelin, "Social Impact of Industrialization on Agriculture in the Province of Quebec", Culture, Vol. XIV, 1953, pp. 157-169.

before positive action can be taken to bring about the structural changes needed to remedy the situation. Undoubtedly, both forces have played an important role in fashioning the pattern of agricultural development.

Government policy may also strongly influence the pattern and rate of development. Therefore, whatever the cause for backwardness, there is the need for exploring all the possibilities open for improving the condition of rural communities. Then, public action may assist by encouraging migration to other communities, development of new industries and a better balance between the resources used in farm and non-farm production. This study will serve to suggest some of these measures.

Quebec holds an important place in the Canadian economy and agriculture is still of major importance in the development of this province, despite its declining relative position. Agriculture to many has remained a fundamental way of life and has retained many of the subsistence features of its early days. Progress has been retarded in many areas by the use of poor land and resistance to change. These forces must be overcome if the potentialities of the region are to be realized.

This introductory statement is intended to give some indication of the road over which Quebec agriculture has travelled

since its early beginning. A detailed account of the development since 1900 will be undertaken in Chapter III, where the efficiency of the industry is considered. Before moving on to this, it is necessary to consider what efficiency really means in economic terms. This is the subject of the chapter which follows.

CHAPTER II

THE CONCEPT OF ECONOMIC EFFICIENCY AND THE METHODS OF STUDYING EFFICIENCY IN AGRICULTURE

It is appropriate to begin by outlining the theoretical concept of economic efficiency, then to proceed to examine the methods of measuring efficiency and see how these can be applied to the study of agricultural problems.

In economic theory, society is viewed as aiming to maximize certain ends from a limited supply of resources, which have alternative uses. Giving due recognition to the variety and complexities of the goals of society (economic goods and services, freedom, equality, security, stability, growth, etc.) one may define an efficient economic organization as one that maximizes the sum total of human satisfaction from these given resources. According to Scitovsky,

> "we shall say that any change of economic policy or institutions capable of making some people better off without making anyone worse off is a change that improves economic efficiency. A situation in which it would be impossible to make anyone better off without making someone else worse off, therefore, will be called an economically efficient situation."1/

Professor Scitovsky points out,2/ however, that efficiency

1/ Tibor Scitovsky, Welfare and Competition, Chicago: Irving,1951,p.55.

2/ Ibid. pp. 59-63.

is only one of two criteria by which economic organization must be appraised; equity being the other criterion. But whereas the economist has set up standards of efficiency he cannot set up standards of equity; "nor have objective or universally accepted standards of equity been set up by any one else." As a rule, the task of the economist is to consider alternatives that differ both in efficiency and in the distribution of wealth and income. And although there is a strnng subjective feeling that a more equitable distribution of welfare between individuals and between social classes would also raise the efficiency of the economic system, by increasing the sum total of satisfactions, there is no objective proof. "Indeed, we can attach no definite and rigorously defined meaning to the idea of a sum of satisfactions." It seems advisable, therefore, to keep separate those discussions which are of a subjective nature from those which are objective and provable. On this basis, problems concerning efficiency would fall into the latter category.

One may argue then that the economist should concentrate on the problem of efficiency while questions of equity remain the concern of ethics and politics. But, since policy decisions must be based on considerations of both efficiency and equity and the economist is as good a judge of equity as anyone else, Scitovsky thinks the economist must be concerned with both efficiency and

equity considerations in tendering his advice on policy decisions, while making it clear that his recommendations are based on both criteria.

For the present, the discussion will be concerned with the "efficiency" aspect of economic organization. The distribution of income will be taken as given. Later, after the analysis has been applied to the agriculture of Quebec, more will be said about problems of equity in considering the policy implications of the findings.

There are many levels of abstraction which may be used in considering efficiency. It may be viewed from the level of the firm (farm) or operations within the firm (farm); or from the level of the industry; or by evaluating the efficiency with which the totality of programs, public and private, approach the interrelated sum total of goals of the entire social group. The complexity of human goals has been mentioned but economists are usually concerned with problems dealing with production and pricing efficiency, economic stability, growth and development, and also equity and justice (welfare economics). Some mention will be made, when considering policy, of the other aspects of the general economic problem; but the problem now is to set up standards of gauging the efficiency of production. This will be done first at the level of the firm (farm) and with modifications, the analysis

can be made to apply to the industry or the economy as a whole.

It can be shown that perfectly competitive behaviour by all members of every market would result in the most efficient organization of production and the best allocation both of productive resources and of consumers' goods and services. For this reason and because agriculture approaches in certain respects the conditions of perfect competition, the efficiency model will be based on the assumptions of perfect competition (large number of buyers and sellers of a homogeneous product, each so small relative to the market as to exert no influence on prices - no price restrictions or restraints on the mobility of resources - complete knowledge).[1/] Although these assumptions lack realism they add simplicity to the analysis and can be later relaxed as the discussion is focused on the real world, with the basic organization of industry given. It will also be assumed that there is full employment of a fixed quantity of resources; if resources are underemployed the first concern would not be to improve efficiency.[2/] For efficient economic organization resources must

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1/ The production plans and decisions of farmers to sell their products are as a rule (except in cases of organized marketing schemes) made without any idea of influencing price or choosing between several possible prices.

2/ Scitovsky, op cit. pp. 8-9.

be allocated in such a way as to best conform with the wishes of society. In aiming at full resource utilization, the pricing mechanism is relied on to determine the community's preferences, thereby facilitating decisions on the level and composition of the output for the firm, the industry and the total economy.

It is assumed here that resources will tend to move into employment which brings the highest rates of remuneration, in order to maximize the total product of society. At the level of the firm (farm) the aim is to maximize profits. The organization of production is in part a technological problem and so the usual approach of differentiating between technological and economic efficiency will be followed; technological efficiency being a necessary but not a sufficient condition of economic efficiency.

Technological Efficiency

Here one needs to know the technical conditions of production in order to choose the production pattern which affords minimum cost to society in terms of manpower, equipment and other resources. It involves having a full knowledge of the production function in order to maximize the physical product from given resources or to achieve the highest ratio of useful output to scarce input. This is an intermediate step to profit maximization and Heady points out that

"While the input-output relationship per se is a tech-

> "nological consideration, its specific nature has many economic implications... Besides, it is doubtful whether a fine line can or should be drawn either within or between the various physical and social sciences. Every practical problem has roots in numerous sciences. Finally, the basic phenomena which underly the important structural relationships in economics stem either from psychology or from the physical sciences. Although economics deals quite largely with the maximization (profit, national product) or minimization (cost, resource outlay) of quantities important in the value framework of individuals, communities, and nations, there is no manner in which these principles and logic can be put into application unless knowledge of production possibilities is available on the one hand, while knowledge of prices or the psychology of the individual as a consumer is available on the other hand." 1/

Physical relationships provide the basic fundamentals of resource allocation and define the ranges of rational production. Irrational or technically inefficient production exists whenever resources can be rearranged in any manner whatsoever to give a greater product from the same collection of resources, or the same product from a smaller collection of resources. That is to say, a system is technically efficient if it achieves the greatest possible output with given resources or a given output with the least input of resources. It is not necessary to know price relationships in order to indicate irrational production. If one assumes the state of technology as given then irrationality could be the result of using wrong techniques.

1/ E.O. Heady, Economics of Agricultural Production and Resource Use, New York: Prentice-Hall, 1952, p. 55.

The production function, which represents the scope and limitations of production as determined by technical conditions, can be illustrated graphically with the aid of production indifference map.[1/] For ease of discussion only two factors are considered. Production indifference curves or isoquants can be drawn to show the different combinations of the two factors which can produce equal given quantities of a product. It is assumed that the same output can be produced in more than one way and with more than one combination of factors. Accordingly, isoquants are drawn with a downward slope through part of their range to indicate that when less of one factor is used, more of the other is needed to produce the same output. The slope of the isoquant in this range expresses the rate at which one factor can be substituted for the other without changing output, and is called the marginal rate of technical substitution between the two factors (MRS). There is a limit beyond which substitution is no longer possible as more and more of one factor is substituted for the other. The various limits for each output together define an area of rational production, that is within the range of substitutability between the two factors. This outlines the factor-factor relationships.

1/ See Heady; Ibid, Chap. 5 or any standard text book on Price Theory.

By cutting across the indifference map, that is by holding one factor fixed in quantity while the other is varied, the factor-product relationships of the classical production function can be derived. This represents changes in the total product, giving the productivity of the variable factor when the other is fixed in quantity. If represented graphically, the slope of this productivity curve shows the marginal rate of transformation of the factor into product or the marginal productivity of the factor. Again, a range of rational production is defined, that is the range between maximum average product and zero marginal product (MP), the latter term being defined as the additional quantity of product realized from the utilization of one additional unit of factor. If the two factors of production are denoted by X and Y, then the marginal rate of technical substitution between factors X and Y (MRS_{xy}) can be expressed as the ratio of the marginal products of the two factors ($MRS_{xy} = MP_x/MP_y$).

This outlines the technical relationships existing between factors, but technological conditions only define an area in which rational production will take place. They do not prescribe exactly the particular combination of factors that will be used for producing a given output within this range. In order to define the conditions for profit maximization, a "choice indicator", price, must be employed. This leads to the discussion of economic

efficiency.

Economic Efficiency

Economic efficiency is defined when resources are used in such a manner as to maximize the particular objective or end quantity (profits in this case) which is relevant to the economic unit under consideration. To maximize profits, any given cost expenditure must be allocated in such a way as to maximize output; or what amounts to the same thing, a given output must be produced at a minimum cost..

With the factor prices given (P_x and P_y), the most economical way of combining factors of production may be expressed geometrically by price lines or isocost lines (i.e. lines which express the various combinations of two factors which can be bought with the same outlay). If price lines were superimposed on a production indifference diagram, then maximum profit is indicated at points of tangency between an isequant and an isocost; such points of contact indicating minimum cost for producing a given output or maximum output for a given outlay. This means, the marginal rate of technical substitution between the two factors (the slope of the isoquant) equals the ratio of their market prices (the slope of the isocost). That is:

$MRS_{xy} = P_x/P_y$. But since $MRS = MP_x/MP_y$.

Then, $P_x/P_y = MP_x/MP_y$ or $MP_x/P_x = MP_y/P_y$.

The principle can be generalized to include more than two factors, giving the condition for cost minimization for the employment of two or more factors. The producer will employ each factor until the value of its marginal product (MVP) is equal to the price of the factor.

$MVP_x/P_x = MVP_y/P_y = 1$ or $MVP_x = P_x$, $MVP_y = P_y$, ...

Therefore \$1 invested in any factor will at the margin return as much as \$1 invested in any other factor employed.

In so far as factors of production or resources are concerned, the quantity of each factor which will be employed in the production process for efficient resource use has been derived. The condition is that, the value of the marginal product of any factor must equal the price of the factor or the marginal physical product (or marginal value product) of all productive services must be proportional to their prices. This gives the minimum-cost condition of combining productive services and the most profitable method of production the firm can use.

Next, it is necessary to know how large an output the firm should produce in order to maximize its profits. If the firm's market opportunities were represented graphically, the total revenue curve would be a straight line going through the origin, since the price of the product is given. The total cost of produc-

ing each level of output could therefore be derived from the production indifference map. The locus of points of tangency of the isoquant and isocost curves (expansion path) would show the minimum cost of producing each level of output. Then, the cost of producing each level of output could be plotted on the same graph with total revenue. The slope of the total revenue curve is the marginal revenue (price) and the slope of the total cost curve is the marginal cost of the product. The condition for maximum profit is that marginal cost of producing an additional unit of product equals the price of the product (and marginal cost is rising). Here, an additional dollar invested in inputs will return exactly one dollar. The cost curve derived from the expansion path shows that the quantity of all factors are variable, which is only true in the long run. In the short run certain factors would be fixed in quantity and expansion could then take place only along the productivity curve of the variable factor. Thus, a producer may not be operating at minimum costs even while maximizing profits at a given level of output in the short run.

It has so far been assumed that the firm is producing a single product. It follows from the above discussion that each of several products would be produced in such a quantity as to equate marginal cost and price. But since a producer with a limited quantity of resources may not be able to extend production of

any one commodity to an optimum scale, consideration must be given to producing two products from a given set of resources. The technological conditions for combining products are defined in a manner similar to those for factors, but choice is now between competing products. Resources are held constant in quantity and variety while products are varied. Heady differentiates between joint products, competitive independent products, complementary products, supplementary products and antagonistic products.[1/] It is customary to discuss the case in which substitution between two independent competing products takes place at increasing marginal rates; that is to say, both are being produced under conditions of decreasing returns.

Given the production function for both products, the slope of each opportunity curve (production possibility) varies depending on the quantity of resources allocated between the two competing commodities. (The opportunity curve could represent a given amount of money outlay rather than physical resources). It is required to determine the maximum return from given resources. Given the product prices, maximum profits are attained when the marginal rate of product substitution is equated to the ratio of the product market prices. Graphically, that is where the price

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1/ Heady, op. cit., Chap. 7.

line (or iso-revenue curve) is tangent to the production possibility curve (or iso-outlay curve). Or, in other words, the marginal value product of a unit of resources allocated to one product must be equal to the marginal value product of a unit of resource allocated to the other product. That is to say, the value productivity of the last unit of resource allocated to either product is equal. This argument can be generalized to include several products.

If the products are not being produced under conditions of decreasing returns (that is if there is constant or decreasing marginal rates of substitution between the products) then one or the other of the two products will be produced but not both at the same time. Diversification is therefore never profitable when both products are produced under conditions of increasing returns.

In the foregoing analysis, outlining the conditions of profit maximization for the competitive firm, it was assumed that all factors were divisible so as to give continuous production functions. Indivisibility of factors does not negate marginal analysis but as Heady points out it simplifies decision making and leads to greater stability in resource use.[1/]

1/ Heady, op. cit., pp. 113, 150 and 255.

Having defined efficient economic organization in terms of the wishes of society, the conditions for profit maximization will be summarized to see when these conform with society's preferences, if perfect competition prevails in both producers' and consumers' markets.

To consider first the combination of products, the firm maximizes profits by producing its different products in such proportions as to maximize the market value of its total output for any given cost outlay. That is, when the marginal rate of substitution equals the product-product price ratio for any two commodities. From the consumers' point of view, the most highly valued output is produced when the marginal rate of substitution between any two products is equal to the ratio of their market prices. The condition of efficiency is, therefore, that the firm's marginal rate of product substitution be equal to the consumer's marginal rate of substitution between any two goods. The firm is then producing products in the proportions desired by consumers; consumers' preferences being reflected by market prices.

Turning to factors of production, the firm aims to minimize costs. This it does by combining factors in such a way as to equate the marginal value product of each factor with the price of the factor, as indicated earlier; while society wishes factors to be combined in such a way that the ratio of their earnings expresses the

relative costs to society of providing their services. Production will be efficient, therefore, when the marginal rate of substitution between any pair of productive services is equal to the relative cost to society of providing these services.

The efficient rate of output, from the firm's point of view, is that which equates the marginal cost of any product with its price and the price of every factor to the market value of its marginal product. If this conforms to society's wishes then, the satisfaction derived from the firm's rate of output will be in balance with the value of effort needed to produce it. Then consumer's marginal valuation of each product will be equal to the marginal cost of producing it, and the marginal valuation of the service of each factor will be equal to its price.

It is presumed that if all the above conditions are fulfilled then profit maximization will lead to the firm's optimum production pattern in so far as society is concerned. Then economic efficiency will be achieved. In the language of welfare economics, the production possibilities curve will be just tangent to the community indifference curve.[1/] Presumably, at this point the

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1/ O.H. Brownlee, "The Meaning of Economic Efficiency in Terms of Possibilities and Choices", Economic Efficiency Series, University of Chicago, Summer 1950.

marginal valuation of all the things which are worth anything to society (quantities for which sacrifices will be made such as equity, freedom, security, stability, economic goods and services, etc.) will be brought into equality. Therefore, to be efficient in production, a firm must first succeed in reaching some point on its production possibility curve and, then, that point which provides the community with the preferred combination of products. Whenever these two conditions are met, an efficient organization of production for the collection of resources available has been achieved.

The necessary requirements for optimum allocation of resources have been summarized in the four following conditions:[1/]

1. For Firms - the marginal cost of any product should equal its price and the value of the marginal product of any factor should equal the price of the factor. If this requirement is met then the marginal value productivity per dollar input is equal in the case of all factors, and is in fact one dollar.

2. For Factors - the price of any factor should equal or exceed its marginal opportunity cost. Any resource must secure from its employment a return that is equal to or exceed the greatest alternative income that is available to that resource.

1/ D.L. MacFarlane in "Resource Allocation in Agriculture" quoting D. Gale Johnson (mimeograph).

3. For Consumers - the ratio of the marginal satisfactions derived from any two commodities must be the same as the ratio of their prices.

4. For Society - the marginal social cost (forgone alternatives) should equal marginal social return for any product or factor.

The foregoing analysis outlining the conditions of efficiency for a perfectly competitive producing unit also sets up the standards by which the efficiency of the industry or various industries would be appraised. The efficient organization of firms within each industry would involve the concentration of output in its most efficient members. All firms would equate the marginal cost of producing the same product and the marginal value productivity of various resources would be equal in all firms, in order to maximize the value of the output of the whole productive system. In this context, maximum efficiency is guaranteed only if single products are produced under conditions of decreasing returns (increasing costs) and if commodities produced in combination are never produced within ranges of complementary and supplementary relationships.

Limitations of the Theoretical Model

Now, it is necessary to withdraw from the static equilibrium conditions of a perfectly competitive society and face the dynamics of the real world. Neither is there perfect knowledge on the part

of the producer or the consumer, nor is there perfect mobility of resources. The theoretical model will only serve as a guide to optimum resources allocation but it cannot be expected that these conditions will be achieved. An examination of the conditions which prevail will show how far they deviate from the optimum standards. Attention will be directed to the agricultural industry.

The basic organization of industry must be accepted as given and it must be recognized that while agricultural production is relatively competitive, many other industries are organized on a monopoly basis and thus restrict production and condition the aggregate efficiency of resource allocation. This serves as a restraint on the mobility of resources between industries.

If production were instantaneous, decision making would offer little difficulty since the production function and the prices of factors and products would be known. Faced with shifting demand and supply conditions over time, however, the producer must base his plans upon expectations. Once the production process is started, it takes time to effect changes. The agricultural producer is at a particular disadvantage in this respect since he is not merely confronted with the uncertainty of prices in the future but is faced with the uncertainty of weather. The industrial producer can tell before hand what product will be forthcoming from a given

set of resources but the farmer, exposed to the vagaries of weather, faces the uncertainty of yields.

In addition to yield uncertainty, many farmers lack knowledge of new and better techniques and are not aware of their production possibilities. Farm amanagement studies have widely revealed this fact. Even with knowledge of the production function, however, irrational production may take place in a range of increasing returns due to capital limitations rather than ignorance. This may be the case of a small farmer with limited funds who because of uncertainty and risk aversion is unable to operate at the optimum scale.

Technological advance brought about through research and inventions (machines, improved varieties of plants and breed of animals) has decreased the labour requirements and increased the need for capital inputs in agriculture. Labour mobility is therefore one of the main problems of resource allocation in agriculture. The reduced labour requirements is aggravated by the higher rate of population increase in agricultural areas. This adds to the surplus of the agriculture labour force. From the efficiency model, optimum allocation of resources is achieved only after resources have migrated between farms, regions and industries until their marginal units were equally productive in all uses. Although the exit of the labour resource from agriculture has been

taking place quite rapidly, there is still evidence of surplus farm labour and too little capital.

Labour immobility on the part of farm people is due partly to lack of knowledge of alternative opportunities. The forces restricting their entry into monopolistic industries are added to by the fact that farmers lack the training and skills for employment in non-farm industries and may fear the instability and uncertainty in industrial employment.

In addition, there are the forces of the "firm-household" complex. Farm people may be motivated by other aims than profit maximization. Account must therefore be taken of the non-financial incentives of the farm household as consuming unit. The farm family may take utility maximization as a goal rather than maximum financial returns. This introduces values which cannot be measured in money terms, the so-called "intangibles" which include such values as "the joy of living in the country" and the "opportunity of being one's own boss". This force may go far towards explaining the existence of subsistence farms. The farm family must also choose between investing earnings in the expansion of production or in consumption,i.e. there is a conflict between the utility of a greater product and direct utility. Account must also be taken of the difference which may exist between the cost of living on the farm as against that of living in

an industrial area.

Heady in recognition of the "firm-household inter-relationships" in farming, includes in his summary list of the requirements for efficient resource use the following condition:[1/] "The marginal rate of substitution must be equal between (a) the income and direct utility (leisure) of a resource in production and (b) the income and direct utility of a resource in consumption for any single resource owner and between resource owners."

Owing to the subjective nature of these relationships they add difficulty to the problem of measuring efficiency. The value productivity of resources and net profit can no longer be used as a gauge of efficient resource use, when these quantities are included in the analysis. Evaluation of efficiency can, however, be made for the farm as a pure firm with profit maximization as its goal, then allowance can be made for the "intangibles" to take into account direct utility, subjective though these may be.

This bare mention of uncertainty, imperfect knowledge and factor mobility serves to show the imperfections of the theoretical model, and the difficulties which are added not only

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1/ Op. cit., pp. 709-710.

to decision making, but also to the measurement of efficiency, which is now to be discussed.

Measurement of Efficiency

The rivalry between profits and direct utility from resources, as the farm family attempts to maximize its satisfactions, has just been noted. Not all products are traded in the market, but some are derived directly from resources.

Despite the imperfections of the market mechanism, it can be said that in so far as the pricing system accurately reflects the value system and consumer preferences, "the value productivity of resources can serve as an index of production efficiency..... A perfect meshing of resource allocation and consumer desire or choice is then reflected if the marginal value productivity of the last unit of each resource is the same in each line of production." 1/

The problem then would be to measure the marginal productivity of each resource in all its various uses, and then, to see how nearly these productivities approach equality. This may be applied to the individual farm or to the allocation of resources between farms. This study is mainly concerned, however,

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1/ Heady, op. cit.,p. 706.

with the aggregate efficiency in the use of agricultural resources, in terms of allocation between regions within agriculture and netween agriculture and other industries. As mentioned before, the same analytical principles apply. Since resource use is based on expectations and imperfect knowledge, measurement of efficiency must be in the historic or "ex-post" sense and involves comparative analysis of the productivity of resources in their various uses.

It will be convenient to group the factors of production into two categories, labour and capital, since these resources can be shifted between alternative uses; whereas land only provides a physical base over which other resources can be deployed. In broad general terms capital may be considered to encompass all resources but labour and to include land. It is not sufficient, however, that capital in broad aggregate and labour in broad aggregate be allocated between farms, regions or industries in a manner that value productivities are equated but the same conditions must be attained for each particular form of capital and other specific resource items.

The application of marginal productivity analysis to details of resource use is best carried out within the individual farm unit. But even at this level there are major difficulties encountered in making empirical estimates of the relevant physical

cost and revenue relationships. The statistical difficulties are multiplied when comparisons of inter-farm and inter-industry resource use are considered.[1/] In view of the complexities and difficulties which marginal analysis presents for empirical studies, many studies have been undertaken using methods which aim to indicate the differences in rate of return or value productivity of resources but these lack the precision of the marginal approach.

The usual approach, as outlined for agriculture by Professor Schultz[2/] entails the following major steps:

(1) Ascertain the amount of income "produced" in agriculture.

(2) Allocate this income to each resource in accordance with its value of productivity.

(3) Calculate the rate of return realized by each resource, and

(4) Compare the rates of return (a) within farms (b) among farms and (c) between farms and the rest of the economy.

This same procedure is also applicable at the level of the indi-

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1/ Heady in a study entitled "Production Functions from a Random sample of farms", (J.F.E., Vol. 28, Nov.1946) devised a set of simultaneous equations, using farm records, to relate the input of 5 factors to total product, from which he determined the elasticities of production of the various inputs. From these elasticities the marginal productivities of the factors were derived. Johnson and Tintner have also carried out some work in this sphere. These studies are open to criticism and do not have wide application.

2/ T.W. Schultz, Production and Welfare of Agriculture, Macmillan: New York, 1950, p. 23.

vidual farm (farm management) and the rates of return for various forms of capital (land, buildings, fences, machinery, fertilizer, etc.) would be compared to the market rate of capital. The statistical problems which would be involved in this can readily be foreseen. Yet estimates can be made of the relevant variables.

This method sets out to estimate the returns to a single factor such as labour or capital. This is done by the residual method outlined by Heady.[1/] What is actually computed is an estimate of average productivities: the residual imputed to labour or capital is divided by the number of workers or the amount of capital to suggest labour income per person or return per dollar of capital. The difficulties of ascribing the residual to any particular factor in the production process are then encountered. The factor inputs or investments applied do not only provide income in one period but as sequences over time. This introduces the problems of resource valuation and product imputation.

Depreciation and interest charges (or a wage rate in the case of labour) can be estimated in order to indicate the value of services from various resources transformed into product within a time period. Or in some instances, the value of resources used and not the value of the resource services transformed in the

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1/ E.O. Heady, op. cit., pp. 402-414.

time period has been used to estimate the average productivity of resources employed in production. But this latter procedure leads to erroneous productivity comparisons if resources employed by different farms or regions do not render services at the same rate.

The product or reward to one factor cannot be established accurately unless the rewards to other factors are accurately reflected. For this reason "net farm income" is not a satisfactory index of resource or production efficiency since it implies that only labour management earned a reward, without specifying whether it was earned with unpaid family labour or hired labour, or on rented or owned land, or from owned or borrowed capital. A procedure must be used, therefore, which subtracts from net farm income (or gross profits less operating costs) a return for all resources except the one to which the residual will be ascribed.

If resources are charged (except for the one given the residual) at the market rate, this will assume that the market prices for resources coincide with the value productivity of the same resources. "Market prices might be expected to equal value productivity of resources in the long run under competitive conditions. However, this condition need not hold true in the short run or in a dynamic economy in which expectations are imperfect

and where competition does not have full reign."[1/] Resource market prices may therefore deviate rather widely, from their marginal productivity. When the market rate is less than the productivity of resources, part of the return to other factors is imputed to the one receiving the residual. If the market rate is greater than the productivity, the reverse is true. Depending therefore, upon the method used in the imputation of the total product, very misleading results may be obtained from resource efficiency comparisons. A management or labour return figure based on market prices for resources may easily over-estimate or under estimate the profitability of individual practices, the relative returns from different scales of operation, or the value of specific resources.

It is customary to assume, however, in resource efficiency analysis that competition prevails such that the market price for each resource, except the one to which the residual is given, approximates the value productivity of the resources. Less exact tests of interregional productivity differentials have been made by imputing the entire product to labour. Such rough average productivity estimates for resources applied at varying levels of intensity in different regions do have significance, however, in

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1/ E.O. Heady, op. cit., p. 406.

that they involve the nature of the production function by relating input of resource to output of product.

The foregoing is intended to give some indication of the difficulties encountered in estimating value productivities of resources by any method, and the uncertainty as to the reliability of the results. However, while the procedures themselves are open to question, they do suggest possible differences in resource returns. A further difficulty is encountered in collecting the relevant data on which to apply these doubtful procedures. These procedures have, however, been used by Heady, Schultz, Johnson and many other research workers in the United States to show wide gaps between the productivities of resources among farms, between areas and between agriculture and other industries. They all seem to show a high rate of return to capital and a low rate of return to labour in agriculture when measured against comparable labour in other fields.

It follows, therefore, that total output could be increased by the movement of labour resources out of agriculture into other occupations, in sufficient numbers to equalize the rate of returns for comparable labour inputs. Transfers between agricultural regions would have similar results. Closing the gap would also entail larger inputs of certain types of capital in agriculture.

The methods of measuring efficiency by comparative analysis, so far mentioned, can be summarized as follows:

1. The gross value product per worker between farms, regions or industries may be compared. This method magnifies differences since the computational procedure imputes the entire product to labout. Industries with large capital will therefore show higher productivity per worker.
2. The average value productivity for each resource can be estimated, by the residual method, for comparisons within agriculture and between argricultue and other industries.
3. The marginal productivities of various resources can be computed by complex methods (involving lease square regression analysis and simultaneous equations) for inter-farm, inter-area, and inter-industry comparisons.

In addition to the above procedures, the first step in viewing the problem of resource allocation would be to examine the historical trends in the aggregate of all the major lines of production. This is simply a way of laying out the record of past production in order to see the influence of the various internal and external factors affecting agriculture, and to observe the extent to which adjustments are being made within and between

different agricultural areas to combat these forces. These trends will also give some indication of probable future developments. The Quebec study will be largely confined to the examination of historical trends (mainly from Census data) in production, prices, population and labour force, technological change and other major factors affecting production. The comparison of historical series will give the primary indication of how production has responded to the dictates of the pricing system in fulfilling the wishes of society. The theories which evolve can then be tested by more precise analysis. "Since opportunities are not great for deriving marginal productivities on a widespread basis, census or other data are likely to continue to be used in deriving average productivities and making resource recommendations."[1/] Some of the implications of this latter method should therefore be considered.

The extent to which average resource productivities can be used as a basis for guiding resource use, either by an individual within his farm or by a public administrator, depends upon the nature of the production function. When constant returns exist for each factor, the production function for each resource is homogeneous of the first degree; then averages alone can serve

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1/ Heady, op. cit., p. 726.

without qualification to suggest marginal productivities. But use of average productivity figures necessitates qualifications if the production for individual farms or agricultural regions is identical and includes ranges of both increasing and decreasing marginal returns. Also, in a case where the production functions of two regions are different, the average and marginal productivities may differ in opposite directions. Then the magnitudes of averages cannot serve as an accurate index for rearranging resources for optimum use.

The nature of these qualifications have been illustrated quite clearly by Heady[1/] to show that average productivity comparisons may be misleading and could lead to erroneous recommendations for recombining resources if they were taken as representative of the marginal productivity figures. This is important for agriculture since some farmers in all regions, and perhaps the majority in a particular region, may operate under conditions of increasing returns to capital. And it is unlikely that production functions of different regions will be identical and homogeneous of the first degree. If certain conditions hold true as to the nature of the production function and if enough information is available, average value productivity figures can

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1/ Ibid., pp. 725-733.

also be used to estimate marginal productivities. When average and marginal productivity are both declining as greater quantities of resources are used and both curves are of a straight-line nature, the marginal product declines at twice the absolute rate of decline in the average product. So, if estimates of two points on the average product curve were obtained, the marginal product could be estimated, if it were certain that the curves were linear. Heady suggests that the "use of a system such as this, even where the average curve is not linear, would give better estimates of marginal productivity than does the system which assumes that differences in marginal products are of the same order as difference in average products."[1/] This is a reasonable suggestion since some of the other limitations in the use of average productivity figures as approximations of marginal productivity would be overcome. These are apparent difficulties in applying this approach, however.

When Census and other aggregative data are used for analysis, the various categories of resources are not broken down sufficiently to allow use of any refined imputational processes in arriving at the rate of returns to any single factor. The fact that returns to resources may differ as greatly between farms within

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1/ Ibid., p. 729.

a region as between the average of all farms in the different regions will be obscured by the use of such composite data.[1/] There are farms producing a high value product per unit of resource within low income regions, while farms of low productivity exist in regions which on the average have a high return per unit of resource.

The disadvantage of making aggregate comparisons should now be evident and it would appear that the farm management approach, though limited in its sphere of application, provides a more accurate guide to resource use. Again, there are greater possibilities for carrying out marginal analysis at this level. It seems desirable, therefore, that greater use be made of the farm management survey in measuring efficiency in agriculture. Canadian institutions could carry out to great advantage studies of this type, many of which already have been carried out in the United States with remarkable success.[2/]

1/ See Lawrence R. Klein, "Remarks on Theory of Aggregation", Econometrica, April 1946; Kenneth L. Bachman, "The Aggregation of Individual Firms in Analyzing Economic Efficiency in Agriculture", Economic Efficiency Series, University of Chicago, 1950.

2/ In this connection the work of Earl O. Heady is most outstanding. The studies contained in Iowa State College Research Bulletins, Nos. 398, 401, 404, 412, 419, 423-9, and 433 (1953-55) are among his many contributions.

Much could also be achieved through greater co-operation between the various departments of Agricultural Colleges and Government Experimental Stations. Controlled experiments could be designed to provide the physical relationships necessary for developing production functions. These could be set up under conditions which are similar to those existing at the farm. Economists and physical scientists could collaborate in developing production functions which would have general application at the farm level for such inputs as feed and fertilizer. These contributions would be of the type made by Jensen and others in connection with milk production.[1/]

Despite the many difficulties to be overcome in the development and use of production functions,[2/] from controlled experiments of farm surveys, they provide information necessary for the understanding and solution of farm problems. Wider use

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1/ "Input-Output Relationships in Milk Production", by Jensen, Woodward, et al -- U.S.D.A. Technical Bull. 815, May, 1942. Also, Peter Hansen, "Input-Output Relationships in Egg Production", J.F.E., Vol. XXXI, No. 4, 1950, pp. 687-696.

2/ See Irving F. Fellows, "Developing and Applying Production Functions in Farm Management," J.F.E., Nov. 1949; J.W. Clarke, "The Production Function in Farm Management Research", Canadian Journal of Agricultural Economics, Spring 1954.

may also be made of linear programming and budget analysis techniques for determining the allocation of limited resources which bring maximum return to the individual farm operator.

Although no completely reliable method of measuring efficiency has been outlined, each can serve to give general directions for the efficient use of resource. With these analytical tools in hand, attention can now be directed to the Quebec problem.

CHAPTER III

THE EFFICIENCY OF AGRICULTURE IN QUEBEC

The purpose of this chapter is to study the productivity of resources used in agricultural production in Quebec and to obtain some idea of the efficiency in their use, relative to time and space, by drawing on the methods of the previous chapter, in so far as is possible.

Method of Study

The analysis of production efficiency usually centres on the proper combinations of resources and products and the proper scale of operations under a given economic environment.

It is evident from the qualifications that no ideal solution would result from the application of the methods of measuring efficiency outlined in the previous chapter. Further, available data will not even permit the study to be conducted with the precision suggested by these methods. An accurate measure of the degree of efficiency in resource use would derive from data which permitted the full use of marginal productivity analysis. This study will examine data on agricultural inputs and outputs, and make use of measures which will

serve as indicators of the relative efficiencies and marginal productivities of the various resources used in Quebec agriculture, rather than provide accurate mathematical measures of these. Although the allocation of resources on individual farms have an important bearing on the aggregate efficiency of agriculture, only the allocations between farming regions and between agriculture and other industries will be considered. Bearing in mind the implications of the theoretical analysis, the following approach will be adopted:

First, the development of agriculture in Quebec will be traced by examining time series of the various factor inputs and outputs of the industry for the province as a whole. This will indicate the changes in the use of resources and in the resulting output of product which have occurred over time. This will account for the changes in production which have resulted from the adoption of new techniques and changes in the productivity of the factors employed. Some references will be made to parallel development in Ontario, the Maritime Provinces and Canada as a whole, to give the space dimensions of the efficiency of resource use in these areas as compared to that in Quebec. The decennial census figures from 1901 to 1951 will serve as the basis for this analysis. Attention will be

focused on changes in the utilization of human resources, shifts in the major land-use categories and material resources, and changes in agricultural output. Examination of various rates of input and physical input-output relationships will indicate the degree of technical efficiency in resource use, then, the money return per unit of resource will suggest the relative economic efficiency of the regions.

This analysis will be supported by a detailed study of annual data, on a provincial basis, from 1935 to 1955 (in some instances from 1926) of inputs, outputs, costs, prices, and incomes. The findings here will be important for considering the outlook for the agricultural industry of Quebec in the final chapter.

Secondly, to employ the value of production per unit of resource as an efficiency indicator, a comparison will be made of the productivity of labour in industry and agriculture in Quebec. This will be essentially a study of farm incomes and comparable non-farm incomes, and will be an indication of the functioning of the agricultural sector with respect to the rest of the Quebec economy. Any disparity which exists between urban and rural living standards will be reflected in this section.

Finally, to examine the province in more detail, a study will be made of the major physiographic regions of Quebec. This section will aim mainly at bringing out the physical attributes and limitations of the regions. This analysis will be based onthe decennial censuses from 1931 to 1951. While this study will allow significant conclusions to be drawn about the particular regions of Quebec, the census figures are not reported in sufficient detail to allow the development of complete regional data for as many variables as is possible for the entire province. However, where possible, counties considered representative of the regions will be used to provide additional data for regional comparisons. References will be made to the adjacent Ottawa-St. Lawrence Lowlands region of Ontario which has many characteristics in common with the St. Lawrence Lowlands region of Quebec.

It is safe to assume that the above measures will provide rough guides to the efficient use of resources since all the variables concerned do, in large part, come under the influence of the market economy.

Agricultural Development in Quebec

Human Resources: The productivity of the human agent depends partly upon quantity and quality. Since there is

no reliable measure of quality, which includes managerial ability, only actual numbers will be considered. In much of the economic literature the process of economic development is associated with a decline in the relative importance of the rural population. Smaller and smaller proportions of a country's working population employed in agricultural production is taken as indicative of economic growth. But, it may be misleading to make economic deductions from population figures alone. Table I below indicates the changes in population and labour force since 1901. The rural population in Quebec was 32.7 per cent of the total in 1951 compared with 60.3 per cent in 1901.

TABLE I. POPULATION AND LABOUR FORCE, QUEBEC, 1901-1951

Census Year	Population		Labour Force a/		Percentage of Labour Force Employed in Agriculture
	Total	Rural	Total	Agricultural	
	- thousands -				
1901	1,649	995	512	196	38.2
1911	2,006	1,039	653	205	31.3
1921	2,361	1,038	781	218	27.9
1931	2,875	1,061	1,022	228	22.3
1941	3,332	1,222	1,189	255	20.6
1951	4,056	1,327	1,472	195	13.3

SOURCE: Census of Canada, 1951, Vol. IV.

a/ Males ten years and over, except in 1941 and 1951, in which the age classification was 14 years of age and over.

Although the population of Quebec was almost three times as great in 1951 as it was in 1901, the agricultural labour force remained almost unchanged, while that of non-agricultural industry increased conspicuously. The percentage of the total labour force engaged in agriculture over the period shows clearly the decline in relative importance of the agricultural industry. This in itself is an adequate measure of the industrialization of the province. The number of workers on farms in Quebec has actually shown absolute increases in each decade but the last one enumerated. As we proceed to examine the use of other factors of production, it will become evident that the farm labour force is kept at a maximum in terms of other resources.

Population and labour force shifts have followed much the same trend in Ontario and all Canada as in Quebec, but to a different degree.[1/] In 1931 the farm population of Quebec comprised 27 per cent of the total population of the province, but by 1951 this figure declined to 19 per cent. The farm population in 1951 still exceeded that of 1931, however. In Ontario, the farm population was 23 per cent of the total population in 1931 and only 15 per cent in 1951. For all Canada,

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1/ D.B.S. Census of Canada, 1951, Vol. IV.

however, the farm population in 1951 constituted 21 per cent of the total population. While the farm population of Quebec in 1941 showed an absolute increase of 8 per cent over 1931, that of Ontario declined by 12 per cent during the same period. The agricultural labour force of Ontario, except for 1931, has decreased at an increasing rate since 1911. Agriculture accounted for 41 per cent of Ontario's total labour force in 1901 but by 1951 it claimed only 11 per cent.

If the declining relative significance of the agricultural labour force is valid as a measure of economic development, then this trend in Ontario certainly surpasses that in Quebec. In a growing economy it is considered essential that agriculture must contribute to growth by freeing labour resources in order that economic development may be speeded up in other sectors. This freeing of labour resources will necessitate an aggregate agricultural output being produced from fewer but more efficiently organized farms. The recent decline in the population and labour force on farms in Quebec suggests that the province is now moving in a direction consistent with economic criteria, towards more efficient utilization of its human resources. The declining percentage of the labour force employed in agriculture (Table I), clearly shows that the population is responding to economic forces.

Farm people are no longer willing to accept a lower standard of living than industrial workers. This decline is not merely an evidence of the declining importance of agriculture but is just as significant as evidence of improved efficiency in agriculture.

A more meaningful measure of the input of labour would be in terms of man-days or man-hours of labour rather than actual numbers. The former measure would indicate more clearly the changes in the intensity of labour use. Sparsity of data will not permit the use of such a measure, however.

Land Resources: Of the 335 million acres of total land area in Quebec, it has been estimated that there are 31 to 36 million acres of arable land, or ten per cent of its area. Of this, 18 to 20 million acres (six per cent) are already occupied and there remain from 12 to 16 million acres (four per cent) to be colonized.[1/] When the Quebec regions are examined in detail, however, it will appear that these estimates tend to over-emphasize the importance of these lands for agricultural purposes.

As shown in Table II, there has been no spectacular expansion of the Quebec farm area since 1901, and the area of

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1/ Statistical Year Book, Quebec, 1954, p.296.

improved farm land has followed very nearly the same trend. This latter category has increased by nearly 20 per cent during the fifty-year period, but this increase all occurred in the first two decades of the century. There has been virtually no change since 1921 -- and this in face of an active policy of "colonization", designed to expand the farm area and maintain a maximum agricultural population. The area in farms reached a maximum in 1941 but in

TABLE II. AREA AND CONDITION OF OCCUPIED FARM LAND, QUEBEC, 1901-1951

Census Year	Area in Farms	Improved Land	Cropland	Hay	Pasture
		- thousands of acre -			
1901	14,444	7,440	4,768	2,548	n.a.
1911	15,613	8,162	5,575	3,231	n.a.
1921	17,257	9,065	6,001	3,658	2,858
1931	17,304	8,994	6,140	3,806	2,601
1941	18,063	9,063	6,138	3,800	2,519
1951	16,786	8,829	5,790	3,516	2,685

SOURCE: Census of Canada, 1951, Vol. VI.

1951 was reduced to its smallest size since 1911; this decline occurring during a decade of rapid industrial expansion.

The area of improved land has remained for five decades at almost a constant ratio of 50 per cent of the occupied farm area.[1/] The area devoted to crops has not changed significantly since 1921, although there has been some shift in the relative importance of different crops. An outstanding characteristic is revealed in the fact that over 60 per cent of the cropland is in hay; the corresponding percentage for Ontario is about 40. Hay and pasture land taken together, shows a declining trend in Quebec, however, and this would suggest a similar trend in the cattle population. But since the dairy and livestock industries have been of increasing importance in the province, this suggests that greater reliance is being placed on "purchased" rather than "farm-grown" feeds. This fact will in a later section be substantiated by the much greater proportion of farm operating expenses which is accounted for by feed. This is partly explained by the facilities afforded Quebec farmers under the Federal Government's freight assistance policy for Eastern Canada on grains and mill feeds from Western Canada for use as feed for livestock and poultry.

1/ For all Canada, 55.6 per cent of the total area in farms was improved in 1951 and in Ontario 60.8 per cent, while in Quebec this figure was 52.6 per cent and for the Maritime Provinces 29.9 per cent. (Calculated from Census of Canada, 1951, Vol. VI.)

Generally, the data on major land-use categories in Quebec suggest a recent retreat from the poorer and more unproductive soils. This, however, has not been accompanied by any significant change in the number of farm units during the five decades under consideration, as is indicated in Table III.

TABLE III. NUMBER AND SIZE OF FARMS, QUEBEC, 1901-1951

Census Year	Number of Farms (farm operators)	Average Size of Farms (acres)	Improved Acres per Farm	Farm Labour Force per 100 Farms
1901	140,110	103.1	53.1	140
1911	149,701	104.3	54.5	137
1921	137,619	125.4	65.9	158
1931	135,957	127.3	66.2	168
1941	154,669	116.8	58.6	165
1951	144,000[a]	116.5	61.3	136

SOURCE: Census of Canada, 1951, Vol. VI, Agriculture, Part I.

a/ To make the 1951 figure comparable with previous censuses, the number of farms has been adjusted from 134,336 to 144,000 to take account of the change in definition after 1941.

In sharp contrast to Ontario where there has been a very substantial reduction in the number of farm units, the number in Quebec in 1951 was within three per cent of that for 1901. The increase in farm numbers and reduction in average farm size registered in 1941 is

apparently a result of the shift to agriculture during the depression years of the 1930's.

Looking next at the farm holdings classified by size of farm,[1/] it is observed that there has been a desirable shift away from units of size ten acres and under. This category comprised about ten per cent of the total number of farms during the first two decades of the century but since the 1940's have been reduced to less than 3 per cent. Throughout the period, farms of size 51-100 acres and 101-200 acres have been of equal importance, and together these groups have comprised about 70 per cent of the farms in Quebec. There has been little tendency towards an increase in the number of farms exceeding 200 acres, while those of less than 50 acres have shown a downward trend and those of 51-200 acres a slight trend upwards.

The average area of improved land per farm has not changed significantly in Quebec since 1901 (Table III). There was in 1951 just over 60 acres of improved land per farm. As compared to Ontario, the 1951 Census shows that improved land per farm in this province increased from 65 to over 80 acres in the past five decades. Of equal importance is the fact that

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1/ D.B.S., Census of Canada, 1951, Vol. VI, Part I, Table 4.

in 1951,57 per cent of Ontario's farms had over 70 acres of improved land while this percentage for Quebec was only 43 per cent.

The fact that the decline in the area of farm land in Quebec has not been accompanied by a similar decline in the number of farm units, accounts for the lack of increase in average farm size, which is observed for Ontario and all Canada. Also, the farm population and labour force per farm has not followed the downward trend indicated for Ontario and Canada. Efficiency in Quebec agriculture will obviously be impaired by its failure to operate larger, and thus more efficient farm units. By keeping its farm working force at a maximum, it must also fail to take full advantage of technological developments. Modern farm machinery substitutes for labour but can only be efficiently applied at a certain scale of operation.[1/] The following section will examine the rate at which these land and labour resources have been combined with capital inputs to determine the output of the industry.

Capital Inputs: The historical trend in farm values for Quebec is presented in Table IV. It is observed that investment

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1/ The question of land tenure is unimportant in this analysis since only an insignificant number of Quebec farms are not owner-operated.

in farm capital has an increasing long-run trend although farm values declined sharply in 1931 and 1941. Since these figures are reported in current dollars they may not present a true picture of the situation. The significant observation, however, is the change in distribution of total farm values between its various components. Table IV reveals the steadily declining importance of "Land and Buildings" relative to "Implements and Machinery" and "Livestock" in Quebec. This trend has been

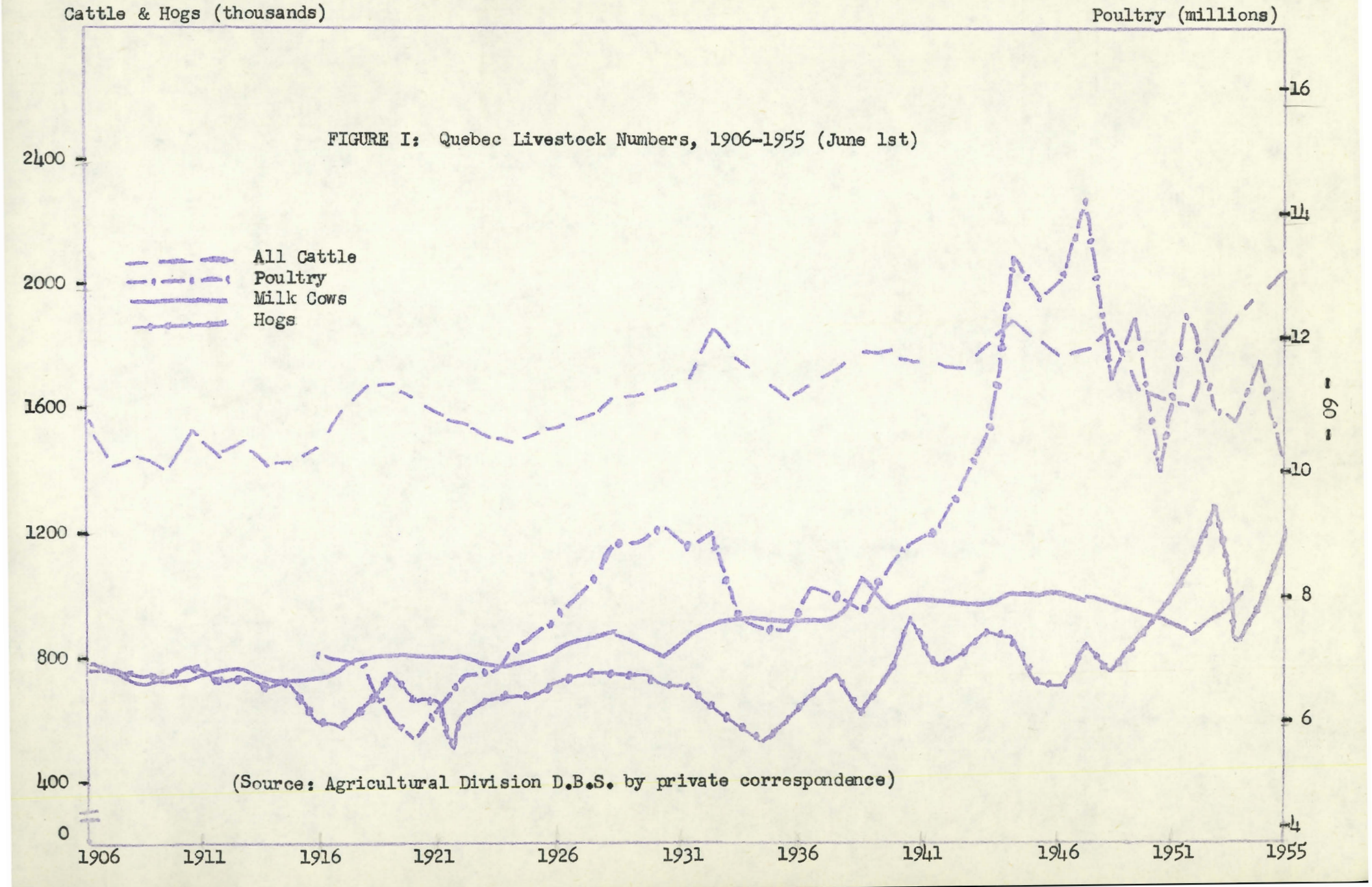
TABLE IV. FARM VALUES, QUEBEC, 1901-1951

Census Year	Total Value	Land & Buildings	Implements & Machinery	Livestock
		- thousand dollars -		
1901	436,077 100%	450,550 80.4%	27,038 6.2%	58,499 13.4%
1911	787,754 100%	638,210 81.0%	51,955 6.6%	97,590 12.4%
1921	1,085,234 100%	850,022 78.4%	111,949 10.3%	123,264 11.3%
1931	877,274 100%	684,131 78.0%	97,270 11.1%	95,873 10.9%
1941	739,747 100%	543,359 73.5%	85,203 11.5%	111,185 15.0%
1951	1,399,363 100%	846,973 60.5%	211,937 15.2%	340,453 24.3%

SOURCE: Census of Canada, 1951, Vol. VI.

general across Canada but the Censuses of Agriculture since 1901 show that investment in implements and machinery has proceeded at a much slower pace in Quebec than in Ontario or Canada as a whole. At no time during the five decades has the average investment per farm in Quebec been as high as in Ontario or for all Canada, and investment in land and buildings has always been relatively more important in Quebec. A comparison with the Maritime Provinces shows Quebec in quite favourable light, however. Then, it must be remembered that the topography of the Maritime does not lend itself to large-scale farming and the small size of farms reduces their requirement for machinery and other inputs.

The historical trend in major livestock numbers from 1906 for Quebec is presented in Figure I. Such a long period is required to overcome the influence of cycles and other extraneous factors. Quebec has had a long-run increase in total cattle number, in milk cow numbers, and in hogs. Since 1950 there has been a sharp increase in both dairy stock and beef cattle, and particularly the latter. However, with a ratio of only one animal unit to about five acres of improved land, it is clear that there is still scope for a very considerable increase in livestock numbers in Quebec. Dairy farming is


Cattle & Hogs (thousands)
Poultry (millions)
FIGURE I: Quebec Livestock Numbers, 1906-1955 (June 1st)
All Cattle
Poultry
Milk Cows
Hogs
2400
2000
1600
1200
800
400
0
16
14
12
10
8
6
4
60
1906
1911
1916
1921
1926
1931
1936
1941
1946
1951
1955
(Source: Agricultural Division D.B.S. by private correspondence)

labour-intensive and the dairy industry is presently hinged on government price support. Yet this industry is becoming increasingly important in Quebec, as will be observed when output is examined. Greater shift to the production of meat animals would serve both to release labour for more productive purposes and to provide products better able to satisfy future consumer demands. If the trend in beef is reflected by the number of cows and heifers kept for beef, then the 1951 census shows that very large increases were made in the number of beef animals on farms during that decade. Poultry numbers have doubled since 1921 in Quebec. The steady growth of the poultry industry has been at about the same rate as in Ontario. The 1951 census shows that the value of poultry in Quebec moved from 4.5 million dollars in 1941 to nearly 16 million dollars in 1951. Efficiency in poultry production has shown greater increases than in other classes of livestock. Yet, in all livestock enterprises there is still within fairly easy reach of most operators a great opportunity to expand output without encountering higher costs. The average number of the important classes of livestock on Quebec farms in 1951 were: cattle 12.2; swine 11.7; and poultry 165.2 per farm.[1/] There has been upward

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1/ Calculated from the Census of Canada, 1951, Vol. VI.

changes in these averages in both provinces since 1901, particularly in the case of poultry, which has increased sharply.

The shift to mechanical power on farms has released large cropland acreages from producing feed for horses to producing products for cash income. The upward trend in use of mechanical power has coincided with a declining horse population. The 1951 Census shows that there were 37,571 horses on Quebec farms in 1911. As compared to 232,863 in 1951, and this reduction occurred mainly since 1941. This is a relatively moderate decline in contrast to Ontario,[1/] but although Quebec has recently made rapid strides in farm mechanization, it still lags much behind Ontario and the Prairie Provinces. Table V shows the advances since 1921 in the use of farm machinery. There were thirteen times as many tractors in 1951 as in 1931. Tractor numbers increased from 5,869 in 1941 to 31,971 in 1951. Remarkable increases are also observed in the numbers of automobiles, motor trucks, milking machines and electric motors but the most significant change has been in tractorization, which has brought with it a wide range of complementary machinery. The 1951 Census reveals

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1/ Both Quebec and Ontario had 1.7 horses per farm in 1951, but the horse population in Ontario declined from 812,214 in 1911 to 260,627 in 1951. (Census of Canada, 1951, Vol. VI.)

TABLE V. FARM MACHINERY, QUEBEC, 1921-1951

Census Year	Automobiles	Tractors	Motor Trucks	Gasoline Engines	Threshing Machines	Grain Combines	Milking Machines	Electric Motors
1921		968						
1931	26,877	2,417	5,152	36,251	39,575		827	3,311
1941	27,026	5,869	6,703	39,274	32,383	55		8,039
1951	41,602	31,971	19,167	30,692	30,360	420	18,238	43,638

SOURCE: Census of Canada, 1951, Vol. VI.

that the change in Quebec does not measure up with that in Ontario, where with practically no tractors on farms in 1921, the number had risen to 105,000 by 1951. In the latter year there were 70 tractors per 100 farms in Ontario as compared to 24 in Quebec. In the Maritime Provinces there were only 20 tractors per 100 farms in 1951. With a surplus of farm labour in Quebec there has been no incentive to move towards the degree of farm mechanization reached in Ontario.

Even with this revolution in farm mechanization which has greatly changed the nature of field operations, the acreage of field crops has shown a recent decline, as noted earlier. It will be observed later, however, that this change has been accompanied by a greater volume of output. The mechanization of farms has not only brought about a better balance between the use of labour and equipment but clearly has also given rise to better farm practices and a better timing of field operations. Despite these advances, there is every indication that there is much greater scope for intensifying production, particularly in areas favourably located to urban market centres. Under more intensive management practices, there is the possibility for reducing crop acreages further and taking some unproductive land out of use.

Publications by the Dominion Bureau of Statistics give annual data of seeded acreages for the most important field crops from 1925.[1/] In Quebec, wheat acreages have declined steeply but since a large area has never been devoted to this crop, the decline becomes less significant. The predominant field crops are oats and cultivated hay. Together, these crops have occupied just under 90 per cent of the area under field crops during the past half century -- hay occupying over 60 per cent. All other field crops have been of little significance with respect to acreage and most show a declining trend, with the exception of mixed grains. The major shift has been away from oats, barley and wheat, sown separately, toward mixed grains. The acreage devoted to hay, including clovers and alfalfa, has declined since 1950. However, with better crop practices and greater use of fertilizer, total output has increased in terms of quantity and quality. Sugar beets and tobacco, which are important crops in selected areas of the province, were given in the 1951 census as occupying 10,741 and 9,458 acres, respectively. Fodder corn now accounts for only 75,000 acres and potatoes for 92,000.

1/ D.B.S. Handbook of Agricultural Statistics, Part I, Field Crops, Reference Paper No.25 (Ottawa, 1951); Quarterly Bulletin of Agricultural Statistics, for the years from 1951.

The comparative importance of Quebec and Ontario in field crop production is indicated by the 1951 census count. The former province had 5.7 million acres in field crops while the latter had 8.1 million acres. The pattern of crop production typifies the livestock economy of both provinces. While crop acreages have undergone greater reductions in Ontario than Quebec, this has been accompanied by an increasing volume of production. Although hay is the most widely grown crop, seeded acreage of hay, including clovers and alfalfa, has always been less than in Quebec,[1/] and accounts for only 40 per cent of the field-crop acreage in Ontario. Wheat, barley, oat, and mixed grains are of major importance in the field crop production of Ontario. In this province, the acreage reductions in wheat, oats and barley have largely been compensated for by the shift to mixed grains, which has nearly doubled in importance since 1925. A similar trend was observed for Quebec. A shift to grass silage in Ontario is reflected in the reduction of fodder corn by more than 100,000 acres. The changing pattern of field crop production in both provinces

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1/ The 1951 census shows that there were 22.7 acres of cultivated hay per farm in Ontario in that year as compared to 27.2 acres per farm in Quebec. Average yields per acre are, however, higher in Ontario than in Quebec.

reveals shifts to more efficient use of land in livestock farming. Fruit farming and vegetable production are also of great importance in certain localities of both Ontario and Quebec, though of much greater importance in Ontario, where soil and climatic conditions are more favourable for their production. These crops will be given further consideration later when dealing with production.

This concludes the review of the changes in factor inputs which have occurred in Quebec agriculture during the past five decades. The changing importance of operating capital will be brought out in the section which follows on costs and prices. In summary, it has been observed that the migration of workers out of agriculture has been relatively slow in Quebec. With the changing pattern of land-use, there has been little change in the numbers and size of farms. These factors combined have served to delay the process of farm mechanization.

The largest single factor in the long-term rise in productivity of farm labour has been progress in mechanization.[1/] Greater use of mechanical power -- tractors, motor trucks and

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1/ Other cnntributing factors have been a high level of general economic development, use of better farming practices, improved management, better financing facilities, and greater interest of farm people in adopting the findings of research. However, many of the small farms in Quebec display little ability to take advantage of modern methods of farming.

automobiles -- have dominated the growing mechanization of Canadian agriculture during the past two decades.[1] A growing list and increasing number of modern labour-saving machines have been used on farms as tractor numbers have mounted. This revolution in farming has not only been a powerful force in increasing the volume of farm output but has released many workers from agriculture. Quebec has, however, understandably lagged behind Ontario and other major Canadian farming areas in this process. The 1951 Census shows that Ontario had a machinery investment of $35 per acre of improved land in 1951, compared to $24 per acre in Quebec. The investment in machinery per acre of improved land for the Maritime Provinces was $30. With not many more tractors per farm than the Maritimes, Quebec is not ahead of this relatively backward area, in so far as farm mechanization is concerned, and much behind other major Canadian farming areas. It is noted, however, that for the fifty-year period there has been some increase in improved land, cropland acreages, and livestock numbers. One measure of the development which has occurred is given by the following changes in input ratios between 1911 and 1951: improved acres per worker moved from 39.9 acres to 45.2 acres; number of cattle per worker

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1/ For a review statement on this subject, see H. R. Shaw and R.C. Gilstrof, "Mechanization in Canadian Agriculture", Economic Annalist, Vol. XXIV, No. 1, Feb. 1954, pp.5-9.

from 7.1 to 8.4; and machinery investment per worker from $254 to $1,085.

Farm Costs and Farm Prices: With an outline of the factors of production employed in Quebec's agriculture, the cost of applying these factors will now be considered along with the prices received for the products produced. These in a very real sense not only describe the economic climate of agricultural production, but are the determinants of the financial results. First, attention is directed to the changing importance of farm operating expenses, and its changing composition.[1/] As operating capital has increased in size, certain inputs have increased in importance at the expense of others. Expenditure on feed and seed, which accounted for about 16 per cent of total operating costs (including depreciation) in 1926, had risen to 35.5 per cent by 1955. Farm machinery costs in 1955 constituted 13.3 per cent of total operating costs as compared to 7.1 per cent in 1926. Worthy of note is the fact that expenditure on feed and seed has always commanded a greater proportion, and that on machinery a smaller proportion of total operating costs in Quebec than in Ontario or all Canada. The increasing importance of these two items is general throughout Canadian agriculture, while the

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1/ See D.B.S. Handbook of Agricultural Statistics, Part II, Farm Income, Reference Paper No. 25 (Ottawa, 1951); and Net Farm Income for the years from 1951.

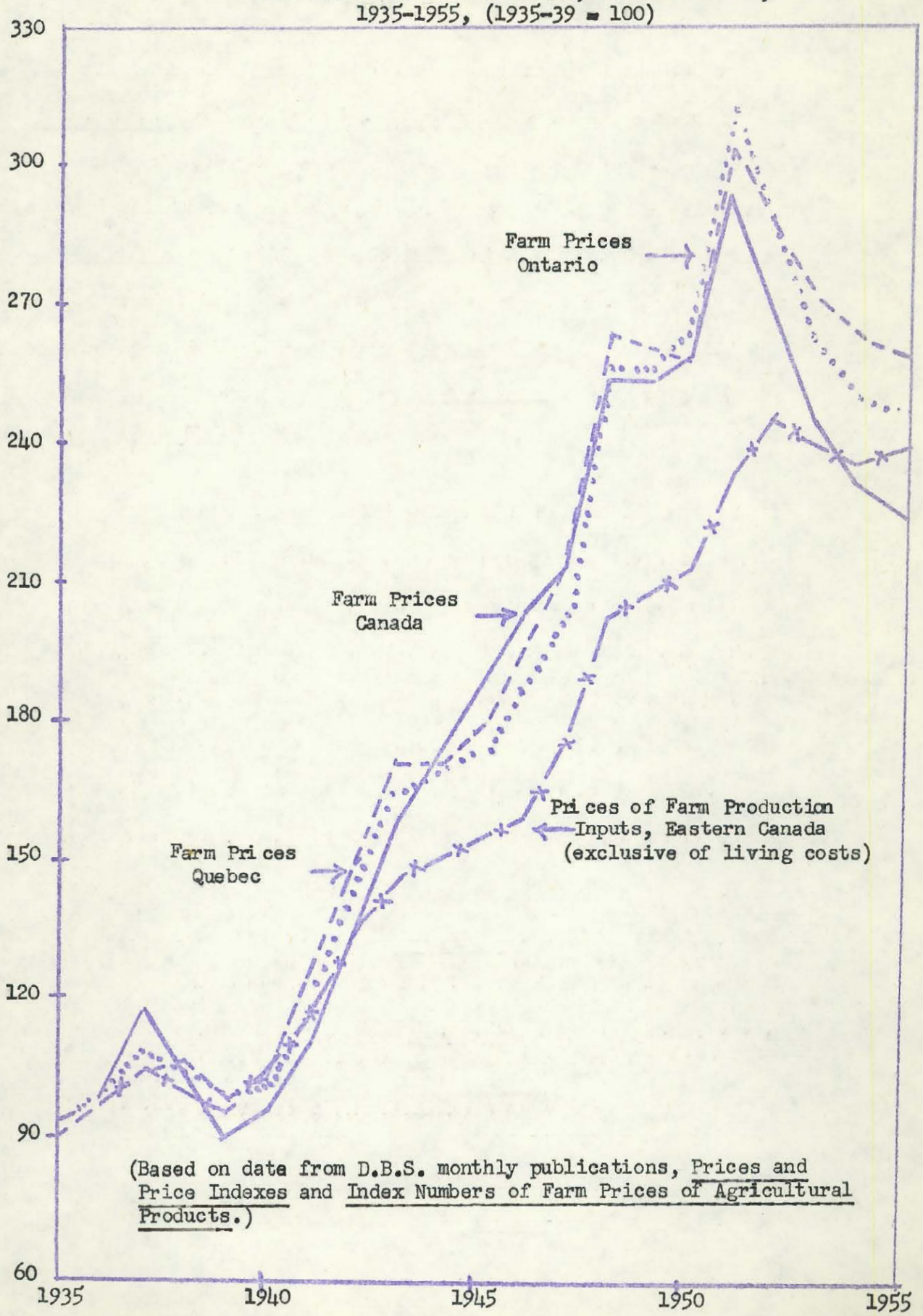
relative importance of hired labour costs and depreciation costs has declined notably. Fertilizer which has gradually increased in importance, still only accounted for 3.5 per cent of total farm operating costs in 1955. Although the relative importance of fertilizer costs in Quebec farming is lower than in Ontario, it is on par with Canada as a whole. There appears to be a definite need for greater use of fertilizer and this would be a part of the programme for more intensive farming operations.[1/]

To consider next the trend in the actual cost of farming, the price index numbers of commodities and services used by farmers in Eastern Canada are presented graphically in Figure II. The details of farm production costs and farm living costs[2/] show that farm wages, currently standing at 427 (1935-39=100) have increased most. They are, in this respect, followed by building materials currently at 287. Farm machinery stands at 208, while equipment and materials are 205.

1/ Mixed fertilizer sales in Ontario during 1954 and 1955 were 376 and 380 thousand tons, respectively, compared to 123 and 112 thousand tons in Quebec. Sales of fertilizer materials in Ontario during these years were 51 and 49 thousand tons, as compared to 16 and 18 thousand tons in Quebec. (D.B.S. Quarterly Bulletin of Agricultural Statistics, Jan.-March, 1956, p.79.)

2/ D.B.S., Price and Price Indexes, (monthly).

FIGURE II: Relation of Prices of Production Inputs and Farm Prices of Farm Products, Eastern Canada, 1935-1955, (1935-39 = 100)



(Based on date from D.B.S. monthly publications, Prices and Price Indexes and Index Numbers of Farm Prices of Agricultural Products.)

Having noted the behaviour of the prices of factor inputs, some insight into the economic well-being of farmers can be revealed by presenting data on the prices of farm products. A graphic presentation of the index numbers of farm prices of agricultural products for Canada, Quebec, and Ontario also appear in Figure II. Like so many of the farm series, most of the data for them are available only since 1935. They are based on 1935-39=100, which for Canadian agriculture clearly reflects depression conditions. Thus, the fact that the price index in one year reached and even exceeded 300, is no indication that farm prices got out of hand. Until 1943, farm prices remained essentially at depression levels; for the next three years they showed modest improvement; since then, they would appear to be favourable to agriculture, But after 1951, as can be observed from Figure II on which the farm costs series also appears, the terms of trade turned sharply against the farm industry. From the favourable situation in 1951 for Eastern Canada, there have been four years of declining farm product prices, accompanied by little change in the prices of purchased input factors -- farm prices and farm costs are again near their 1935-39 relationship. This questions the common assumption that prosperity in agriculture is dependent upon prosperity in the other sectors of the economy. Price changes for individual farm products over the past 20 years

may seem to suggest that over the next 15 years production conditions will be more favourable for crop production than for livestock products, and that this will likely be reflected in comparative prices. But other factors point in the opposite direction.

It is from these relationships of prices and costs that producers are given the directives to produce. It is in order, then, to consider the volume and value of output produced, in response to these varying factors, before turning to see what all this means in terms of realized income, and the productivity of factors. We note in passing that, the general level of farm prices has in recent years been more favourable in Quebec than in Ontario.

Farm Output and Farm Income: The indexes of physical volume of agricultural production which provide the best guide to overall changes in farm output, are presented in Figures III and IV, together with trend lines (not fitted statistically), for Quebec, Ontario and Canada from 1935-55.[1/] The all-Canada index, which rose by some 50 per cent after 1935-39, is strongly weighted by Prairie grain crops and shows the influence of the

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1/ These figures are based on data from D.B.S. Memorandum, Index of Farm Production 1955.

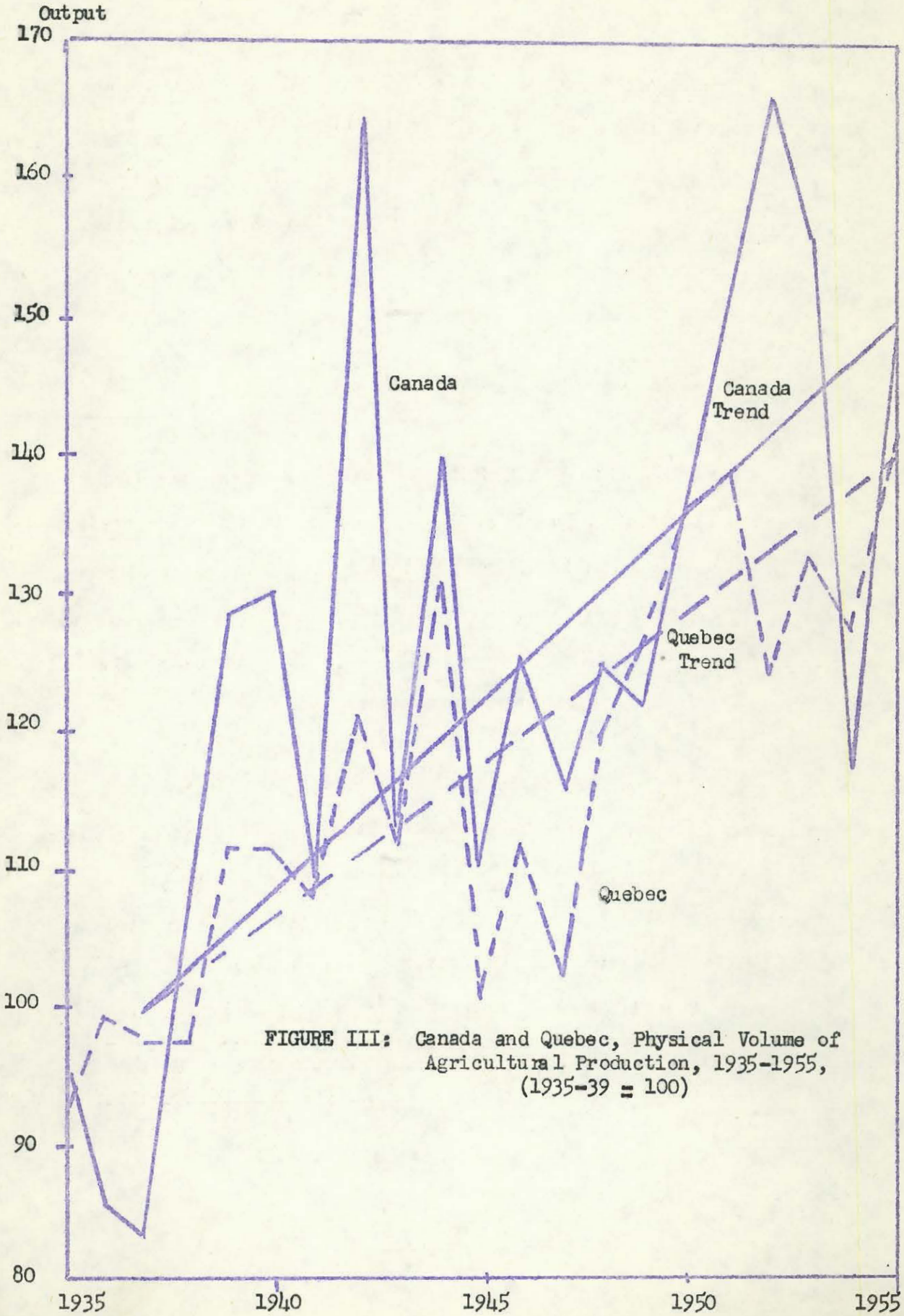

FIGURE III: Canada and Quebec, Physical Volume of Agricultural Production, 1935-1955, (1935-39 = 100)

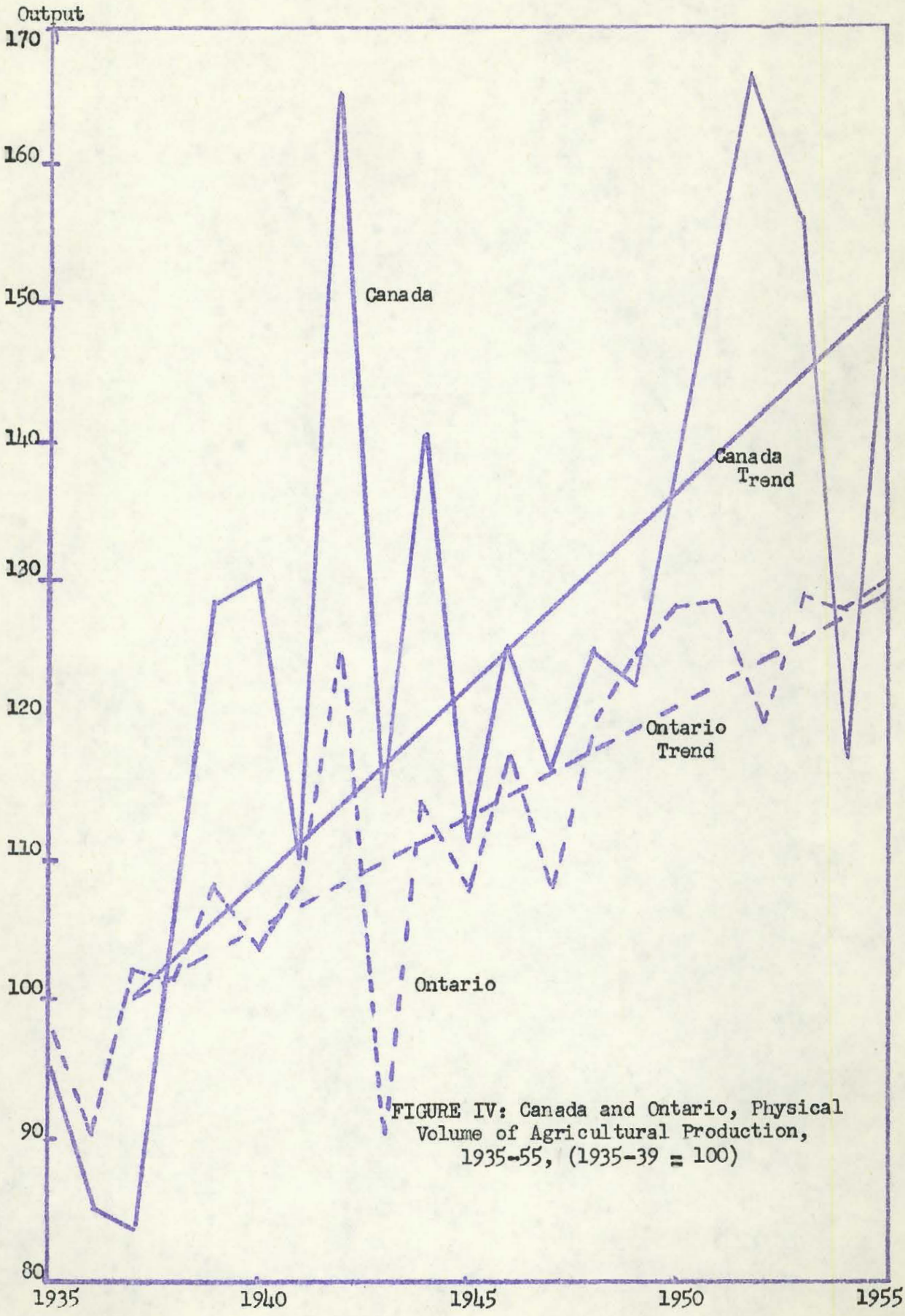

FIGURE IV: Canada and Ontario, Physical Volume of Agricultural Production, 1935-55, (1935-39 = 100)

remarkable degree of mechanization in that region. This is reflected in the record level of output recorded for Canada for years 1951-53, due to the influence of very large Prairie grain crops. Quebec and Ontario reached record levels of farm output in 1955. Quebec farm output in that year exceeded the 1935-39 base period by about 40 per cent, while Ontario was greater by 29 per cent. Presently it will be seen that livestock and dairy products are the main contributors to the record farm production in both Quebec and Ontario. Although the Ontario output has been rising at a slower rate than that of Quebec, its behaviour appears to be typical of a mature and more highly developed agriculture.

There are a number of methods of constructing indexes of production, depending on the use to which they are to be put. Although these presented here are designed to give only a general indication of the direction and size of changes in production, by relating them to inputs of labour, some approximation of the changes in productivity of this factor would result. It is evident that the physical productivity of labour in agriculture had increased over the period, even with a declining labour force. To relate this increasing volume of production to the declining labour input for Quebec, the trend values of the output

index were divided by the estimates of the male agricultural labour force during June, for the years 1946 to 1955. These very crude physical productivity estimates, which give some indication of the changes in output per worker over the ten-year period, show that labour in Quebec agriculture was over 80 per cent more productive in 1955 than in 1946. By 1949 the productivity had increased by more than 20 per cent and by 1952 by more than 50 per cent. This is no indication of increased effort per worker but of the advantages gained from mechanization and improved techniques.

Next is considered some of the quantities of the actual products which underlie the index measure of farm output. The average volume of output of the most important field crops for the years 1953-55, for Quebec and Ontario, are presented in Table VI below. Yields per acre for oats, hay and mixed grains have fluctuated widely over the past 50 years and show no significant increasing trend. Table VI shows that crop production in Quebec is far from impressive alongside the corresponding output for Ontario, but it was noted before that crop production is of declining importance. This is more noticeably so, as far as income from cash sales is concerned. The important producers of cash income in both

TABLE VI. AVERAGE PRODUCTION OF MAJOR FIELD CROPS, 1953-55, QUEBEC AND ONTARIO

Crop	Quebec	Ontario
	- thousand bushels -	
Wheat	224	24,085
Oats	35,195	66,684
Barley	1,312	5,210
Fall rye	58	1,645
Mixed Grains	5,364	46,904
Corn	-	23,458
Beans, dry	14	1,332
Soybeans	-	4,689
Potatoes	13,635	10,315
	- thousand tons -	
Hay	5,728	6,673
Fodder Corn	615	2,513
Field Roots	73	187
Sugar Beets	72	241

SOURCE: D.B.S. Quarterly Bulletin of Agricultural Statistics.

provinces are livestock and dairying, so most attention will be directed to the products of these enterprises. Statistics on meat production are unfortunately not available on a provincial basis.

Appendix Table A presents for Quebec and Ontario the annual production of milk, butter, cheese and eggs since 1935. Quebec, with one-third of Canada's milkcows, produces just over one-third of Canada's total milk output and is now the leading producer in Canada: the highest production in the province's history was in 1955. Quebec also leads Canada in butter production, accounting for 128 million pounds in 1955, this requiring 3 billion pounds of milk or nearly one-half of its total milk production. Fluid sales required 2 billion pounds, cheese 0.2 billion and concentrated products 0.4 billion pounds. The Appendix Table shows a steady increase in dairying since 1936, the annual rate being about three per cent. Ontario's dairy production, on the other hand, after showing some variation and decline, has been relatively stable for the past 5 years. The downward trend since the end of World War II coincided with the introduction of margarine, the effect of which is also reflected in the fact that butter production has declined from a level of 112 million pounds annually in the period 1935-39 to 80 million pounds during the years 1951-55.

Apart from the wartime bulge, which served the purpose of providing exports of cheese, production of this product has shown a distinct decline in both provinces. Canada, being unable

to export cheese at competitive prices, is now essentially on a domestic basis for this product. The rapid expansion of the poultry industry is shown by the increases in egg production. Quebec, with an annual rate of increase of more than five per cent, has doubled its egg production since 1935. Ontario, with more than twice as large a production as Quebec, has currently nearly doubled the production of the late 1930's. With a strong domestic demand for poultry products, the promises for the future of this industry remain bright. The dairy industry is not in such a fortunate position, however, being presently faced with many difficulties. Quebec, being free from the direct competition of margarine, is in a better position than Ontario but is also particularly affected by marketing problems. Yet, there is considerable scope in Quebec for improving the efficiency of the dairy industry, both in terms of producing feed and of breeding, feeding and management practices. This, of course, applies equally to other classes of livestock production.

The ideal measure of physical productivity is the volume of output of a specified product (or service) per unit of factor input. The total volume of physical production is, therefore, not of major importance to this study but rather the

production per unit of factor employed. This gives an indication of the advances in technological efficiency. Immediately the problem of obtaining statistics of individual input and output items is encountered. The rough estimate of labour productivity from the generalized volume of production index has been discussed. But no reliable estimates of the rate of output per unit of any category of livestock is available from official sources. From the above increases in output, it is clear that these changes have resulted mainly from the increases in production per animal unit. The most significant changes in production efficiency are the increases in milk production per cow and number of eggs per hen. Unofficially, the Bureau of Statistics estimates that the output of milk per cow has increased by about 25 per cent over the past 20 years, and over the same period, the number of eggs per hen has increased from about 120 to 160. Such are the benefits of improved techniques and better farm organization.

In order to attach economic significance to the preceding measures of production, it is necessary to examine the value of production and incomes accruing to the factors employed. These are now examined, with the assurance that the findings here will be consistent with the foregoing. The series

on cash income from the sale of farm products by commodity groups from 1926 [1] indicate the relative importance of Quebec and Ontario agriculture in the Canadian picture. Further indication is given by the cash income data for the past five years presented in Table VII. Quebec produces between 14 and

TABLE VII. CASH FARM INCOME FROM THE SALE OF FARM PRODUCTS QUEBEC, ONTARIO AND CANADA, 1951-1955

Year	Quebec	Ontario	Canada [a]
	- million dollars -		
1951	437.0	786.8	2816.5
1952	412.6	719.0	2849.3
1953	393.6	720.2	2775.8
1954	407.0	714.4	2395.3
1955 [b]	425.0	744.1	2352.6

SOURCE: D.B.S. Quarterly Bulletin of Agricultural Statistics.
a/ Excludes Newfoundland. b/ Preliminary.

18 per cent of the Canadian cash farm income, while Ontario, now the leading producer of cash income from farming among Canada's provinces, accounts for between 25 and 32 per cent. The Quebec cash income has averaged about 60 per cent of that produced in Ontario.

1/ D.B.S. Handbook of Agricultural Statistics, Part II, op.cit.

Quebec, with 27 per cent of the Canadian farm population in 1951, produced only 16 per cent of Canada's cash farm income; while Ontario, with 24 per cent of Canada's farm population produced 28 per cent of the nation's cash income from farming in the same year. By reading across Table VIII which follows, the position of Quebec agriculture relative to Ontario and all Canada, as a producer of cash income is clearly revealed. The average cash income produced per farm and per capita in Quebec has consistently been below the all-Canadian averages, while those in Ontario remain always above.[1/] This reflects the low productivity of Quebec agriculture and is a clear indication of its relative inefficiency.

TABLE VIII. CASH INCOME PER FARM AND PER CAPITA, QUEBEC, ONTARIO AND CANADA, 1931-51

		Quebec	Ontario	Canada
Cash Income per Farm ($)	1931	552	890	653
	1941	909	1,540	1,208
	1951	3,253	5,248	4,520
Cash Income per Number of Farm Population ($)	1931	97	213	145
	1941	168	390	281
	1951	551	1,120	967

SOURCE: Compiled from D.B.S. Quarterly Bulletin of Agricultural Statistics and Census of Canada, Vol. VI, 1951.

1/ The 1951 census shows that only 26.2 per cent of the farms in Quebec sold products valued at $2,500 and over in 1950. The percentage of such farms in Ontario was 48.7 per cent.

This will be expressed in terms of returns per worker in the discussion of net farm income which follows shortly.

The details of the cash income data reveal that over the past ten to fifteen years from 75 to 80 per cent of the Quebec income has been from livestock products. It is noted also that this item is of increasing importance in Quebec agriculture. This is consistent with the trend in Canadian agriculture as a whole, although no such trend is discernible in Ontario. In Quebec, dairy products account for half the livestock income and nearly 40 per cent of total cash income. The increasing importance of dairying in the province is more prominent than for Canada as a whole. Next, in order of importance as contributors to cash income in Quebec, are hogs (15-20 per cent), cattle and calves (10-15 per cent) and poultry and eggs at almost the same percentage of the income. Receipts from forest and maple products have accounted for 11 to 13 per cent of cash income, while all crops, the declining importance of which was before noted, have in recent years contributed just under 10 per cent.

Of greater significance in determining the relative importance of agriculture in the national economy is the contribution that is made by this industry to national

income.[1] Burton suggests that "one of the main reasons why farmers receive a less than proportionate share of the national income is that their average productivity is less than that of people in other industries". Before turning to examine the truth of this statement, in so far as Quebec is concerned, the net income position of Quebec farmers will be examined.

The net income of farm operators from farming operations in Quebec during 1955 was estimated at 293.4 million dollars. This represented a gradual increase since 1952 but a decline of about 14 per cent from the record of 333.8 million dollars in 1951. This trend was general across Canada. The Quebec income in 1951 was almost four times as great as the average for the five-year period 1926-30, and 47 per cent above that for the post-war years 1946-50.[2] These changes are misleading due to the changing value of the dollar, but the real changes in productivity have already been given by the volume of production index. The net income per worker[3] in 1941 was 460.2 dollars and in 1951, 1818.2 dollars. These earnings were only 81.6 and 64.6 per cent, respectively, of the averages for Canada as a whole in those years, and much further behind

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1/ In this connection see G.L. Burton, "Do Canadian Farmers Produce a Fair Share of the National Income", Agricultural Institute Review, May 1948.

2/ See D.B.S. Handbook of Agricultural Statistics, Part II, op.cit., and Net Farm Income, for years 1951 to 1955.

3/ Estimated by adding the wages of hired labour to net income and dividing by the farm labour force.

the Ontario averages of 727.7 and 2,958.8 dollars, respectively. Again, this points to low productivity and relative inefficiency of Quebec agriculture. It cannot be denied that this province has made tremendous strides in agricultural productivity during the past half-century, but it has consistently lagged behind the Ontario and all-Canadian averages.

This is not meant to suggest that there are no efficient farms in Quebec but there is a very high percentage of inefficient ones. This is substantiated by the fact that of the 142 thousand full-time farms counted by the 1941 Census, 44 per cent were classified as subsistence or combination of subsistence farms. The gross revenue of these farms in 1940 amounted to only 22 per cent of that of all full-time farms. The important place of subsistence farming in Quebec agriculture is at once apparent; but some indication of their extremely low productivity is given by the fact that the value of products consumed by the farm household on such farms is 50 per cent or more of their gross revenue. The 1951 census classified 21.4 per cent of the full-time farms as small-scale farms which sold products valued at less than 250 dollars in 1950. Of the remaining full-time farms (those classified as commercial farms with cash sales greater than 250 dollars) only 10.3 per cent sold products valued over 5,000 dollars.

Small scale farming is much more prominent in Quebec (and the Maritime Provinces) than in any other Canadian region. The long and narrow farm holdings, with far from imposing farm buildings, immediately strikes the eye of the traveller in many parts of Quebec. Herein lies the most serious problem of Quebec agriculture, and so long as these conditions hold, it is safe to say that the average Quebec farmer will continue to enjoy a lower standard of living than the average Canadian farmer. The section which follows views the performance of the agricultural sector of Quebec as compared to the non-agricultural.

Farm and Non-farm Income

The efficiency criterion is that labour of equivalent capacities should earn the same real return in all employment. There are, however, numerous difficulties in any attempt to compare farm and non-farm incomes. The problems encountered in making income comparisons are well known and some of the basic difficulties have been outlined by Grove and Koffsky.[1/] In addition to the tasks inherent in making agricultural income estimates, there is the impossibility of measuring the value of the satisfaction derived from the so-called "intangibles" associated with farming as a way of life. Account can only be

1/ E. W. Grove and N.M. Koffsky, "Measuring the Incomes of Farm People", Journal of Farm Economics, Vol.XXXI, 4, Nov. 1949, pp.1102-11. See also D. Gale Johnson, "Functioning of the Labor Market", Economic Efficiency Series, University of Chicago, Summer 1950.

taken, therefore, of the actual returns to farmers, with allowances for the value of farm products consumed in the home and for use of the farm home, when making comparisons with workers in other industries.

The residual method of measuring productivity although it provides only a rough estimate of the marginal product of a factor, has been applied with diligence to labour in Canadian agriculture by W. J. Anderson.[1/] Anderson's study includes an estimate of the productivity of labour in agricultural and non-agricultural employments in Quebec. This writer, being almost entirely in agreement with Anderson's approach, does not propose to undertake a separate study but will merely make reference to the findings of his research. These findings are quite consistent with those arrived at by the less refined procedures in the preceding paragraphs.

Anderson made adjustments to the published labour force data for the agricultural and non-agricultural sectors, by making allowances for differences in the sex composition and the length of the working year, in order to make both groups comparable. The over-all effect of those adjustments was to decrease the size

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1/ W. J. Anderson, "Productivity of Labour in Canadian Agriculture", Canadian Journal of Economics and Political Science, Vol. XXI, 2, May 1955, pp.228-236. See also D.L. MacFarlane, "Mobility in the Canadian Agricultural Labour Force", (unpublished).

of the total non-agricultural labour force and increase that of the agricultural. By dividing these figures into the estimated net product of the agricultural and non-agricultural sectors, Anderson derived the net product per unit of labour for the respective groups. The non-agricultural sector was represented by the earners of wages, salaries and supplementary labour income, and of the net income of non-agricultural unincorporated business. From the last item a 25 per cent deduction was made for the earnings of capital. An adjustment was also made for wages paid to labour in agriculture. The results for Quebec are reproduced in Table IX.

TABLE IX. PRODUCTIVITY OF AGRICULTURAL AND NON-AGRICULTURAL LABOUR, QUEBEC, 1945-53

Year	Net Product per Unit of Labour ($)		Ratio of Agricultural to Non-Agricultural
	Agricultural	Non-Agricultural	
1945	458	1,857	.25
1946	536	1.821	.29
1947	545	2,022	.27
1948	776	2,157	.36
1949	804	2,204	.36
1950	767	2,331	.33
1951	1,088	2,516	.43
1952	983	2,714	.36
1953	957	2,843	.34

SOURCE: W. J. Anderson, "Productivity of Labour in Canadian Agriculture", Canadian Journal of Economics and Political Science, May 1955, p.235.

The table shows that over the period from 1945 to 1953, the productivity of labour on farms in Quebec has not exceeded 43 per cent of that for labour in other industries; this maximum was achieved in a year most favourable for agriculture. The disparity between farm and non-farm productivity was general across Canada, but there were wide regional differences. "British Columbia and the Prairies were quite similar and showed the closest resemblance between farm and non-farm return, the ratio rising to as high as .87 in 1951 in the Prairies. In Quebec which ranged from .25 to .43, the ratio was lowest, but only slightly lower than in the Maritimes. In Ontario the ratio was somewhat lower than in the Prairies and British Columbia."[1/] Anderson also found a wide regional variation in the productivity of labour within Canadian agriculture -- Quebec and the Maritimes were about the same, while Ontario was behind British Columbia and the Prairies, which lead in all years. Regionally, the differences in productivity per unit of labour in the agricultural sector were far in excess of those in the non-agricultural.[2/]

The above findings not only reveal that the productivity of labour in Quebec agriculture is considerably behind that in the non-agricultural sector, but support the view expressed before

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1/ Ibid, p.234.

2/ Ibid, p.236.

that the productivity of Quebec agriculture lags behind that of other major Canadian regions. It is observed, however, that during the seven-year period the rate of increase in productivity has been greater in Quebec than in other regions. This is most encouraging but yet equalization is still distant. It is of interest to note the close coincidence between Anderson's increases in economic productivity for Quebec farm labour and the increases in physical productivity derived earlier from the volume of production index. It is believed, however, that the increases are largely due to the favourable price relationships which existed for agriculture during the period considered.

Anderson, in his comparison of farm and non-farm returns, did not take into account the differences between rural and urban living costs. This would narrow the gap between the earnings of the two groups. Again, the very liberal allowance made for extra hours of work by the farming community served to reduce further the net product per worker in agriculture. Also, it must be remembered that farmers receive income from other sources and that a great proportion of the farm labour force is in the category of unpaid family labour. To partly counterbalance these factors, however, is the fact that no consideration was given to the contribution of management to labour earnings. If management

is considered a factor of production, then this factor being much more widely distributed in agriculture, would account for a greater proportion of the product than it would in non-agricultural industries. Although it is impracticable to separate the management factor, if this should be taken into account, the labour earnings in agriculture would be more greatly reduced than the non-agricultural. Also to be considered is that only in the long-run is it reasonable to compare the returns in agriculture with that of all other occupations. It would take time for farmers to acquire the necessary skills to perform the duties of the rest of the working population. In the short run only those occupations to which farmers may readily migrate should be given consideration.

The above considerations would still not alter the general disparity which exists between farm and non-farm incomes, and would have little influence on the difference between the earnings of farmers in Quebec and those in other Canadian regions. Even if it is necessary to make an allowance for the "intangibles" when making inter-industry comparisons, then, it may hardly be assumed that Quebec farmers enjoy greater satisfaction from farming than the other farmers of the nation. No other conclusion can be reached but that agriculture in Quebec is relatively inefficient.

Economic theory now suggests that to improve the existing situation, it is necessary to strike a new balance in the allocation of resources between regions and between agriculture and other industries. The immediate concern is that there are too many people engaged in agriculture and particularly so in Quebec. A movement of human resources out of farming will assist in bringing about a better combination of the factors of production and thus enable more adequate scales of operations. Accompanying this would be greater scope for better farm management and ease in the adoption of improved practices. Unfortunately there are many barriers to the mobility of resources. These will be outlined, when reviewing the causes of inefficiency, in the summary of this chapter which follows the examination of the Quebec agricultural regions.

The Agricultural Regions of Quebec

Economic theory dictates that production should be specialized geographically according to the distribution of natural resources. Physical factors will largely condition the possibilities for development, though cultural, social, economic and political circumstances are of greater significance in determining the speed with which the potentialities of a region may be realized. Regional examination of Quebec agriculture will expose the physical attributes and limitations of its three major

regions. This analysis will add more meaning to that for the province as a whole in view of the wide variations in physical characteristics. Conditions of soil, climate and location are among the factors which determine the production possibilities of an area. The implications are stated quite clearly by Heady in the following words:

> "The forces which determine or condition the pattern of production and resource allocation in different geographic areas are of interest not only to the production economist in his analysis of efficiency at the farm or national level; they are of direct concern to the individual farmer as he tries to ascertain the extent and nature of forces which determine the most profitable combination of factors and products. At the other extreme legislators and other public managers of resources also are concerned with the efficiency aspects of regional resource specialization. A maximum national product is forthcoming from given resources only as mobile resources (capital and labor) are applied to immobile resources (land) in a geographic pattern which allows the greatest economic product to each unit of mobile resource." 1/

The Province of Quebec is divided quite naturally into three distinct geological regions - the St. Lawrence Lowlands, the Appalachian Uplands and the Laurentian Plateau. In the absence of a generalized soils map or type-of-farming

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1/ Earl O. Heady, Economics of Agricultural Production and Resource Use, New York: Prentice Hall, 1952, p.639. For a detailed treatment of this subject, see R. L. Mighell and J. D. Black, Interregional Competition in Agriculture, Cambridge: Harvard University Press, 1951.

maps, these regions with slight modifications[1] provide a very satisfactory basis for classification into agricultural areas. These regions are shown in Figure V. Estimates of the present extent of agricultural land in the province are given by regions in Table X. Of the 18 to 20 million acres of occupied

TABLE X. APPROXIMATE AREA OF THE NATURAL REGIONS AND OF THE AGRICULTURAL DOMAIN OF THE PROVINCE OF QUEBEC

Natural Regions	Total Area	Occupied Farm Land
	- millions of acres -	
Laurentian Plateau	307	3
Appalachian Uplands	15	6-7
St. Lawrence Lowlands	12.8	9-10
Total	335	18-20
Percentage	100	6

SOURCE: Statistical Year Book, Quebec, 1954, p.296.

farm land 9-10 acres or 50 per cent lies within the St. Lawrence Lowlands, the smallest region of the province. It is estimated that 90 per cent of the Lowlands area is cultivatable. The

1/ The deep clay pockets of the Lake St. John and Abitibi areas within the Laurentian Plateau, are included in the St. Lawrence Lowlands since they are of somewhat similar origin and have similar characteristics to the latter region.

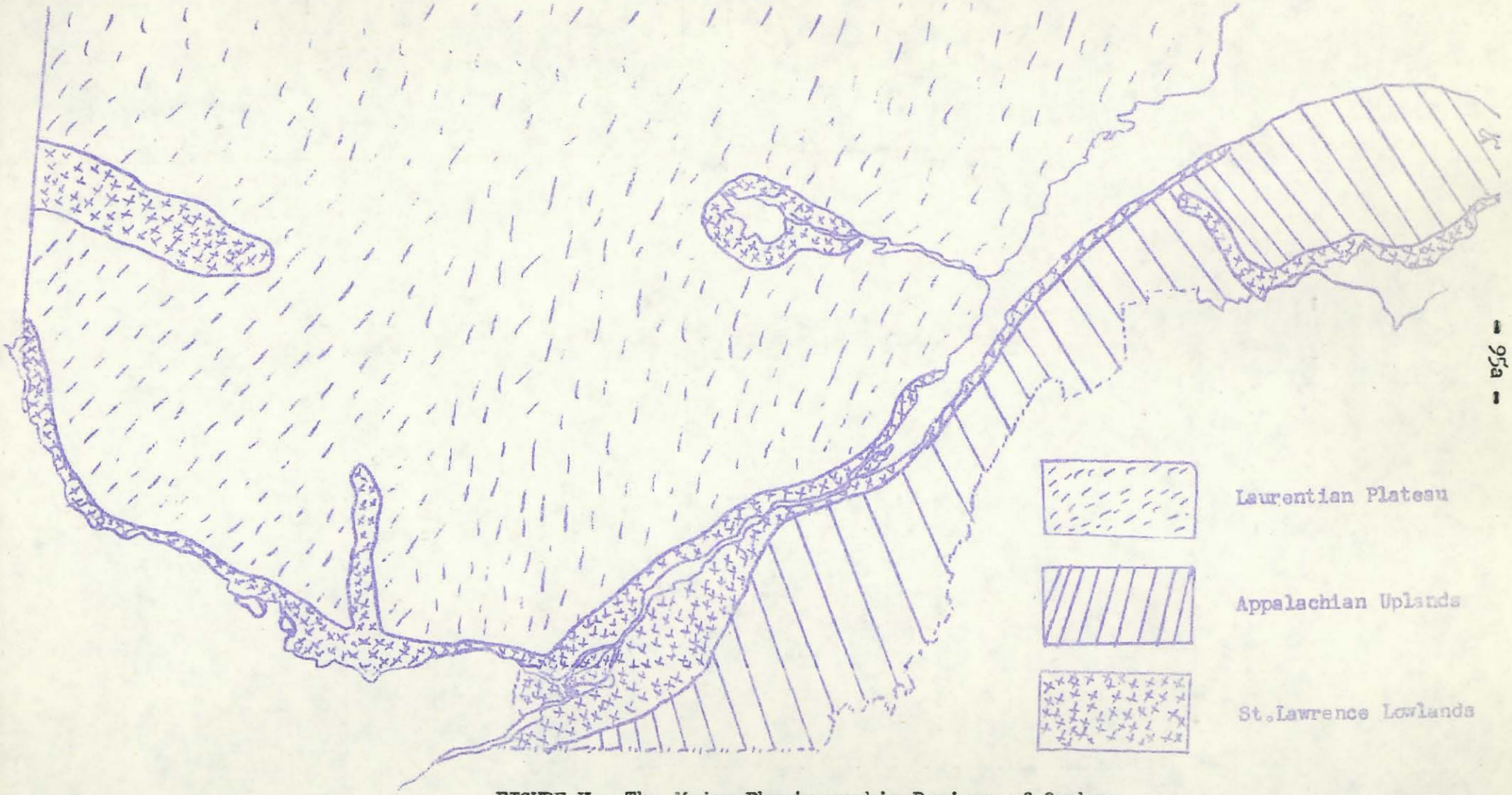

FIGURE V: The Major Physiographic Regions of Quebec

corresponding figures for the Appalachian and Laurentian Plateau regions are 57 per cent and 4 per cent respectively.

As stated earlier, this regional analysis is based on the censuses of 1931, 1941 and 1951. Since the regional boundaries cut across the census subdivisions, the task of developing regional data from these censuses was tremendous.[1] It was by quite a laborious process that the provincial statistics reported by municipalities were grouped to represent the three regions. This also set a limit to the number of compilations, but in order to provide additional data, the regions are in some instances represented by those counties falling wholly within a region. Haythorne, in his regional study of Quebec,[2] overcame this difficulty by selecting regions which allowed fuller use of available census data. He adopted an economic classification, based on the proximity of areas to centres of commercial activity, whereby regions were classified as metropolitan, intermediate or frontier. Though enabling more details for analysis, this classification results in a great deal of overlapping of the physiographic regions.

1/ From large scale topographic maps, the location of the parishes or municipalities of the counties which were divided by the regional boundaries was determined. The census data given by parishes was then allocated according to regions and totals obtained for the respective regions. In a few cases where the location of a parish was doubtful, the percentage of improved farm land was used as a guide for assigning it to a region.

2/ G. V. Haythorne, Land and Labour, Toronto: Oxford University Press, 1941.

It is the characteristics of the physiographic regions that are considered the basic determinants of agricultural activity in this study. Location with respect to a trading area is probably of equal importance in considering the efficiency of production, and cannot be overlooked. It is possible that regions with inferior soils but favourable market location may enjoy advantages over distant areas with richer soils. In any event, there is need for regional analysis on a level which permits taking full account of both the factors of location and physical features. Only then will the characteristics peculiar to smaller areas of the province be revealed. It will be sometime yet before official statistics allow much analysis[1/] but adequate coverage could be achieved by regional surveys.[2/] In the meantime this broad regional division of the province must serve for the purposes of analysis.

The St. Lawrence Lowlands: This region being the most readily accessible, was the earliest to be settled for farming

1/ The Quebec Bureau of Statistics has recently adopted a new classification of economic regions which when divided into sub-regions will fill a part of this need. But only through field work will one gain the intimacy needed for dealing with a specific area in great detail.

2/ For example, L. R. Fortier and P. G. Muller, "Business Analysis of 70 Selected Farms in the Eastern Township, Quebec, 1951-56". Economic Annalist, Dec. 1954, also "Etudes sur l'Agriculture de l'est du Quebec", Agriculture, Vol.X, no.1, Printemps 1953.

in Canada. It has remained the most important agricultural area of Quebec, although it comprises the smallest land area. It is a V-shaped plain which occupies mainly two narrow strips of land on either sides of the St. Lawrence and Ottawa rivers.

The Lowlands are underlain by gently dipping beds of sandstone, shale and limestone of Palaeozoic age. These materials originated from the glacial debris deposited by streams of melt-water pouring into the very large but temporary lakes formed during the glacial period. When these lakes were eliminated or greatly reduced in size, by drainage to lower levels as the ice receded, there remained considerable areas of flat-lying soil forming material, upon which some fertile soils have developed.

The Lake St. John and Abitibi areas were submerged in glacial lakes, while the lowlands of the St. Lawrence and Ottawa valleys were inundated by the salt water of the Champlain Sea, following the retreat of the glaciers. This sorting and depositional action on glacial debris by melt-water and sea-water has given rise to the considerable area of good agricultural land in the St. Lawrence Lowlands. Limestone and shales which predominate among the sedimentary rocks of this region are relatively good soil formers. There is also a considerable amount

of sandstone, some of which is rather easily weathered to farm soil.[1] Dr. Ripley summarizes the general agricultural adaptability of the St. Lawrence Lowlands in the following terms:

> "This area is rather limited with regard to the variety of crops which can be grown. The frost-free period is approximately 130 days with a growing season of about 190 days. The total annual precipitation is about 31 to 34 inches and the growing season begins from April 15 to April 25th. The temperature index is approximately 43° and drought is rather rare, occurring about 9 to 15 times in the past 50 years.
>
> The soils in the area vary greatly. A large percentage of the agricultural soils consist of imperfectly to poorly drained clays of moderately good fertility. Another large percentage consists of light sandy soils which are underlain by clay. These sandy soils are lower in fertility than the clays and are from time to time either droughty or wet. Most of the ridges and knolls are stony soils which may range from the fertile Brown Forest types to the acid and leached Podzol types. [2]

This statement stresses the limitations imposed by poor drainage and by climatic factors on this Quebec region and its counterpart, the Ottawa-St. Lawrence Lowlands region, in Ontario.

1/ See J. A. Dresser and T. C. Dennis, Geology of Quebec, Quebec: Redempti Paradis, 1944; A. W. Currie, Economic Geography of Canada, Toronto: Macmillan, 1947; and P. O. Ripley, "Agricultural Potentials in Eastern Canada", unpublished, 1955.

2/ Ibid., p.3.

The principal agricultural statistics from 1931 to 1951 for the regions of Quebec are presented in Appendix Tables A to E. The tabulations which follow in this section of the text are condensed from that source.

The agriculture of the Lowlands is dominated by dairy farming. The major exception is in the area adjacent to Montreal where specialized vegetable and poultry farms are very common. While dairying is by far of greatest importance, the hog enterprise is supplementary and rates high as an income producer. In this region, hogs produce from 40 to 50 per cent as much income as dairying, then follow beef cattle, poultry, and fruits and vegetables.

The tabulation below summarizes the major farm population data and those relating to numbers of farms:

Item	Province	St. Lawrence Lowlands
Farm Population, Thousands		
1931	777	386
1941	839	388
1951	793	363
Numbers of Farms, Thousands		
1931	136	67
1941	155	70
1951	144	67

These data indicate that the Lowlands area has close to half the farm population and farms of the province. As we shall note later, while these farms are not the largest in the province they are the most productive. Generally, they are capitalized at twice the level of the Laurentian Plateau farms and 50 per cent more than the Appalachian region farms. While the number of farms in the province increased slightly in the two decades, the number in the Lowlands area has remained fairly constant.

With regard to land-use, this region follows a pattern closer to the more mature areas of Ontario than to the other Quebec regions. Thus, as indicated in the following tabulation, the acreage of improved land declined at twice the rate in this area as in the whole province. At the same time this area alone of the three showed a decline in pasture acreage. This is attributable to competition of specialty crops such as vegetables, potatoes and sugar beets. This region has nearly one-third of the farm woodland of the province.

The farm economy of this region is more clearly described by reference to livestock than to land-use. The data

Item	Province	St. Lawrence Lowlands
	- thousands of acres -	
Improved Land		
1931	8,994	4,767
1941	9,062	4,645
1951	8,929	4,445
Field Crops		
1931	6,080	3,364
1941	6,062	3,224
1951	5,686	3,045
Pasture		
1931	2,601	1,225
1941	2,519	1,184
1951	2,685	1,159
Woodland		
1931	6,036	2,147
1941	5,963	1,816
1951	5,874	1,863

on livestock are presented in the following tabulation. As explained earlier, no useful historical trends may be determined from such a tabulation, but the position of each region is clearly set out in Appendix Table C.

The Lowlands area has about one-half of the cattle of the province and the same proportion of milk cows. Dairying in this area is clearly more specialized than in the other regions, since the major fluid milk markets, Montreal, Quebec and Three

Item	Province	St. Lawrence Lowlands
All Cattle - Thousands		
1931	1,707	827
1941	1,757	858
1951	1,641	806
Milk Cows & Heifers - Thousands		
1931	851	429
1941	1,213	605
1951	1,106	559
Beef Cattle - Thousands		
1931	n.a.	n.a.
1941	17	7
1951	62	27
Hogs - Thousands		
1931	728	412
1941	808	467
1951	1,108	578
Poultry - Thousands		
1931	7,862	4,628
1941	8,063	4,740
1951	10,050	5,926

Rivers, are largely supplied from it. Dairy farming in the other areas is largely tied to butter and cheese production. The Lowland area has more than half the hogs of the province, and through the three censuses has had 59 per cent of the poultry.

With level and fairly productive land, with important fluid milk markets, and with a metropolitan area as a market for vegetables and other specialty crops, this region has made much greater strides in mechanization than the other areas. The investment per farm in machinery in 1951 was about $2,300 compared with less than $1,500 in the other two regions.[1/] More than half the farms had tractors while in both the other areas the proportion was about 15 per cent.[2/] Even in the Lowlands where tractors may be used advantageously, the number is relatively small. This may be taken as an indication of more than adequate supplies of labor, a matter related in turn to the large size of families.

Brief mention is made at this point of the Ottawa-St. Lawrence Lowlands region of Ontario. This is one of the poorer agricultural regions of that province, having conditions of soil, climate, topography and market location much inferior to the Southern Ontario regions. As the name implies, it has very similar physiographic features to the Lowlands region of Quebec, although it is not so favourably located with respect to markets. Agricultural development in these regions have followed a very similar pattern. The Ontario region is also known primarily for its specialization in dairying and livestock.

1/ See Appendix Table D.
2/ See Appendix Table E.

It has also lagged behind other regions of Ontario in mechanization and has many subsistence and part time farms. Data developed for this region, by the same process as was used for the Quebec regions, show, however, that adjustments are taking place more rapidly than in the adjacent Quebec Lowlands. This is suggested by the faster rate of decline in the farm population and in the number of farm units.

The Appalachian Region: Like its counterpart in the United States which extends as far south as Alabama, the Quebec Appalachian region is known more favourably for its scenery than for its agriculture. However, in this province, characterized by generally low productivity in agriculture, one-third of the farms are in the Appalachian area. This region, as shown in Figure V, lies south-east of a line running from Lake Champlain to Quebec City and to the south of the St. Lawrence estuary below this city. In the province of Quebec, this region comprises the eastern part of the Eastern Townships, Beauce, Temiscouata, Matapedia, and nearly the whole Gaspe Peninsula.

The folded and faulted Appalachians give rise to exposures of granitoid rocks. Granite rocks have formed coarse-

textured, shallow, droughty soils of low productivity. The enormous pressures and shearing stresses involved in the folding of rocks make them harder and more resistant to soil-forming processes. The most productive soils of the area are usually the transported soils found in bottom lands along streams.

Dr. Ripley describes the agricultural resources and adaptability to farming in the following terms:

> "The Appalachian Upland in Quebec lies south of the St. Lawrence River and extends from the Richelieu River near the international boundary to the Gaspe Peninsula. Much of this Upland is rough and hilly, with many rock outcrops. This rough land is covered with deciduous, mixed or coniferous forests. The agricultural development is in the main concentrated on the smoother soils in the southwestern part of the area which is known as the Eastern Townships of Quebec. It has a frost-free period of about 125 days and a growing season of some 185 days. The annual precipitation is about 40" and the temperature index is about 44°. Evaporation is relatively low and drought rather infrequent. The well-drained soils are of the podzol type, being acid and leached. They are often stony and generally have a sandy loam to loam texture. The poorly drained soils are generally peaty or mucky and are for the most part used for rough pasture or left in woods." 1/

1/ Op. cit., p.4.

On the rough Appalachian land, farming tends to be extensive. Grazing livestock are best adapted to the area. Other enterprises are complementary to cattle and sheep, or are supplementary in the sense of providing outlets for the labour force. As would be expected, farm woodlots provide a considerably higher proportion of income than in other regions. This takes the form of maple products, pulpwood, and saw timber. Hardwoods and softwoods both thrive in this area.

The limited extent of the agriculture of the region is demonstrated by the data in Appendix Tables B and C. Information on numbers of farms and on farm population is extracted and presented below. This table shows the area to have more than one-third of the farm population and of the farms of the province.

Item	Province	Appalachian Area
Farm Population - Thousands		
1931	744	266
1941	839	307
1951	793	296
Number of Farms - Thousands		
1931	136	50
1941	155	59
1951	144	54

As shown in the following table, the Appalachian area accounts for one-third of the improved farm land of the province and the same proportion of land under crops. However,

Item	Province	Appalachian Area
	- thousands -	
Improved Land		
1931	8,994	3,018
1941	9,062	3,112
1951	8,829	3,113
Field Crops		
1931	6,080	1,953
1941	6,062	2,040
1951	5,686	1,895
Pasture		
1931	6,601	975
1941	2,519	921
1951	2,685	1,112
Woodland		
1931	6,036	2,525
1941	5,963	2,733
1951	5,874	2,680

while data to prove it are not available, it is well-known that acre yields in this area fall well behind those of the Lowlands area. Perhaps the best indication of this, as considered below, is the number of heads of livestock per acre of improved land. The accompanying table shows that the acreage

of field crops is declining slightly. However, this is more than overcome by an increase in pasture acreage of more than 20 per cent in the decade of the 1940's. This expansion

Item	Province	Appalachian Area
All Cattle - Thousands		
1931	1,707	666
1941	1,757	674
1951	1,641	650
Milk Cows & Heifers - Thousands		
1931	851	318
1941	1,213	461
1951	1,106	429
Hogs - Thousands		
1931	728	221
1941	808	241
1951	1,108	407
Poultry - Thousands		
1931	7,862	2,127
1941	8,063	2,105
1951	10,090	2,749

has come about by the clearing of land. This, as part of a lumbering operation, has been observed particularly in the Eastern Townships.

The general position of livestock in this region may be established on the basis of the data presented above. The

Appalachians are essentially devoted to dairying, and being distant from large cities, manufacturing products, particularly butter and condensed products, take a large proportion of the milk of the area. The Borden Company maintains a large plant in the Eastern Townships. With dairying of the importance indicated, this area has suffered the full brunt of the adjustments required by the introduction of margarine and by other factors which have adversely affected this industry. However, buoyant economic conditions and the federal price support program on dairy products have effectively aided in the adjustments facing the industry. Given the resources of this area, the farmers in this region have had little recourse but to stay with dairy cattle. They have, however, as the data indicate, made a small shift towards beef. The numbers of beef cattle trebled in the 1940's.

While sheep numbers in Quebec have declined rapidly, as in other parts of the province and country, the decline has been less rapid in the Appalachian area. In 1951 the region had half of the sheep of the province. Hog numbers in this area have shown much greater gain than in other regions. While this enterprise is largely dependent on Prairie grains, it has the advantage of the large supplies of skim milk produced in the region. Poultry numbers also increased substantially in the 1940's.

The increases indicated for major classes of livestock meet one of the requirements for increasing production and incomes of farmers in this region. There is, however, still great scope for increasing livestock production by increasing feed supplies, and also by better breeding and feeding practices. In 1951 the area had one animal unit of grazing livestock per five acres of improved land. While this ratio represents a little less density of livestock population than in the Lowlands area of the province, it is actually a wider ratio when one takes account of the relative importance of cash crops in the Lowlands area. A proper target for the next ten years would be no less than three acres per animal unit. This takes account of the soil limitations in this area.

As has been indicated, even the relatively favoured St. Lawrence Lowlands area is far from well mechanized. Yet the Appalachian area had only $1,450 per farm investment in machinery in 1951, compared with $2,275 for the Lowlands, and only $13 per improved acre. The number of tractors per hundred farms was only 16.

The Laurentian Region: This region occupies 93 per cent of the total area of Quebec. It lies approximately north of a straight line joining the cities of Ottawa and Quebec and to the north of the estuary of the St. Lawrence river below the latter city. It is that vast expanse lying north of the St. Lawrence and Ottawa river estuaries, except for the relatively narrow strip on the north shores of these rivers and the Lake St. John and Abitibi areas, which belong to the St. Lawrence Lowland Region. This plateau, a portion of the great Canadian Shield, is almost entirely underlain by igneous rocks of the pre-Cambrian era which are poor soil formers. The Canadian Shield must have been covered by a mantle of soil which was removed by glaciation, to the benefit of other regions where the material was deposited.

The Laurentian area includes about 15 per cent of the farm population and of the farms of the province. These facts are indicated below.

Settlement in this unproductive area was rapid in the depressed 1930's, with a one-third increase in farm population and numbers of farms. The decline in the 1940's, however, just matched that of other areas.

Item	Province	Laurentian Area
Farm Population - Thousands		
1931	744	108
1941	839	143
1951	793	133
Numbers of Farms - Thousands		
1931	136	19
1941	155	25
1951	144	23

The use of land in the region has shown relatively little change over the three census periods. Even the one-third increase in numbers of farms in the 1930's was accompanied by no more than an eight per cent increase in improved land in farms, as the tabulation below indicates.

Item	Province	Laurentian Area
Improved Land	- thousands	
1931	8,914	1,209
1941	9,062	1,305
1951	8,829	1,250
Field Crops		
1931	6,080	763
1941	6,082	798
1951	5,686	746
Pasture		
1931	2,601	400
1941	2,519	414
1941	2,685	414
Woodland		
1931	6,036	1,363
1941	5,963	1,414
1951	5,874	1,331

These data suggest that agricultural expansion in the area is pushing against strong odds in terms of hilly land and poor soils.

Apart from the portions of this area within convenient distances to such cities as Montreal and Quebec, the agriculture is organized very largely around livestock. In the portions influenced by nearby large urban centres, vegetables, fruits and poultry are of importance. In a county representative of the Laurentians (there is only one agricultural county wholly in the area), income from livestock in 1951 exceeded that from crops five times over. Forest products yielded an income well in excess of all other crops and yet only one-fourth of that from livestock. In considering these income measures as indicators of type of agriculture, the fact that the whole area is dominated by subsistence farming should not be neglected.

The relative position of livestock in the region is shown in the tabulation below. These data show that livestock density relative to improved acreage is lower than in any other area. They also indicate that the proportion of each class of livestock, except poultry, relative to the provincial total is tending to fall.

Item	Province	Laurentian Area
All Cattle - Thousands		
1931	1,707	214
1941	1,757	225
1951	1,641	185
Milk Cows and Heifers - Thousands		
1931	851	103
1941	1,213	147
1951	1,106	118
Hogs - Thousands		
1931	728	96
1941	808	100
1951	1,108	123
Poultry - Thousands		
1931	7,862	1,108
1941	8,063	1,217
1951	10,090	1,415

With large numbers of small farms in this region, there is much evidence of an uneconomic use of machinery. Thus a typical subsistence farm with 40 acres of improved land would have an investment of $800 in machinery, or $20 per improved acre. A large farm for this region with 150 acres of improved land and a tractor might very well have a machinery investment of no more than $20 per acre and yet have a far more efficient complement of machinery than the former. Thus it is necessary in considering this region to take account of the relatively small numbers of farms with one hundred acres or more of improved

land on the one hand and the large number of small inefficient subsistence farms. It should be noted that the former are located in the few relatively productive pockets of soil created by geological accident. These pockets, though they may run up to 50,000 acres in extent, are few in number. Furthermore, since settlement has already claimed all of them that are likely to be at all accessible to markets, there is little possibility for further agricultural development in this area.

Any expansion in the Laurentian area for the next two decades will be largely limited to serving the needs of the woods and mining industries of the region, and families some of whose members work in these industries. While there is an opportunity for expansion of farm output on the relatively few productive farms of the region, in quantitative terms, this will not be large.

Summary

From the foregoing regional analysis, it is evident that the physiographic features of Quebec impose quite severe limitations on the location, nature and extent of agricultural activity in the province. These limitations place Quebec in a less favourable position for agricultural production than its neighbour, Ontario. This qualification is necessary since

such frequent references were made to the latter province during the foregoing discussion. This does not alter any of the findings as to the relative inefficiency of Quebec agriculture, however. The economic principles outlined in the previous chapter suggested that resources be transferred into their alternative uses until the rate of return to similar resources is equalized. The productive efforts of an area would then be concentrated in its most suitable members, for efficient resource use.

The greatest agricultural potential of the regions within Quebec is in the St. Lawrence Lowlands. However, to achieve the possible increases in production, large outlays of capital will be required, especially for drainage. The soils, rough topography and less favourable market location of the Appalachian region offer less scope for agricultural development. This region is best adapted to more extensive production in the sections further removed from organized markets. The Laurentian region is severely limited by conditions of soil, climate and location. Agricultural development in this region will largely be confined to meeting the demands of the mining and forestry industry communities within its boundaries.

For Quebec as a whole, there is great scope for improvement of agriculture, even within the present organization of the industry, in so far as size of farms is concerned. The opportunities would, however, be much greater if the present scale patterns were enlarged. Generally, Quebec farmers have been inclined to retain the methods of the previous generation. It has been noted that there is little tendency towards taking full advantage of the opportunities offered by mechanization, although considerable progress has been made during the past two decades. Further advances require a large reduction in the number of subsistence farms; then, a more intensive pattern of agriculture will be made possible on fewer and larger farms.

It was observed that the annual rate of output has shown substantial increases, particularly since 1941. This has been achieved with about a one-third reduction of the agricultural labour force, which coincided with a considerable expansion in investment in farm machinery. There are some indications of desirable shifts in land use from the more unproductive soils, and the expansion of the livestock industry, despite its current difficulties, has considerable prospects for meeting the needs of future consumption patterns. The future of

Quebec agriculture will largely depend upon increased efficiency in livestock and dairy production. If the recent rate of increase in production should continue and be accompanied by other desirable adjustments, there would be considerable scope for developing a sound farm industry in Quebec.

A look at the farm income picture of Quebec farmers shows, however, that they have consistently lagged behind other major Canadian regions as income producers. It is necessary, then, to consider why this disparity and relative inefficiency of Quebec agriculture exists. It is suggested that this inefficiency stems mainly from the highly parochial context around which the agriculture of this province has developed. This aspect will be given fuller treatment in the final chapter which follows. Bearing in mind now the causes which were advanced for the general inefficency in agriculture when considering the theoretical limitations of the model in Chapter II, the statement in the following paragraph is made with particular reference to Quebec.

Quebec farmers have not generally shifted to the use of modern farming equipment, and this is mainly the result of farming on an inadequate scale and having surplus labour which

competes with the use of farm machinery. In addition, credit facilities have not been available to the extent necessary for applying modern farming techniques, and those available have not been put to the most advantageous use. Greater emphasis on rural education and extension is needed to improve the basic skills of farmers, thus providing the knowledge for improvement in farm organization. This will also help to make farmers aware of alternative opportunities for their efforts and so bring greater ease in the mobility of farm people, in view of the decline in farm labour requirements. Agricultural policy can be directed to removing the above obstacles, but the influences of political, social and cultural traditions must also be taken in to account. In moving to this topic, it has to be remembered that policy must be adapted to political and social concepts.

POLICY CONSIDERATIONS, RECOMMENDATIONS AND OUTLOOK

CHAPTER IV

Eighteenth century English writers had conflicting opinions on the effect of the advent of the industrial era in England. While Goldsmith, in his poem "The Deserted Village," viewed with grief the passing of the happiness associated with a pure and humble country life, Adam Smith (Wealth of Nations) extolled the oncoming growth in wealth from industrial expansion, with its accompanying urbanization. An analogy can be drawn between the situation which existed in England then and that which is still in force in the Province of Quebec to-day. On the one hand, the most powerful institutions in Quebec, the Church and State, appear to resent the migration of the farm population to industrial centres which offer more attractive opportunities. It will be shown that active steps have been taken to curtail this movement of farm people. On the other hand, agricultural economists and others, observe with pleasure, and would hasten, the growing trend in the exit from farm to industrial occupations. If the "economic man" will seek the situation which offers the greatest reward, then it is by this movement that the disparity between the incomes of farm people and that of the industrial worker will be narrowed. No one can deny the beauty, splendour and simplicity of life in the country. But, if it is argued that

the greatest good, or the ultimate aim of human endeavour, is happiness, then it may be assumed that there are benefits to be derived from the "round-about methods of production" which bring forth higher standards of living.

The requirements for an efficient organization of agriculture have been discussed in Chapter II. Mention was also made of the human goals that should be given consideration in formulating any policy which would generally assist in bringing about the greater efficiency in agriculture.[1/] For the formulation of a policy there must be goals, but since policy implies change, the various conflicting goals of society must be taken into account, if there is to be reconciliation of differences. The goals for agricultural policy have been outlined as greater stability in the short run and greater equality and efficiency in the long run.

In moving from generalities to the specific problem of "Agricultural Policy in Quebec," first is considered the setting around which the investigation is centered, then, those programmes of the provincial government which most clearly bear on future policy. A critical review of past and present policies should then enable the framing of certain policy proposals, the

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1/ W.E. Haviland, "Reflections on Agricultural Policy", Canadian Journal of Agricultural Economics, Vol.III, No.2, 1955, pp.32-43.

implementation of which would appear necessary for achieving greater overall efficiency in the agriculture of this province.

The problems of agriculture in the past were mainly concerned with expansion of production and improvement of farming techniques. There was then little concern about marketing problems since most of the farms were of a subsistence type. Coupled with the previous problems, however, there is now much concern about the problems of marketing agricultural products. There is daily mention of farm surpluses.[1/] Technological advance in the agricultural industry has enabled enormous expansion of output. With an inelastic demand for farm products, producers are faced with falling prices of agricultural products, while the things which farmers buy remain relatively fixed in price. The share of the national income accruing to farmers remain at a low level. The fact is that a relatively smaller proportion of the manpower and other resources are needed in agriculture to produce the community's requirements of its products. With rapid developments and expansion in other industries there is room for

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1/ This is merely a short run problem but policies must be directed to bringing about adjustments without placing farmers or the rest of the community at too great a disadvantage. With a growing population and changing food consumption patterns, long-run planning must include shifts in agricultural production to meet future consumer demands.

absorbing the excess labour in agriculture in more productive uses. For efficiency, the trend must be away from subsistence to commercial farming. While the short-term problem is to stabilize prices and incomes, the long-term view of efficient resource allocation must not be overlooked. There remains also the problem of getting farmers to increase productivity by adopting the best known techniques.

The province of Quebec has certain characteristics which render it almost unique, and which appear to generate a dominant force in the shaping of its policies. The French-Canadian is the dominant ethnic group in Quebec and it is widely recognized that there is conflict between the French-speaking and English-speaking peoples of the province, The former group strives arduously to preserve its language and customs; but while this battle is being waged, it is becoming increasingly necessary for the majority group to speak English in order to raise themselves economically. As Miriam Chapin puts it, "The French Canadian, so long as he remains one, cannot live like other men; he must consciously or unconsciously shape his every action with the thought of defence of his own culture in the back of his mind."[1/]

1/ Miriam Chapin gives a very interesting and lively account of the problems facing the people of Quebec in her book, Quebec Now, Toronto: Ryerson, 1955.

If it is to retain its language and tradition, it becomes almost necessary for this group to live in isolation, but this becomes more and more impracticable. Yet, there is some indication that attempts are being made to retain the identity of a people by holding them together. As a result, there is resistance to migration and support of an extensive but uneconomic colonization scheme. Coupled with the language difficulty, this tends to retard industrialization and progress,

In such an atmosphere the task of adopting useful policy measures becomes tremendous. There are two opposing forces at work; one trying to maintain a strong rural population and thus control of the people, while the force of industrialization invites the people to a greater share of worldly goods. The forces of economic change must indeed have their way but they will nevertheless be impeded when non-economic goals are given priority for policy decisions. During the past three decades Quebec has changed from a predominantly agricultural state to an industrial one, and so, from a rural community with clerical leaders to a city one, where the Church is no longer certain of its power as once it was. Even if declining, the power and influence of the Church cannot be overlooked as far as policy is concerned. In being able to exercise considerable control over education and the attitude of the people, the politicians must in large part

respond to its dictates if they are to gain the support of the electorate.

Commenting on the rapid strides made by co-operatives through the firm support of the church and government, Mrs. Chapin suggests that,

> "So long as raising hay for a dairy, and milking cows pays only a few cents an hour, no co-op on earth can save the dairy industry and the life that is based on it. The farmer may not keep accounts, but he knows he is getting poorer..... Every year farming becomes more a business and less a way of life, and the purpose of a business is to make a profit. Only through national expansion can Quebec agriculture be saved."1/

In her journalistic style, Mrs. Chapin manages to throw a cynical twist into all her comments, but her argument is in the main substantiated by writings on a more exalted, though maybe less revealing, level in "Essays on Contemporary Quebec".2/ Although the dominant role of the Catholic Church in molding the basic institutions, the traditions and the mentality of the French-Canadian society has been admitted, as also the "fullest and most intimate co-operation" between Church and state,3/ there

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1/ Ibid, pp. 116-117.

2/ Jean-C. Falardeau (Ed.) Quebec: Laval University Press, 1953.

3/ Ibid, pp. 112-113.

is a lenient view as to the influence of institutional forces in retarding the process of industrialization and progress in agriculture.

Professors Faucher and Lamontagne indicate that the late development of Quebec's industrial structure is accounted for mainly by factors of geographical location with respect to economic activity, as the whole North American continent passed "from a regime of merchantilism to a system of industrialism based upon coal, steel and steam." Quebec, "without coal and iron and without technological know-how in the iron works", was disfavoured by this change, industrial growth had to be delayed. With rapidly increasing population, with Church and state encouraging further proliferation, the only possible solution was to be found in encouragement of agriculture and colonization. "Thus agricultural expansion coincided with the teachings of a traditional philosophy of rural life; but it cannot be said that it resulted from these teachings: there was nothing else to do." This, despite the fact that as early as 1820 arable agricultural land, with the exception of the Lake St. John and Abitibi regions, "had reached its optimum point of expansion covering the St. Lawrence Lowlands and the arable patches of river valleys."[1/]

1/ Ibid. pp. 24-37.

Faucher and Lamontagne, suggest that contrary to frequent interpretation, "Quebec's relative economic backwardness" during the period 1866-1911 had nothing to do with cultural factors. Also, Quebec was primarily agricultural at the end of this period "not by choice but through sheer necessity". The following decades introduced great changes, however. Substitute metals available in Quebec were in demand and hydro-power was in abundant supply. "Quebec was strongly favoured by the new orientation of economic development", and indultrialization is taking place at an increasing rate. "Employment in manufacturing doubled from 1939 to 1950... Since 1939, in volume terms, output of manufacturing industries rose by 92 per cent in Quebec and 88 per cent in Canada, while new investment in manufacturing increased by 181 per cent in this province and by only 154 per cent in the whole country". With such rapid growth and excellent prospects in Quebec's industry, the strain on the agricultural sector is being relieved. This has taken place to a great extent but yet agriculture lags behind.

The brilliant analysis of Faucher and Lamontagne strongly supports the view that the relatively slow progress of agriculture in Quebec is accounted for by retarded industrialization,

not influenced by cultural environment, but by "a mere regional manifestation of the overall economic evolution of the North-American continent." However, now that Quebec is exposed to an extremely favourable situation and is enjoying rapid indultrial expansion, agriculture remains inefficient with low standards of living. It will become evident that provincial agricultural policy still tends to support agricultural expansion by keeping the population rural, rather than have them share the benefits of this indultrial boom. Colonization though unsuccessful, is still an active policy. The Quebec Assembly adopted estimates totalling over $13 million for colonization for the 1956-57 fiscal year in its recent sitting. This scheme is obviously in support of goals other than economic ones.

The agricultural policy of a country is determined by existing conditions, by tradition, and by individual judgment of the policy-makers. But, any policy should bear a logical relationship to generally accepted economic principles. It is outside the scope of this study to consider in detail the social environment in which Quebec operates. The social structure must be taken as given and proposals made to improve efficiency within such a framework. The preceding paragraphs were necessary to give a general setting for considering policy, however.

It has been suggested that certain institutional forces in Quebec have tended to retard progress in agriculture, while aiming to preserve the religion, language and culture of its people by keeping the population on farms. There is also the view that it is as a result of the delay in industrialization in Quebec that the forces apt to produce structural changes in agriculture had been absent. From the latter view, it may be expected that with the rapid indultrial growth in the Province, especially during the past decade, one may expect to see major changes in the structure of its agriculture, while the institutions and beliefs remain fundamentally unchanged. It will be observed, however, that policies, particularly in relation to colonization, have favoured the expression of the former point of view. Government legislation must be taken as the reflector of the policy of the province.

Although the constitution of Canada provides that both federal and provincial governments should be competent to make laws respecting agriculture, with over-riding authority going to the federal government in case of conflict, jurisdiction in the field of agriculture is virtually a provincial matter.[1/] The

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1/ Federal Agricultural Legislation in Canada 1954, Canada Dept. of Agriculture, April 1955.

test usually applied in deciding the fields of interest and action is whether the matter is of interprovincial, national or international concern, and it is with respect to trade and commerce that most of the federal authority is derived. Only through agreements and mutual understanding is it possible for each party to assume responsibility in certain spheres of activity, such as research, and so preserve favourable relationships and avoid the duplication of effort. Federal activities are confined mainly to the marketing of farm products and supplies moving in interprovincial and foreign trade, and to research and relief measures of national significance. With this setting, therefore, comprehensive agricultural programmes on the part of the federal government have been limited and cooperation between federal and provincial governments assumes the greatest importance. It appears that each government, scrupulously regarding the rights of the other, has neglected certain spheres of action.

Quebec agricultural policy has centered mainly around farm extension activities, the provision of farm credit facilities, support for the settlement of new agricultural areas, and encouragement of cooperative organizations. These will be examined in turn before going on to other areas of provincial

policy, particularly that of marketing, in which there have been recent developments.

Farm Credit: It was remarked earlier that capital limitation was one of the greatest barriers to the development of an efficient farm organization. Any policy which assists in making capital available to farmers on easy terms should therefore favour the development of more efficient farm units, if it is effectively executed, to bring about a better balance between capital and other factors of production.

Under the Farm Credit Act of 1936, the Quebec Farm Credit Bureau was established and began operations in 1937. Prior to this, credit was available to Quebec farmers under federal schemes. The Quebec Farm Credit Bureau, with the rights and powers of a corporation, has authority to borrow by the issue of bonds or otherwise, money for loan to established farmers and young farmers. Originally the Bureau could borrow and lend up to $10 million in 1936 but this amount has been successively increased until July 1, 1955 the total amount at their disposal was $130 million. Loans made to farmers bear interest at the rate of 2 1/2 per cent per annum, payable semi-

annually, and are repayable during a period of 39 1/2 years by way of a payment by amortization of 1 1/2 per cent per annum.

Loans are made by the Bureau to established farmers or persons acquiring farms, of amounts up to 75 per cent of the value of the farm or farms secured by mortgage in favour of the Bureau; such loans not exceeding $7,000 to each borrower. (The maximum amount loanable was previously $6,000 until 1953, and the rate of interest was formerly 3 per cent with an amortization rate of 2.714 per cent). 1/ Farms are valued according to their state of cultivation and earning power and in each case the Bureau may indicate the purpose for which the sums loaned shall serve.

Any policy which supports the provision of long term credit on low interest rates will undoubtedly go far towards filling one of the primary requirements for agricultural development. The Quebec Farm Credit Bureau is in an admirable position to satisfy these credit needs. With authority to indicate the purposes for which loans shall be used, the Bureau

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1/ Raising the amount of loans is said to have speeded up the retirement of the older farmers, who hand over to their sons. The reason for this appears uncertain.

is also in a position to exert much influence in directing farm mechanization and production. However, the total amount at the disposal of the Bureau is far from adequate for meeting credit needs.

By the way of comparison, Ontario has a less comprehensive farm credit scheme than does Quebec. It is worthy of note, however, that in Ontario's Junior Farmer Establishment Act for assisting young farmers, the maximum loan is 80 per cent of the value of the security or $15,000, although these loans are repayable within 25 years.

The credit facilities available to farmers in Quebec appear to be in line with its overall social policy, in making it easy and attractive for young people to go into farming and to keep the already established ones there. This in itself may not be desirable but putting that aside for a moment, it is questionable if the facilities available are adequate for the establishment of efficient farming units. With the rapid technological advances in agriculture, larger capital requirements are needed in order that movement away from the subsistence type of farming may proceed. The developments in farm mechanization

are of a capital consuming and labour-saving nature. In 1950 Professor MacFarlane stated that "farm management studies show that a capital investment of between $15,000 and $20,000 is required to reach an economic degree of mechanization". 1/ Since this report, the increasing need for capital inputs would now certainly bring the requirement up to a $20,000 to $25,000 range. It is clear from this statement, therefore, that a maximum of 75 per cent of the farm value, or $7,000 in Quebec does not fill the requirements. The provision in Ontario for establishing young farmers comes closer to filling the need.

If the aim of a credit policy is to aid in the establishment of efficient farm units, with the necessary degree of mechanization, then the Quebec policy appears to fall short of filling this need. According to the 1951 census the average value of a farm in Quebec was $10,400 and of this 61 per cent was accounted for by the value of land and buildings, 24 per cent by livestock and the remaining 15 per cent by implements and machinery, which is suggestive of under-mechanization. The lag of Quebec in the process of mechanization was noted in Chapter III.

It is impossible for a young farmer with these credit

1/ D.L. MacFarlane, "Technology and Agriculture", Queen's Quarterly, Vol. LVII, No.1, 1950.

facilities to organize an economic unit. Yet, it is noted that the Minister of Agriculture makes a special point of reporting the number of young men established on farms (12,722 of the 35,241 loans made up to 1951 under the Credit Scheme), a fact which he claims "brings a powerful help to the stability of our agriculture and to the permanent establishment of farmers' sons". Nothing is said, however, about the likely productivity of these young farmers. If short-term credit at low interest rates is to go towards aiding efficiency by overcoming the capital shortage in agriculture, or more correctly, improve the balance between capital investment and other factors, then this credit should go mainly to the already established and more progressive farmer, rather than encourage the introduction of a larger number of relatively inefficient units.

A report of the Credit Bureau states that "it is indisputable that the easy terms and low interest granted by the Provincial Farm Credit make it easier for the farmers to pay their municipal, school and church taxes and strongly contribute to the security and progress of our municipal, school and parish corporations." One would suspect that short

term credit could better fill those needs, while long-term credit be devoted entirely to farm improvement. To December 1951, 35,241 loans amounting to $85,931,120 has been granted of the $96 million available to the board. Of the $121 million authorized in 1954, 43,680 loans amounting to $114,447,570 were made, of which 18,445 amounting to $54,989,350 went towards establishing the sons of farmers.

Technological advance in agriculture not only necessitates larger capital requirements per farm for economic mechanization, but requires substantial shifts of farm people and other agricultural resources from the industry. This means a need for larger farming units and fewer farmers. There is no evidence that Quebec policy supports such a view. This is clearly shown from its colonization scheme.

Colonization: Quebec has a well defined colonization policy for the settlement of new agricultural areas. The Montreal Gazette of January 26 reported colonization Minister Begin as saying that "His department has opened to agricultural development 6,450 lots of 100 acres each in various colonization centres of the province since 1948. Speaking during the discussion of

colonization estimates for the 1956-57 fiscal year, totalling $13,690,000, Mr. Begin said the Provincial Government finds candidates for opening new land are hard to find. During 1955 the department established 995 settlers which he said was no record but "the Government is satisfied that more land is being opened to agriculture". Despite these efforts agricultural population shows a declining trend. The Minister's statement gives some indication of the nature of the policy with respect to new agricultural lands. It was suggested earlier that much more could be gained from more intensive production on presently occupied farm land or even less land.

If we consider the size of the lots and the fact that they are situated in areas far removed from central markets, there is little wonder that the Colonization Minister finds settlers scarce, even taking account of the inducements offered by his department.

David Ricardo in his theory of differential rent maintained that poorer land would be taken up hand in hand with increasing expenditure on better land which was subject to diminishing returns. But according to the response to colonization,

it would appear from the equi-marginal principle that some of these areas are still beyond the margin of profitable utilization. Von Thunen later stressed the importance of location in determining land utilization. This factor assumes great significance in Quebec.

The policy of colonization appears to be contrary to the popular belief that there is an excess of labour in agriculture and that as a result the opportunities available within agriculture are inferior to those available in other industry. If the reasons are other than economic, then such a policy may be explained by the view that there is a desire to keep Quebec rural at any cost.

Since 1934 the Department of Colonization has been under the authority of a Minister holding no other portfolio in the Cabinet. Before, it was successively connected with the departments of Agriculture, Mines, Public Works and Fisheries. The Minister has authority to acquire lands and establish settlers, farmers and farmers' sons on them. The amount paid for any one parcel of land must not exceed $1,000 or more than 33 1/3 per cent of the municipal valuation. Provision is made for an annual fund

of $50,000 to be devoted to the payment of a portion of the interest on loans made to settlers by co-operative syndicates and to the payment of premiums on insurance policies assigned as security for such loans. A settler before he can secure a letter of patent, must clear and place in a good state of cultivation in one block at least 30 acres (of which at least five acres is arable) in every 100 acres and clear each year three acres and not more than six acres unless given authority to clear more. The settler must build a house and reside on the land. No person shall obtain letters of patent for more than 300 acres of land for colonization purposes. On the extensive margin this acreage appears inadequate.

The Minister may pay colonization premiums to encourage settlers to clear their lots and plough them and reside thereon. Provision is also made whereby nine or more persons in the province, who obtain the approval of a competent ecclesiastical authority of the religious denomination to which they belong, may form a colonization society for the purpose of promoting the establishment of settlers on crown lands, to attract immigrants and to restore to the province those who have emigrated, to

assist in building roads, to assist settlers, and to diffuse information of a nature to extend colonization. Provision is also made for a federation of colonization societies.

Here can be observed how the influence of the Church may be utilized. Also, as is most pronounced in Quebec, every encouragement is given to co-operative societies. There is also evidence of opposition to the migration of people from the province, and in addition the desire is to keep them on the land. Such a policy, even if it tends to preserve a language and culture, can only be at the expense of efficient agricultural organization. However, even if it be of little benefit to agriculture it may assist in opening up the interior of the province to the advantage of other industries (mining and forestry) but it seems a high price for the settlers to pay.

Such a programme can only lead to inefficient agricultural production and a lower standard of living for the farmers concerned. Colonization can only be maintained by heavy government subsidy and it takes time before the land comes into productive use. The limited success that has been achieved under this settlement

programme is due only to the great expansion of non-agricultural activity in some settlement areas. Premier Duplessis has declared that his government had done all possible to keep farmers on the land and that there would be much fewer farmers today if they had not taken the steps they did ("Montreal Star", January 25).

Despite the effort to keep the farmer on the land, the agricultural labour force was just about the same in 1951 as it was in 1901 while the total labour force has almost trippled during the same period. This shows that even with opposition, economic forces have been at work and this gives some indication of the extent of industrialization in the province. It was shown earlier that in 1951 only about 13 per cent of the labour force engaged in agriculture as opposed to about 40 per cent in 1901.

In support of a policy of keeping a large farm population we may consider the political stability which may be derived, or the production of unskilled labour for a growing industrial labour force. There is also the freedom and joys of living in the country to be taken into account. As a temporary

.measure, it will also tend to curtail the pressure that could be brought about by a great onrush of rural population into urban centres --- causing acute housing shortage and disruption of society. But regardless of this social policy, which appears to have a permanent place, way must be given in the long run to economic forces.

The forces of the credit and colonization policies together could eventually only be in support of a subsistence type of farming. This is in evidence, as was observed earlier, that there has been little change in the size of farms towards the larger and more efficient categories, during the fifty year period 1901-51. There was a slight decline in improved land in 1951 from 1921, the acreage during this period having remained relatively stable (9,000,000 acres), and the number of farm units have shown no remarkable change. One would expect the trend to be towards fewer and larger farms with declining farm population, if pace is to be kept with the trend in farm mechanization, as is more evident in Ontario. It is recalled that 44 per cent of the farms in Quebec in 1951 were classified as subsistence or part-time.

Co-operation: It has been said that co-operation in Quebec is a religion. Here again the social aspects of policy may over-ride the economic advantages to be gained from co-operation. However, in just about every phase of Quebec agricultural policy the doctrine of co-operation finds a place. Every effort is made to support co-operation by way of subsidies and grants and technical assistance. There is some form of co-operative society in every agricultural activity, and it cannot be denied that co-operatives play an admirable role in any society.

Legislation provides for the formation of co-operative associations for the development of agriculture, the manufacture of butter or cheese or both, the sale and purchase of livestock, farm implements, commercial fertilizers and other articles used in agriculture, and the purchase, preservation and sale of agricultural products (under the Co-operative Agricultural Associations Act.) Each association is a corporation and may take out shares in the Society Cooperative-Federee des Agricoles de la Province de Quebec. The property of an association is exempt from all government taxes.

The "Financial Post" reported that in Quebec "Cooperative marketing extends to most farm products. By early 1955 nearly $112 million worth of farm products had been marketed through cooperative organizations, while farmers had bought through the same channels $74 million worth of farm commodities. Over 68,000 farmers subscribe to 585 agricultural cooperative societies." This appears to be a good point at which to turn to the marketing policy of the province.

Marketing Policy: The field of marketing agricultural products had been left almost entirely to the co-operatives until the last session of the Quebec Parliament and still it appears that the situation will not be greatly altered except for the supervision by a Government Board. The 1956 Quebec Agricultural Marketing Act establishes a Marketing Board to supervise, co-ordinate and improve the marketing of farm products. This is by way of an enabling act in respect of the 1949 Federal Marketing Act which gave powers to authorized Provincial Boards to exercise certain powers in interprovincial and international markets. The Board has powers to assist in directing production, finding new markets and improving existing ones and co-ordinating the various

marketing operations to the best advantage of producers, giving due regard to the interest of consumers. The Board shall also generally collaborate with producers, the co-operatives or professional organizations of farmers, associations of consumers, and representatives of traders in farm products.

The Act states specifically that it is not intended to compete with the co-operative organizations in the production and marketing of farm products but supplement them. It really appears that existing co-operatives will be strengthened by being made agents of the Board for the purpose of executing the Act.

The Provincial Board will consist of four members who will be appointed by the provincial cabinet for a term of ten years. The powers of the Board are far-reaching and includes just about every requirement necessary for effectively carrying out the provisions of the Act. Its decisions are binding being subject to revision only by the provincial cabinet.

Ten or more producers in an area may request approval of a plan for marketing one or several categories of farm products in its area. An approved plan comes into force if it is favoured

by 75 per cent (in number and value) of the interested producers. The plan then becomes binding to all producers and buyers of the product concerned within the specified area. Power to suspend or cancel a producer plan rests with the Board.

The Board has power to arbitrate, adjust or otherwise settle any dispute arising from the carrying out of a marketing plan; it may establish negotiating agencies to facilitate agreements between producers and purchasers; and may investigate any matter related to the cost of production and marketing of any farm product to which a marketing plan applies.

This marketing scheme has definite possibilities for improving the marketing facilities available to Quebec farmers. Yet it may be open to many defects which will depend largely upon the manner in which it is put into operation. It will be interesting to see what developments take place then.[1/] The scheme should insure improvement in grading, standardization, inspection and transportation of farm products. Co-operation among producers will also

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1/ (In Ontario, where full advantage has long been taken of organized marketing of farm products, 21 products come under the jurisdiction of price-fixing marketing boards.) The validity of the legislation delegating powers to the Ontario marketing boards is now being questioned, however, and is before the Supreme Court of Canada for a decision.

assist in reducing marketing costs, particularly if powers of the Board are delegated to existing co-operatives which already have organized market channels.

Through orderly marketing and collective bargaining, there should be a stabilizing influence on farm prices and on farm incomes. There is the danger, however, that the power of producer boards may serve to encourage inefficient production. Rigid prices may restrict the free working of market forces. The consumer may also be placed at a disadvantage as the administration and control of production and marketing becomes more centralized. In the Act, the provisions for consumer representation and participation are rather limited. If the scheme is to function successfully, care must be taken that it does not become the subject of political intrigue.

Prior to passing of the Quebec Marketing Act, provincial legislation with respect to marketing was confined mainly to the distribution of fluid milk and cream. The Quebec Dairy Industry Commission is empowered to fix the price of milk or cream in the various milk markets. Producers are paid, on a

quota basis, at one price for milk sold for fluid consumption and at a lower price for "surplus" milk. Legislation designed to protect the dairy industry prohibits the manufacture or sale of any dairy product substitute in which vegetable oils or fats have been used. It is doubtful that much advantage is being gained from this restriction.

Aids to Production: Much of the value has been done to encourage efficient agricultural production in Quebec either directly or by way of farm welfare policies. Under this heading can be mentioned drainage schemes, rural electrification and road construction. Many of the various services brought to the farmer through the Agronomes could be mentioned at this point but these will be treated under the heading of "Education, Extension and Research", which follows.

There are various drainage schemes which aim to provide adequate drainage facilities throughout the province with financial assistance from government. Provisions are made for the provincial government to collaborate with the federal and local governments in the execution of drainage works. Large areas of land under

cultivation have been improved and extensive areas have been reclaimed for farming operations.

A Rural Electrification Bureau was established in 1945 to promote rural electrification by means of electricity co-operatives. The co-operatives are assisted by loans and other ways. Electricity has been made available to the farming and rural communities in general, and since this scheme began the percentage of farms with electric current has increased from 20 per cent to over 80 per cent. This is certainly an important factor in aid of agricultural production as well as for the social benefits of rural people.

Great care is taken to keep rural roads in good condition of repair and the Colonization Department is particularly concerned with facilitating settlement through the construction of roads. Any programme of road improvement which assist farmers in getting their products to markets will be of great benefit to agriculture. It may not be worth the expenditure, however, to undertake such programmes in isolated areas, when funds could be employed for similar or other schemes in already established areas.

In addition to the above there are various schemes to assist farmers directly in livestock and crop improvement, such as the establishment of demonstration farms.

Education, Extension and Research: The province of Quebec is well equipped with educational institutions. In the field of agricultural education it is better provided for than any other province in Canada. Education is the preserve of the Provinces, under the constitution. Each province is, therefore, responsible for its own agricultural education and extension work.

There are three university schools of agriculture, and a school of veterinary science in Quebec. The Dairy School at Ste. Hyacinthe trains butter and cheese makers. There are also a number of regional vocational schools in which agriculture is taught at various levels. The Quebec Government gives varying degrees of financial support to these institutions. Grants are made to students in the degree and diploma courses in agriculture. The support to agricultural education has brought marked improvements in farm practices but further support is necessary by way of student aids and grants for investigation and research.

Various policies of the government are introduced at the farm level through a comprehensive extension programme. In emphasizing the problems of the farm unit and in providing positive guides to increasing the production and income of individual farms, this extension programme has been the most progressive in Canada. The Agronomes serve as liaison officers between the various branches of the Agricultural Department and the farmers. They arrange short courses, field days and demonstrations and assist and advise farmers on all phases of agricultural activity. It is claimed, however, that the financial incentive necessary to attract the number of specialists necessary for this most important duty is lacking.

Legislation provides for the formation of agricultural societies and farmer's clubs which are local institutions for promoting improvement in agricultural practices through discussions, lectures, demonstrations and competitions. The activities of these institutions are supervised by the Agronomes and they are given financial support by the provincial government. Through the "Order of Agricultural Merit" farmers are encouraged by

honors and awards in acknowledgement of services rendered to agriculture.[1/] Maintaining these institutions are a most effective way of bringing to the farmer new farming methods and improved techniques which have resulted from research, and more extensive use could be made of them.

In the field of agricultural research there is co-operation between the federal and provincial departments to avoid duplication of effort. The Quebec Agricultural Research Council, which was established in 1947, has as its main objectives the stimulation and co-ordination of research. It encourages and provides financial support for research work, helps to train research workers and bring about closer collaboration between "scientists" and institutions, and make known the findings of research. The agricultural colleges also make valuable contributions to the research field. The Quebec Department of Agriculture maintains a special branch for research in rural economics, which is active in work pertaining to co-operatives and in agricultural surveys.

1/ See A. Gosselin and D. Fortin "Better Farm Management Practices Through Demonstration" Economic Annalist, Feb.1949. Also "Quebec Better-Farming Competitions", Economic Annalist, June 1949 and "Improving Efficiency Through Quebec Better-Farming Competitions", Economic Annalist, October 1951.

A Way to Improvement: Suggestions were made throughout Chapter lll as to the direction in which change in the structure of Quebec agriculture should proceed. This section is in addition to those made earlier or to re-emphasize them.

Quebec has all the physical requirements necessary for pursuing a progressive agricultural policy. Its success depends largely, however, upon whether policy aims are such that appear to over-ride economic goals.

Every effort to encourage, rather than restrict, the mobility of the agricultural population should be made. A reduction of the farm labour force by movement into industrial employment will contribute to improving agricultural efficiency. Inadequate combination of the factors of production can only result in the persistence of low productivity. A better balance between the farm population and other agricultural resources is therefore necessary. If the present rate of industrial growth continues, the demand for labour should remain high enough to enable a faster rate of transfer of labour from agriculture. This movement must take place if the living standards of the

Quebec farm people are to be raised. Policy measures should give full recognition to this factor.

Active steps must be taken to reduce the number of low-income farmers. Subsistence farmers should be encouraged to pursue some other line of endeavour. This could be approached under some rehabilitation scheme. This would help to pave the way for the development of larger and more efficient farm units.

Improved technology in agriculture necessitates the employment of capital in larger amounts for efficient farming operations. With larger farming units, facilities should be made available for achieving the required level of mechanization. Long-term loans at low interest rates should be large enough to enable the progressive farmer to operate on a profitable scale, and keep in line with technological advance.

Rural education need not only serve to bring to farmers modern methods and techniques but may serve to speed up migration out of agriculture. Education programmes should be designed to equip rural people with the training and skills which would assist in their migration from agriculture. This

will entail widening and intensifying extension services.

The drive to improve scientific methods in agriculture must proceed at a never lessening pace. Research facilities must therefore expand to serve more fully the needs of the agricultural industry.

To meet the needs in the short run for more stable prices and incomes for farmers, much can be achieved through co-operative marketing schemes. Also, in this connection it is assumed that the Federal Government will continue a flexible price support programme.

To conclude this section no better can be done than to quote from G.V. Haythorne's book:

> "Yet agriculture, whether it is to expand or contract in the future, vitally needs greater skill, training, mechanization, and applied science. To encourage the placing of more people on the land without reference to these other factors, in a sphere of life which has already so many examples of prodigal and uneconomic labour, is on a par with the use of shovels instead of excavators on important construction projects in order to 'give more work'." 1/

The policy makers in Quebec should bear this in mind, particularly

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1/ Land and Labour, Toronto, 1941, p.448

when the economic environment is such that attractive opportunities offer themselves outside of agriculture. Emphasis must be on positive action to overcome the impediments that keep people from migrating to progressive communities from backward areas.

Finally, the need for co-operation between all governmental and institutional agencies serving the agricultural industry cannot be too strongly emphasized.

Outlook: The study is brought to a close by considering very briefly the prospects facing the Quebec farm industry for the next two decades. No attempt can be made here to make precise projections, therefore, broad general statements must suffice.

The object of production is to meet the requirements of consumer demand. Consideration must be given then to the forces which determine the demand for farm products. Mainly, these determinants are income, price, population and consumer preferences. All these forces point in the direction of an increasing demand for the products being produced, or capable

of being produced in Quebec, without need for any rigid adjustment to the present pattern of farm production.

With rapid industrial expansion in Quebec, accompanied by urbanization and an increasing population, the demand for farm products will also increase. Rising incomes, however, will give rise to changing consumption patterns. These changes will be towards the more expensive protective foods and away from cereals and potatoes. There will therefore be an increased domestic demand for meat, dairy and poultry products, and fruits and vegetables.

These include the main products now being produced in the province and since the demand for these will be bouyant in the next two decades, the outlook for Quebec agriculture is a bright one. The present difficulties which face the industry can be removed but this, only if the measures previously outlined for improved efficiency are put into operation. Only then can the full benefits open to the industry be realized. An efficiently organized industry can meet these future requirements with even fewer resources than those presently employed.

It is suggested that production be concentrated not only in those products which have high income and price elasticities but those products whose prices are rising relative to production costs.

Finally, the aim must be to reorganize the resources employed in Quebec agriculture in such a manner as to give a greater product with the same inputs or the same product with fewer inputs, in keeping with the wishes of society.

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APPENDIX TABLES

TABLE A

PRODUCTION OF MILK, BUTTER, CHEESE AND EGGS IN QUEBEC AND ONTARIO, 1935-1955

	Milk		Butter		Cheese		Eggs	
	Quebec	Ontario	Quebec	Ontario	Quebec	Ontario	Quebec	Ontario
	'000 lbs.		'000 lbs.		'000 lbs.		'000 doz.	
1935	4,316,624	6,518,664	87,173	114,171	20,608	75,450	30,613	81,961
1936	3,786,432	5,698,509	88,586	112,946	25,631	88,589	32,566	83,550
1937	3,902,469	5,613,533	89,052	107,761	30,618	94,000	33,166	82,100
1938	4,093,899	5,805,779	92,803	112,537	28,794	87,719	31,765	78,200
1939	4,056,157	5,855,497	92,368	112,354	27,750	90,093	33,224	78,461
1940	3,905,608	6,006,239	85,057	110,364	34,067	98,648	35,854	78,798
1941	4,069,999	6,053,242	86,650	110,860	36,969	102,891	35,921	80,690
1942	4,505,821	6,125,081	84,710	94,525	65,306	128,980	39,442	90,117
1943	4,639,038	5,916,586	93,399	89,747	49,611	106,293	41,418	102,457
1944	4,780,187	5,816,220	90,287	82,799	63,026	107,681	53,022	107,276
1945	4,936,709	6,031,883	95,974	85,300	60,979	114,182	55,342	119,344
1946	4,754,468	5,724,297	93,165	76,928	43,225	96,523	52,032	130,048
1947	4,868,446	5,865,495	105,493	85,341	25,478	90,566	61,274	154,160
1948	4,775,769	5,572,691	106,833	86,308	17,174	71,741	60,131	141,331
1949	4,836,936	5,677,129	102,039	84,071	27,880	88,565	56,929	116,972
1950	4,842,433	5,465,550	91,435	73,719	24,344	74,909	52,992	121,334
1951	4,967,216	5,441,027	96,204	71,934	19,995	71,866	50,974	116,036
1952	5,298,157	5,492,473	107,527	82,470	14,991	57,121	53,409	133,398
1953	5,577,009	5,317,033	116,650	85,709	14,657	65,432	53,738	140,100
1954	5,813,682	5,445,822	123,830	85,944	19,505	71,228	62,071	153,619
1955	6,059,913	5,520,910	128,251	86,200	19,025	69,210	57,460	144,693

SOURCES: D.B.S. Publications, Quarterly Bulletin of Agricultural Statistics; Dairy Statistics; and Production of Poultry and Eggs.

TABLE B

QUEBEC, PRINCIPAL STATISTICS ON FARM POPULATION, FARM NUMBERS, LAND USE AND CROPS BY REGIONS 1931-51

Item and Years	Province	St. Lawrence Lowlands	Appalachian Uplands	Laurentian Plateau
FARM POPULATION				
Numbers - Thousands				
1931	777	486	378	113
1941	839	388	307	143
1951	793	363	296	133
Percent of Province				
1931	100	49.7	35.8	14.5
1941	100	46.3	36.6	17.1
1951	100	45.8	37.4	16.8
Percentage Change				
1931-41	8.0	0.5	10.4	26.5
1941-51	-5.5	-6.5	-3.6	-6.9
NUMBERS OF FARMS				
Numbers - Thousands				
1931	136	67	50	19
1941	155	70	59	25
1951	134	62	51	22
Percent of Province				
1931	100	49.3	36.9	13.8
1941	100	45.5	38.1	16.4
1951	100	45.9	37.6	16.5
Percentage Change				
1931-41	13.8	5.1	17.5	34.4
1941-51	-13.1	-12.5	-14.3	-12.3
AREA IN FARMS				
Acres - Thousands				
1931	17,304	7,745	6,524	3,035
1941	18,063	7,486	7,147	3,429
1951	16,786	7,067	6,618	3,102
Percent of Province				
1931	100	44.8	37.7	17.5
1941	100	41.4	39.6	19.0
1951	100	42.1	39.4	18.5
Percentage Change				
1931-41	4.4	3.3	0.5	13.0
1941-51	-7.1	-5.6	-7.4	-9.5

TABLE B (continued)

QUEBEC, PRINCIPAL STATISTICS ON FARM POPULATION, FARM NUMBERS, LAND USE AND CROPS BY REGIONS 1931-51

Item and Years	Province	St.Lawrence Lowlands	Appalachian Uplands	Laurentian Plateau
IMPROVED LAND				
Numbers - Thousands				
1931	8,994	4,767	3,018	1,209
1941	9,062	4,645	3,112	1,305
1951	8,829	4,445	3,133	1,250
Percent of Province				
1931	100	53.0	33.6	13.4
1941	100	51.3	34.3	14.4
1951	100	50.4	35.5	14.2
Percentage Change				
1931-41	0.8	-2.6	3.1	7.9
1941-51	-2.6	-4.3	-.7	-4.2
UNDER CROPS				
Numbers - Thousands				
1931	6,140	3,410	1,965	765
1941	6,138	3,282	2,051	804
1951	5,790	3,127	1,912	752
Percent of Province				
1931	100	55.5	32.0	12.5
1941	100	53.5	33.4	13.1
1951	100	54.0	33.0	13.0
Percentage Change				
1931-41	-0.04	-3.7	4.4	5.1
1941-51	-5.7	-4.7	-6.8	-6.5
FIELD CROPS				
Numbers - Thousands				
1931	6,080	3,364	1,953	763
1941	6,062	3,224	2,040	798
1951	5,686	3,045	1,895	746
Percent of Province				
1931	100	55.3	32.1	12.6
1941	100	53.2	33.6	13.2
1951	100	53.6	33.3	13.1
Percentage Change				
1931-41	-0.3	-4.1	4.4	4.5
1941-51	-6.2	-5.6	-7.1	-6.6

TABLE B (continued)

QUEBEC, PRINCIPAL STATISTICS ON FARM POPULATION, FARM NUMBERS, LAND USE AND CROPS BY REGIONS 1931-51

Item and Years	Province	St.Lawrence Lowlands	Appalachian Uplands	Laurentian Plateau
PASTURE				
Numbers - Thousands				
1931	2,601	1,225	975	400
1941	2,519	1,184	921	414
1951	2,685	1,159	1,112	414
Percent of Province				
1931	100	47.1	37.5	15.4
1941	100	47.0	36.6	16.4
1951	100	43.2	41.4	15.4
Percentage Change				
1931-41	-3.1	-3.4	-5.6	3.6
1941-51	6.6	-2.1	20.8	-0.1
WOODLAND				
Numbers - Thousands				
1931	6,036	2,147	2,525	1,363
1941	5,963	1,816	2,733	1,414
1951	5,874	1,863	2,680	1,331
Percent of Province				
1931	100	35.6	41.8	22.6
1941	100	30.5	45.8	23.7
1951	100	31.7	45.6	22.7
Percentage Change				
1931-41	-1.2	-15.4	8.2	3.7
1941-51	-1.5	2.6	-1.9	-5.9

TABLE C

QUEBEC, PRINCIPAL STATISTICS OF LIVESTOCK NUMBERS BY REGIONS 1931-51

Item and Years	Province	St.Lawrence Lowlands	Appalachian Uplands	Laurentian Plateau
ALL CATTLE				
Numbers - Thousands				
1931	1,707	827	666	214
1941	1,757	858	674	225
1951	1,641	806	650	185
Percent of Province				
1931	100	48.5	39.0	12.5
1941	100	48.8	38.4	12.8
1951	100	49.1	39.6	11.3
Percentage Change				
1931-41	2.9	3.6	1.3	5.2
1941-51	-6.6	-6.0	-3.6	-17.9
MILK COWS AND HEIFERS				
Numbers - Thousands				
1931	851	429	318	103
1941	1,213	605	461	147
1951	1,106	559	429	118
Percent of Province				
1931	100	50.5	37.4	12.1
1941	100	49.9	38.0	12.1
1951	100	50.6	38.8	10.6
Percentage Change				
1931-41		(data not comparable)		
1941-51	-8.8	-7.6	-6.8	-20.2
BEEF CATTLE				
Numbers - Thousands				
1931		(no data available)		
1941	17	7	8	3
1951	62	27	27	8
Percent of Province				
1931		(no data available)		
1941	100	39.8	45.2	15.0
1951	100	43.8	44.2	12.1
Percentage Change				
1931-41		(data not comparable)		
1941-51	266.9	303.4	258.5	195.2

TABLE C (continued)

QUEBEC, PRINCIPAL STATISTICS OF LIVESTOCK NUMBERS BY REGIONS 1931-51

Item and Years	Province	St.Lawrence Lowlands	Appalachian Uplands	Laurentian Plateau
OTHER CATTLE				
Number - Thousands				
1931	857	398	347	111
1941	528	246	206	76
1951	473	219	194	60
Percent of Province				
1931	100	46.5	40.5	13.0
1941	100	46.6	39.1	14.4
1951	100	46.4	41.0	12.6
Percentage Change				
1931-41		(data not comparable)		
1941-51	-10.4	-10.8	-6.0	-21.2
SWINE				
Numbers - Thousands				
1931	728	412	221	96
1941	808	467	241	100
1951	1,108	578	407	123
Percent of Province				
1931	100	56.5	30.3	13.2
1941	100	57.8	29.9	12.3
1951	100	52.2	36.7	11.1
Percentage Change				
1931-41	11.0	13.4	9.3	4.3
1941-51	37.2	23.9	68.5	23.6
SHEEP				
Numbers - Thousands				
1931	734	312	307	115
1941	526	223	222	80
1951	316	120	156	40
Percent of Province				
1931	100	42.5	41.8	15.7
1941	100	42.5	42.3	15.3
1951	100	38.0	49.3	12.7
Percentage Change				
1931-41	-28.3	-28.4	-27.5	-30.2
1941-51	-39.9	-46.2	-29.8	-50.1

TABLE C (continued)

QUEBEC, PRINCIPAL STATISTICS OF LIVESTOCK NUMBERS BY REGIONS 1931-51

Item and Years	Province	St.Lawrence Lowlands	Appalachian Uplands	Laurentian Plateau
HENS AND PULLETS				
Numbers - Thousands				
1931	7,862	4,628	2,127	1,108
1941	8,063	4,740	2,105	1,217
1951	10,090	5,926	2,749	1,415
Percent of Province				
1931	100	58.9	27.1	14.1
1941	100	58.8	26.1	15.1
1951	100	58.7	27.2	14.1
Percentage Change				
1931-41	2.6	2.4	-1.0	9.8
1941-51	25.1	25.0	30.6	16.2

TABLE D

FARM VALUES BY REGIONS, QUEBEC, 1931-51

(Counties falling wholly within a region are taken as representative of the region) a/

	Ten Counties of the St. Lawrence Lowlands			Ten Counties of the Appalachian Uplands			Two Counties of the Laurentian Plateau		
	1931	1941	1951	1931	1941	1951	1931	1941	1951
Total Value ('000 $)	123,187	101,589	161,059	139,764	117,906	236,960	11,818	9,613	18,995
per farm $	10,243	8,232	14,961	5,481	4,337	10,487	4,673	3,145	7,915
per improved acre $	127	108	184	88	72	93	95	60	126
Land & Buildings ('000 $)	101,660	79,548	105,525	105,140	83,049	132,303	8,690	6,532	10,969
per farm $	8,453	6,446	9,803	4,123	3,055	5,855	3,436	2,137	4,570
per improved acre $	105	85	121	66	51	52	70	41	72
Implements & Machinery ('000 $)	11,743	10,349	24,490	15,756	13,466	32,966	1,652	1,357	3,586
per farm $	976	839	2,275	618	495	1,459	653	444	1,494
per improved acre $	12	11	26	10	8	13	13	8	24
Livestock ('000 $)	9,785	11,690	31,044	18,872	21,392	71,690	1,478	1,726	4,440
per farm $	814	947	2,884	740	787	3,173	584	565	1,850
per improved acre $	10	12	36	12	13	28	12	11	29

a/ The ten counties included in the St. Lawrence Lowlands were: Vaudreuil, Soulanges, Beauharnois, Laprairie, Chambly, Montreal I and Jesus I, Vercheres, St. Hyacinthe, Richelieu, Yamaska. The ten counties included in the Appalachian Uplands were: Brome, Sherbrooke, Stanstead, Compton, Richmond, Wolfe, Frontenac, Megantic, Beauce, Dorchester. The two counties included in the Laurentian Plateau were: Labelle and Saguenay.

TABLE E

FARM MACHINERY BY REGIONS, QUEBEC, 1931-51.
(Counties falling wholly within a region are taken as representative of the region) a/

	Ten Counties of the St. Lawrence Lowlands			Ten Counties of the Appalachian Uplands			Two Counties of the Laurentian Plateau		
	1931	1941	1951	1931	1941	1951	1931	1941	1951
Automobiles	3,444	3,501	4,818	5,518	5,443	9,091	393	345	499
per 100 farms	29	28	45	22	20	40	16	11	21
Tractors	627	1,437	5,843	92	529	3,550	18	35	359
per 100 farms	5.2	12	54	0.4	1.9	.6	0.7	1.1	15
Motor Trucks	1,438	1,758	2,543	586	704	2,455	32	79	578
per 100 farms	12	14	24	2.3	2.6	11	1.3	2.5	24
Gasoline Engines	3,255	3,192	1,118	6,076	7,102	6,214	682	741	563
per 100 farms	27	26	10	24	26	27	27	24	23
Treshing Machines	4,251	2,934	1,886	6,518	5,652	5,460	842	702	644
per 100 farms	35	24	17	26	21	24	34	23	27
Grain Binders	6,889	no data	5,654	1,535	no data	1,996	578	no data	585
per 100 farms	57		52	6.0		8.8	23		24
Grain Combines	-	7	108	-	4	49	-	-	8
per 100 farms	-	0.06	1.0	-	0.01	0.2	-	-	0.3
Milking Machines	94	no data	1,701	234	no data	3,605	8	no data	20
per 100 farms	0.8		16	0.9		16	0.3		0.8
Electric Motors	520	1,322	5,910	504	836	7,236	22	37	171
per 100 farms	4.3	11	55	2.0	3.1	32	1.0	1.2	7.1

a/ The ten counties included in the St. Lawrence Lowlands were: Vaudreuil, Soulanges, Beauharnois, Laprairie, Chambly, Montreal I and Jesus I, Vercheres, St. Hyacinthe, Richelieu, Yamaska. The ten counties included in the Appalachian Uplands were: Brome, Sherbrooke, Stanstead, Compton, Richmond, Wolfe, Frontenac, Megantic, Beauce, Dorchester. The two counties included in the Laurentian Plateau were: Labelle and Saguenay.