THE UNIVERSITY OF MANITOBA

BENEFITS AND COSTS OF LAND CLEARING IN THE INTERLAKE AREA OF MANITOBA

by

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ABSTRACT

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The Interlake is a depressed region with emphasis on mixed farming and beef cattle grazing. Land clearing was initiated in the Interlake area of Manitoba in September, 1967, under an overall FRED plan designed to upgrade the economic condition of the rural community. Other projects included drainage maintenance and reconstruction, education and manpower training. Large sums of money were being pumped into the economy. This prompted the present study with the following main objectives:

a) to provide useful information to decision makers for framing future resource development policies;

b) to provide valuable information to farmers in the area to determine the economics of clearing more land.

Discounted gross benefit-cost ratios were used to determine the profitability of clearing additional land. A total of 600 farmers cleared land over a three year period of analysis. A sample of 90 was chosen for study, comprising all the three soil capability classes in the area.

The gross benefit-cost ratios were not found favourable in general. Farmers were then stratified into those who produced for

only one year, two years and three years over the period of analysis. Farmers who produced for three years were found to be younger and more successful in respect to education and farm operations. Their gross benefit-cost ratios were relatively better. Benefits and costs were expanded for the whole area on the basis of average returns and costs to those farmers who produced for three years. As additionally cleared land was recognized as a source of perpetual income, projections were made for 2 years and up to 25 years in the future. On the basis of these projections, the project was found to turn profitable after a period of three years.

Data for the study was made available through the Interlake Land Clearing Evaluation Survey, 1971, conducted by the Department of Agricultural Economics, University of Manitoba. The time period involved was 1967-1968 to 1969-1970.

ACKNOWLEDGEMENTS

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Responsibility of all weaknesses in the study rests with the author.

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CHAPTER I

INTRODUCTION

The Canadian economic scene is characterized by many depressed regions. The Interlake area in Manitoba is one such region. The mainstay of population in this area is agriculture. As per 1966 census, fifty percent of the population in the region lived on 5,650 farms. The Interlake Fact Digest maintains that primary industry in the Interlake consists mainly of agriculture and fishing. Manufacturing is of relatively minor importance . . . Trade and service activities mainly related to agriculture are a major component of area economic activity.[1] Farm incomes are relatively low. A sizeable labour force is under employed. Industrial development is minimal.

The Interlake area is covered by the F.R.E.D.[2] and A.R.D.A.[3] programmes. A ten year regional development agreement was signed between the province of Manitoba and the Government of Canada, in May, 1967.

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[1] C. F. Framingham, J. A. MacMillan and D. J. Sandell, Interlake Fact, (Winnipeg: Government of Manitoba, 1970), p. IX.

[2] Fund For Rural Economic Development: The parliament of Canada passed the F.R.E.D. Act in May, 1966. It was amended in March, 1967. It permits a federal expenditure up to $300,000,000 from the consolidated revenue fund. Under F.R.E.D. the federal government may sign an agreement with any province to implement a comprehensive plan of social and economic development in an area that has special and

The objectives of the agreement were to increase levels of income, employment opportunity, and standards of living of the Interlake residents by means of extensive public investment in education; increased training facilities; counselling; development of renewable resources; encouragement of secondary industry and development of infrastructure. A total of up to $85,085,000 is to be allocated for these programmes until 1977.[4]

By strict geographic definition, the Interlake region of Manitoba is that area located between Lake Winnipeg on the east and Lakes Manitoba, Winnipegosis and Cedar on the west. This territory is over 15,000 square miles in size. On the other hand, the Interlake F.R.E.D. region extends south to the Assiniboine River directly south of Lake Manitoba's eastern shoreline and along the northern boundary of Metropolitan Winnipeg. The northern boundary follows the 36th township line at approximately 52°10' N latitude. Size of the designated F.R.E.D. region is 10,350 square miles.[5] This study relates to the Interlake F.R.E.D. region.

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urgent needs.

[3] Agricultural and Rural Development Act: The A.R.D.A. differs from F.R.E.D. in respect to its geographic and policy scope. A.R.D.A. covers all agricultural areas in a province. F.R.E.D. covers only a specific region in a province, with programs including education, transportation as well as agriculture.

[4] Department of Forestry and Rural Development, Interlake Area of Manitoba, Federal Provincial Rural Development Agreement (Ottawa: Queen's Printer, 1967), p. 9.

[5] C. F. Framingham, J. A. MacMillan and D. J. Sandell, The Interlake Fact, (Winnipeg: Government of Manitoba, 1970), p. IX.

Interlake agriculture is reported to have a high development potential. The report Kah-Miss-Ahk states: Plenty of crop land still lies under bush, while thousands of acres of cultivated land are prone to flooding and require drainage. In 1966, seventy five percent of the farmers grossed under $3,750 per year. This compared to sixty percent in this category for all Manitoba.[6]

A similar viewpoint has been expressed in the following paragraph:

Much of the land in the area has a high capability for agriculture. A large portion is being farmed, but there are some 500,000 acres of unused or under utilized land in the area that has high potential for agricultural production. Studies indicate that with bush removal and fertilization over sixty percent of this land would be high productivity arable land for annual crops. The remainder, if cleared of bush would produce quality hay and pasture. In fact, improvement of this agricultural base could support about 3,000 viable commercial farms.[7]

The Interlake agricultural economy is basically a mixed farming economy with emphasis on beef cattle grazing.

The F.R.E.D. development programme[8] in the Interlake area

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[6] Government of Manitoba, Kah-Miss Ahk (No date).

[7] Department of Forestry and Rural Development, Interlake Area of Manitoba, Federal Provincial Rural Development Agreement (Ottawa: Queen's Printer, 1967), p. 35.

[8] The F.R.E.D. Agreement defines a programme as a definite course of intended proceedings for a major operation within the plan.

includes a project[9] on land clearing, which is a part of a larger plan.[10] Some of the other programmes and projects under the plan include drainage, education and manpower training.

PROBLEMATIC SITUATION

A large number of low-income farmers in the Interlake area possess uncleared bush land, capable of producing grain or forage. The government has committed a large sum of money to help and encourage the Interlake farmers to clear their bush land. A subsidy of four dollars per cleared acre of land is given to all those farmers whose land is approved for land clearing by the Manitoba Department of Agriculture. The farmers themselves are spending sizeable sums of money under the assumption of getting increased incomes and employment opportunities.

It is important to know the precise impact of this expenditure for the following reasons: 1) is it worthwhile for the government to continue to support this programme or should the expenditure be allocated to another program? 2) is it profitable for the farmers of the Interlake to clear more bush land? 3) what will be the impact of land clearing on the Provincial economy? and 4) on the National economy? To successfully answer these questions a study of costs in-

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[9] The same source defines a project as an undertaking, with specific objectives that forms a self contained unit within a programme.

[10] Plan, under the F.R.E.D. Agreement refers to the overall design for implementing the rural development strategy.

volved and of benefits accrued is essential. A cost-benefit study would suggest whether bush clearing will: (i) increase farm incomes and help upgrade standard of living in the Interlake area; (ii) increase capital stock of Interlake farmers; (iii) create more employment for labour and machinery on Interlake farms; and (iv) improve the distribution of income among the Interlake farmers (one goal of the programme is that small farmers should benefit more than large farmers).

OBJECTIVES

The main objectives of this study are to:

a) provide information to decision makers at local, provincial and federal levels, useful in framing future resource development policies in the Interlake area and elsewhere in the country.

b) provide local farmers with results which would be of definite help in calculating the economics of clearing more land;

In addition, an attempt will be made:

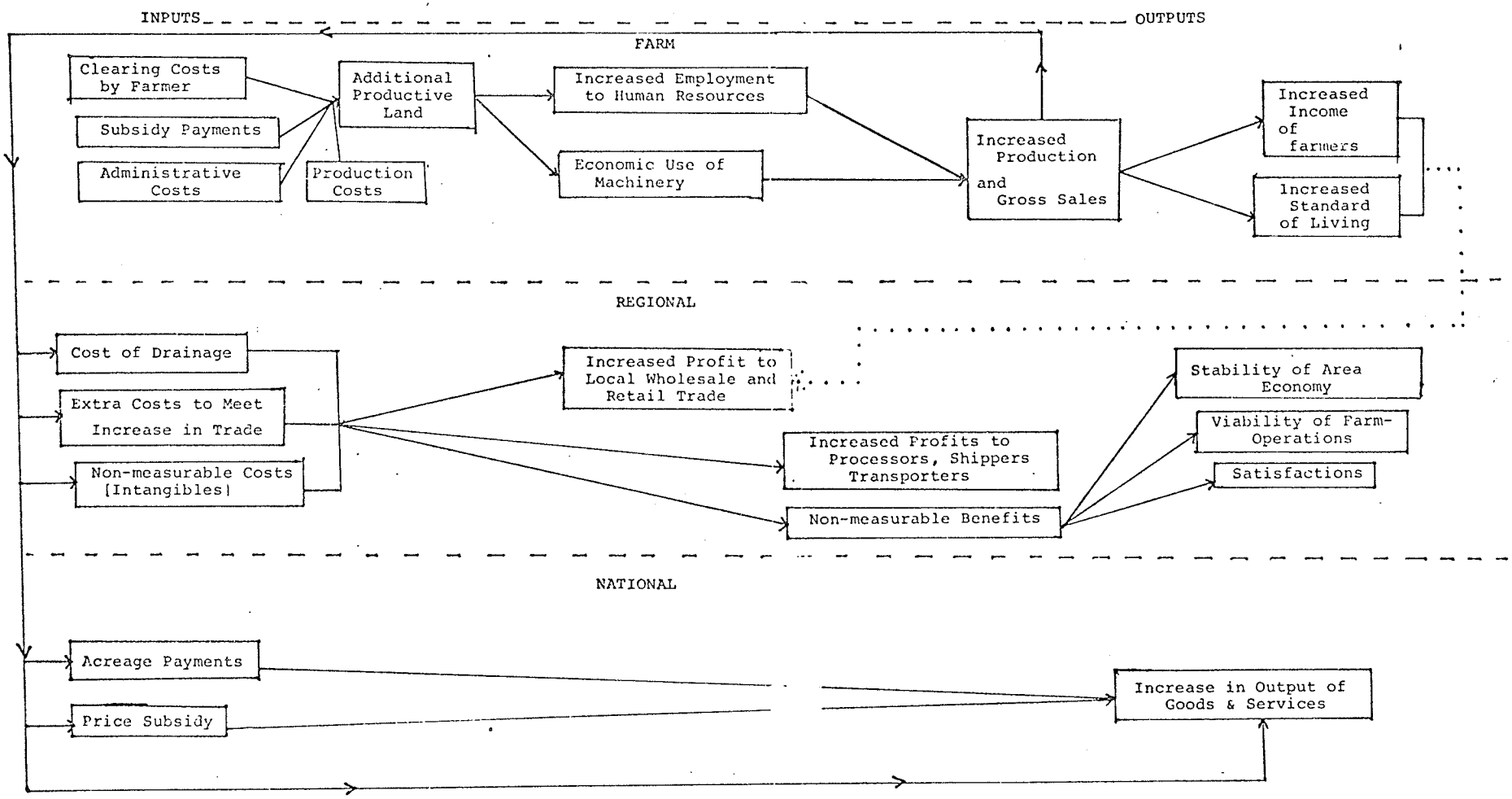
c) to analyse farmers' attitudes towards the role of the government subsidy;

d) to compare the cost structure of various types of land clearing methods to help the farmers in making appropriate decisions in the future.

The objectives of a study will vary with a change in the level of decision making. As specified earlier the objectives of this study relate primarily to the farm level. An attempt will however be made to compare them with regional and national objectives.

The interaction between the various inputs and outputs of the

FLOW CHART No. 1



THREE TIER FLOW CHART SHOWING INTERACTION AMONG INPUTS AND OUTPUTS OF THE LAND CLEARING PROGRAMME.

land clearing programme and the costs and benefits at various levels of the economy are best explained with the help of flow chart No. 1.

At the farm level, additional productive land would involve clearing costs, production costs, administrative costs and subsidies as inputs. On the output side benefits include increased employment of farm human resources and economic use of machinery. This would lead to increased production and gross sales, which would ultimately result in increased income and higher standards of living, for the people of the Interlake area.

On the regional and provincial level increased incomes would induce more consumption and production expenditures. This may induce indirect benefits for traders and processors. It would also lead to certain non-measurable benefits such as the stability of the area economy, satisfactions etc. On the other hand, extra costs may be incurred for drainage and creation of additional facilities for trade.

On the national level, costs would be additional acreage payments to control production or price subsidies to farmers to compensate for lower prices due to increased production. Gains would of course include the increase in output of goods and services.

FRAMEWORK OF THE STUDY

The benefit/cost ratios and other results in this study were obtained from the Interlake Land Clearing Evaluation Survey data,

1971.[11] A total of 600 farmers cleared additional land in the area, out of which a sample of 90 farmers was chosen for this study. The Interlake farmers were divided into three groups on the basis of representative soil capability classes. Canadian soils have been classified into seven classes on the basis of their capability to grow crops.[12] Starting from one, soils become progressively less suitable for cultivation. Interlake soils are classified as of grades 3, 4 and 5. In each soil class, the cleared parcels of land were located with the help of records from the Manitoba Department of Agriculture. The sample was drawn from these parcels. At the time of survey, data were available for a total period of three years. The evaluation survey collected information on costs and benefits of land clearing plus information on farm assets and liabilities, total farm size, farm receipts and expenditure.[13]

This study involves the use of discounted benefit/cost analysis to find out the profitability of the project to individual farmers. Gross benefit/cost ratios were estimated for farmers in the three soil groups on the basis of the sample and then these figures were expanded for the total number of clearing farmers in each soil

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[11] Interlake Land Clearing Evaluation Survey, Department of Agricultural Economics, University of Manitoba, 1971, conducted by L. Jersak, M. Brydges and Larry Miller. (Appendix C)

[12] See Appendix A for Interlake Soil Map and description of various soil classes.

[13] See Appendix B for land clearing evaluation questionnare.

class and ultimately for the whole Interlake. In a complementary analysis assessment was made of changes in farm assets, receipts and expenditures and comparison made with characteristics of all Interlake farmers.

The calculated gross benefit/cost ratios and the expanded gross benefit/cost ratios were projected for two years and upward up to 25 years in future, to determine the year that the project becomes profitable. This projection was made assuming constant costs and prices. Constant costs and prices were assumed because estimation of a change in costs and prices involved many difficulties.

CHAPTER II

METHODOLOGY OF BENEFIT-COST ANALYSIS

Benefit-cost analysis is similar to the methods of investment project appraisal used by businessmen. It is designed to help solve problems involved in public decision making. The present problem is:

1) the measurement of benefits and costs of the land clearing programme in the Interlake area, to determine whether it would be useful for the farmer to clear additional land;

2) through benefit-cost analysis, the decision makers are interested in knowing whether the potential return exceeds the costs of investment.

The rationale behind the use of benefit-cost analysis is effective allocation of scarce resources. There is always a competition for the use of scarce resources. We must choose those which contribute the most to our objectives. Once we know such uses, scarce resources could be effectively used. Benefit-cost analysis, thus serves as an indicator to ascertain the productivity of a government programme.

Cost-benefit analysis has been widely used in evaluating public expenditure decision:

> "Cost-benefit analysis is a practical way of assessing the desirability of the projects, where it is important to take a long view (in the sense of looking at reprecussions in the future as well as nearer future) and a wide view (in a sense for allowing for side effects of many kinds on many persons, industries, regions etc.) that is, it implies that enumeration and evaluation of

all the relevant costs and benefits."[1]

Cost-benefit analysis, by its very nature, is a system for recommending programme decisions. It always leads to a single and simple answer.

> "Conceptually, the cost-benefit ratio is the best signal any analyst can provide to the political decision maker. A cost-benefit ratio of greater than 1 to 1 says to a decision maker, if you do this project, the benefits to the society as a whole will exceed the cost to society as a whole, and therefore, the society as a whole will be better off as a result of your decision."[2]

Benefit-cost analysis allows meaningful comparison of changes which result from a given situation. A common unit is used to rate programme costs and benefits. This common unit is dollar value. Benefit-cost analysis, in general, is therefore restricted to goods and services which can be assigned a dollar valuation. However, there are many intangibles which cannot be assigned a dollar value. One such example is the social benefits associated with improved viability of the rural community. Before we start discussing benefit-cost analysis in relation to the land clearing programme some of the commonly used terms and concepts in benefit-cost analysis are defined. Most of these terms will be frequently used in the following pages.

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[1] A. R. Prest and R. Turvey, "Cost-Benefit Analysis: A Survey", The Economic Journal, December 1965, p. 683.

[2] H. A. Hovey, The Planning Programming Budgeting Approach to Government Decision Making (New York: Praeger Publication, 1968), p. 179.

DEFINITIONS[3, 4]

Direct or Primary Benefits

Values of the products and services which result directly from a project. In case of the land clearing programme the direct benefits would accrue to the farmer in the first place and would be in the form of higher farm incomes due to cleared land. Other direct benefits would be incentive grants provided by the government and rebate on income tax on the amount of money spent by the farmer on clearing additional land. In addition, there would be direct intangible benefits at the regional level.

Secondary or Indirect Benefits

Are those benefits which are 'induced by' or which indirectly stem from the project. In the land clearing programme, these benefits will be increases in the profit of local wholesalers and retailers from handling increased sales of farm products, profits of processors, shippers etc., and higher tax revenues to the state.

Intangible Benefits

Usually refer to those benefits which are not bought or sold at a price nor their value be derived indirectly from the price of secondary products produced by using their services. Intangible

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[3] W. R. D. Sewell, et al, Guide to Benefit-Cost Analysis, (Ottawa: Queen's Printer, 1965), pp. 5-8

[4] S. V. Ciriacy Wantrup, "Benefit-Cost Analysis and Public Resource Development," Journal of Farm Economics, Volume 37, 1955, pp. 676-689.

benefits can be direct as well as indirect. Some of the intangible benefits associated with land clearing are viability of farm operations, satisfaction due to increase in incomes and stability of area economy.

Primary or Direct Costs

Value of goods and services used to establish, maintain and operate a project. These costs, in addition to all monetary costs, include interest, promotional expenses, engineering and supervision, etc.

In the case of land clearing programme, the direct costs will include the incentive payments plus cost incurred by the project authorities in planning and advising about land clearing.

Since this project will mainly be financed by farmers clearing the land, the major proportion of direct costs are the clearing costs borne by the farmers.

Associated Costs

Costs which are borne by the concerned people to get maximum benefit out of a project. In case of land clearing programmes, the associated costs would be the costs of new equipment, fencing, seed, fertilizer and other operating costs, opportunity cost of investment, etc.

Indirect Costs

Indirect or secondary costs are those costs which are associated with the generation of secondary benefits.

In case of the present study, secondary costs will com-

prise of the extra costs incurred by traders, processors, transporters, etc., to handle extra volume of trade due to increase in production in the area, increased costs of drainage, increased subsidy payments to other farmers in the area. (The increase in production, in a surplus economy, may bring prices down and the government will have to subsidize farmers. This extra cost incurred would be a national cost.)

Intangible Costs

As there are intangible benefits, there are also intangible costs. A project may lead to such immeasurable costs as loss in scenic beauty. A qualitative estimate would be of use in such cases.

In case of the land clearing programmes also, there will be some intangible costs such as loss of wildlife habitat, and in some cases, loss of scenic beauty or recreation areas.

Evaluation of Land Clearing as a Capital Investment

In the land clearing project, the major beneficiaries are individual farmers in the Interlake area. They also incurred the major percentage of costs in the form of land clearing costs and costs of operation. Although government provides a subsidy, for clearing land, a greater part of the analysis would be confined to individual farmers. It is not possible to separate the clearing due to subsidy from clearing which would have occurred without the subsidy. This would, therefore, be more or less an analysis of the investment activity of the farm firm.

The land clearing programmes involve large initial capital

outlays and produce cash flows which would spread over a number of years in the future. Hence, it needs a form of analysis which takes into account the differences in timing of income and expenditure. Such analysis of cash flows which would be discounted for purposes of comparison may be called "Discounted Cash Flow Analysis." There are alternate methods available for assessing the profitability of projects. The important ones are the Internal Rate of Return, Net Present Value, Pay Back Period, Average Rate of Return, and B/C ratios.

CASH FLOW ANALYSIS

Cash flow includes both inflow of cash or receipts and outflows of cash or expenditures. As indicated earlier, benefit-cost analysis is mainly concerned with cash flows (dollar value of goods and services). The cash flow analysis differs from profit and loss statements as no depreciation is permissible because capital outlays are included in cash outflows for the year in which they are made. The land clearing programmes represent an expansion of existing farm business. In such a case we have to isolate the effects of additional investment. (In this study it would be done by studying additional outflows and inflows.)

The most important part of investment analysis is to find out the relevant costs and returns and their magnitude. Project cash flows can be divided into three parts.

(i) Project Benefits - inflows
(ii) Project Outlays)
(iii) Annual Operating Costs) - outflows

In any one year the net cash flow is the difference between (i) and (ii and iii) for that year.

In case of land clearing programmes, project benefits are income from cattle, food or feed crops taken on the investment of cleared land. Expenditures are clearing costs, which include costs of knockdown, piling, burning and stumping, etc., and also operating costs such as cost of seed, fertilizer, harvesting, etc. Capital outlays are generally made during the first years or a first few years. Later on most of the annual costs would comprise of operating costs only. We will discuss more about it at a later stage.

Internal Rate of Return [IRR]

Quirin defines Internal Rate of Return as follows:

"By definition, the rate of return is the rate of discount which will equate the present value of the net benefits with the cost of the project." It can be found by solving the following equation for r.

$$\sum_t Q_t \, (1+r)^{-t} = \sum_t C_t \, (1+r)^{-t}$$

where: r is the rate of return.

Q_t = net cash inflow during a period t,

and C_t = net cash outflow during a period t.[5]

It is also known by the names "marginal efficiency of capital,"

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[5] G. D. Quirin, The Capital Expenditure Decision (Homewood: Richard D. Irwin, Inc., 1967), p. 41.

or "the rate of return over cost." The internal rate of return is so called because it is a return "internal" to the project, calculated independently of the cost of capital.

If the IRR is greater than the cost of capital (rate of interest) to the firm, the investment is considered profitable. This is a necessary condition for a project to be acceptable. If more than one investment projects are to be considered, these can be ranked in order of the magnitude of their IRR's. All projects with returns above the cost of capital should be accepted depending upon the capital available. The IRR is computationally difficult, and also leads to problems of non-existent returns and multiple rates of return.

The Net Present Value [NPV]

The NPV of a project is the difference between present values of cash inflows and the present value of cash outflows, all discounted at an appropriate rate.[6]

The NPV is the project's net contribution to the firm's wealth and is calculated by using the following expression.

$$NPV = B_n - C_n,$$

where:

B_n = Present value of benefits
C_n = Present value of costs

An investment is taken to be acceptable if its NPV is positive.

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[6] G. W. Whitlam, et al., Methods of Evaluation of Farm Development Projects (Brisbane: Queensland Department of Primary Industries, 1970), p. 10.

When two competing projects are being considered, the one with a higher NPV should be considered as more profitable.

The NPV is highly dependent on the rate of interest. The higher the interest rate, the greater the discount factor will be, and consequently the lower the net present value. Thus, when present values of costs and returns are plotted against the rate of interest, the curves are consistently downward sloping.[7] It is shown in Figure 2.1. Since the majority of costs are incurred early in the life of the project, the C_n curve is relatively insensitive to changes in the interest rate and thus flatter than the B_n curve. Where these curves intersect, the NPV curve crosses the rate axis. This indicates a critical rate of interest ic, above which the project would be rejected.

The Payback Period[8]

It is the minimum number of years required for the project to recover costs. It is closely related to NPV, and these two measures may be calculated simultaneously. In other words, we can say that it is the number of years for which the project must be continued until the NPV becomes positive. This method generally does not make use of discounting, but it is possible to discount.

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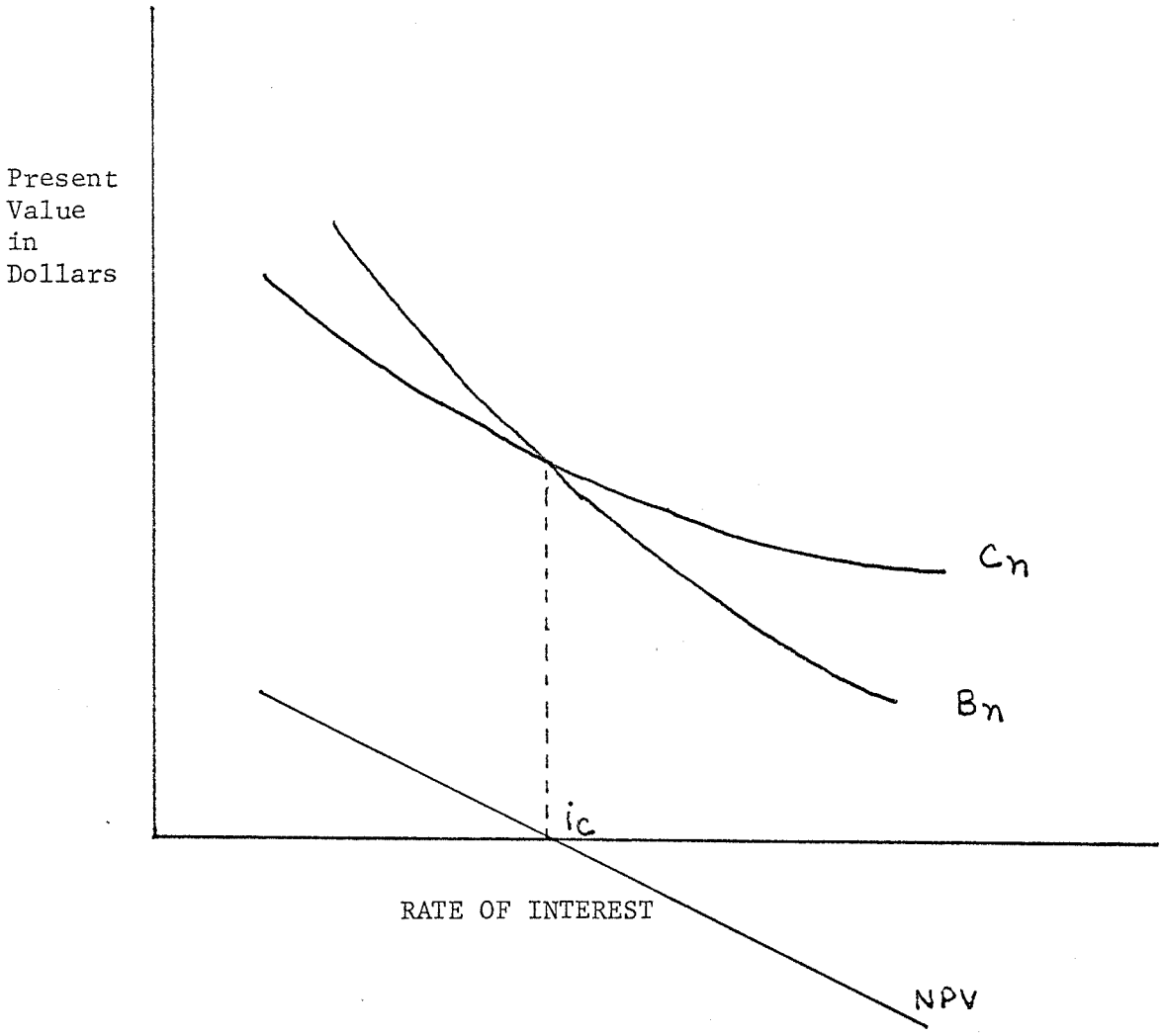
[7] Ibid., p. 12.

[8] Ibid., pp. 14-15.

FIGURE 2.1

PRESENT VALUE OF COSTS AND RETURNS FOR VARYING INTEREST RATES



Discounted Cash Flows and the Problem of Interest Rate: Present and Future Values

We have to deal with cash flows at widely removed points in time. It is necessitated by the long term nature of capital investment. Comparison of the streams of earnings and expenditure over different spans of time is possible through the process of discounting. The central theme of discounted cash flow techniques is an acceptable rate of interest. While there is an agreement on the usefulness of discounting as a technique, there is no agreement on the rate of interest. A dollar has a specific value only at a specific date. Thus a dollar yesterday is a dollar 1.08 today at 8% interest per day. Similarly a dollar tomorrow is worth only .925 cents today at 8% interest rate per day. A dollar value is therefore a function of time and interest rate. A careful selection of the rate of interest is more than essential for a good analysis. A high rate of interest may lead to the rejection of beneficial projects and a low rate of interest may lead to the approval of a project which may not be the best opportunity for investment.

The most difficult decision to be made in the evaluation of public projects, therefore, is the choice of a suitable rate of interest. The term rate of interest has various connotations:

i) the borrowing rate: the rate of interest actually paid on loan finance,

ii) the opportunity cost: that rate which investment funds could earn in alternative employment,

iii) the interest rate on government bonds - long term rate,

iv) the rate of return on private investment, and

v) the social rate of time preference.

In land clearing programmes, we propose to find out the discounted benefit-cost ratios for different soil classes and also at the project level. The best way would be to follow Eckstein's procedure and arrive at a compromise.

> "Let the government use a comparatively low interest rate for the design and evaluation of projects, but let projects be considered justified only if the benefit-cost ratio is well in excess of 1.0"[9]

Many leading economists, including Baumol[10] seem not to agree with this viewpoint. However, as indicated earlier, we will follow Eckstein's proposition. In that case an interest rate around 5 to 6 percent seems to be reasonable. There is another justification for the use of a 5 percent rate of interest in the land clearing study. This rate has already been used in the study of benefits and costs of drainage programmes in the Interlake area.[11] The same rate of interest would facilitate comparison among various projects in the area.

In the land clearing project a high percentage of costs are borne by private individuals and a low rate of interest may not reflect

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[9] Otto Eckstein, Water Resource Development, The Economics of Project Evaluation (Cambridge: Harvard University Press, 1958), p. 101.

[10] W. J. Baumol, "On the Social Rate of Discount," The American Economic Review, LVIII, 1968, pp. 788-802.

[11] G. A. Norton and J. A. MacMillan, "Drainage Maintenance and Reconstruction Costs and Benefits: A Watershed Analysis," Canadian Journal of Agricultural Economics, XVIII, 1970, pp. 56-63.

the true opportunity cost of their capital. Also, if they borrow funds, they will have certainly to pay interest rates higher than 5-6 percent per annum. This happens because cheap sources are scarce in relation to demand, ignorance on the part of borrowers and the nature of investment project. The Manitoba Agricultural Credit Corporation charges interest at 6 to 6.75% rate, on loans up to $3,500 and 7 to 7.75% on loans above that. The best alternative is to discount government and private investment at different rates.

The process of discounting converts future amounts to their present value. The present value of a sequence of amounts a_o, a_1, a_2 . . . a_n earned at the years 0, 1, 2, . . . n is given by:[12]

$$PV_n = a_o + \frac{a_1}{(1+i)} + \frac{a_2}{(1+i)^2} + \ldots + \frac{a_n}{(1+i)^n}$$

$$= \sum_{t=o}^{n} \frac{a_t}{(1+i)^t}$$

where: i = rate of compound interest.

Benefit-Cost Ratios

There are several forms of benefit-cost ratios including average and marginal benefit-cost ratios, as well as the net and gross benefit-cost ratios. We are here, concerned only with the net and gross types.

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[12] Whitlam et al, op. cit., Bulletin No. 7, pp. 6-7.

The net benefit-cost ratio gives the net operating return per dollar of capital outlay. This is given by the following expression:

$$\text{Net B/C ratio} = \frac{PV_b - PV_c}{PV_k} \quad [13]$$

where:

PV_b = Present value of benefits or gross returns from the project,

PV_c = Present value of annual operating costs, and

PV_k = Present value of capital outlays. (If undertaken at the beginning of a time period, it would be equal to the initial capital.)

It is possible in many cases, that the net benefit-cost ratios between projects may be equal, but the total cash flows may differ. In such a case we have the gross benefit-cost ratio, which is given by the following formula:

$$\text{Gross B/C ratio} = \frac{PV_b}{PV_k + PV_c}$$

The gross benefit-cost ratio thus relates gross annual returns from the project to total cost, including capital expenditure and annual operating costs.

If the net or gross B/C ratio of a project is greater than 1.0, it should be considered as profitable. This would be so only if benefits are greater than costs. Benefit-cost ratios are highly use-

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[13] Ibid., pp. 16-17.

ful in ranking different projects. The greater the ratio, the higher the ranking.

Let us consider an example. The following table shows the cash flows of an investment project. If the interest rate is six percent, present values would be as follows:

TABLE 2.1

ANNUAL CASH FLOWS OF A HYPOTHETICAL INVESTMENT PROJECT[14]

Year (1)	Project Income (2)	Capital Outlays (3)	Operating Costs (4)	Net Cash Flows (5) = (2) - (3+4)
1	100	150	50	-100
2	100	0	50	50
3	100	0	50	50
4	100	0	50	50

$$PV_b = \frac{\$100}{1.06} + \frac{\$100}{(1.06)^2} + \frac{\$100}{(1.06)^3} + \frac{\$100}{(1.06)^4} = \$346.51$$

$$PV_c = \frac{\$\ 50}{1.06} + \frac{\$\ 50}{(1.06)^2} + \frac{\$\ 50}{(1.06)^3} + \frac{\$\ 50}{(1.06)^4} = \$173.26$$

$$PV_k = \$150 = \$150.00$$

[14] Table adopted from G. B. Whitlam, op. cit.

The net and gross benefit cost ratios would be:

$$\text{Net B/C ratio} = \frac{\$346.51 - \$173.26}{\$150.00} = 1.11$$

$$\text{Gross B/C ratio} = \frac{\$346.51}{\$150.00 + \$173.26} = 1.07$$

Both these ratios are greater than 1. The project is economically acceptable. However, we find that the gross ratio is less than net. In many cases the difference may be even greater. The magnitude of difference is a function of capital intensity of the project. If the capital requirements of a project are low in relation to operating costs, the net ratio may be high. In such a case, the gross ratio may be preferred. In fact, either ratio will lead to the same decision, both being equal to unity at the same interest rate. This will be clear through the following diagram.[15] The higher the rate of interest, the lower the ratio. In Figure 2.2 the project is acceptable for an interest rate of r percent or below.

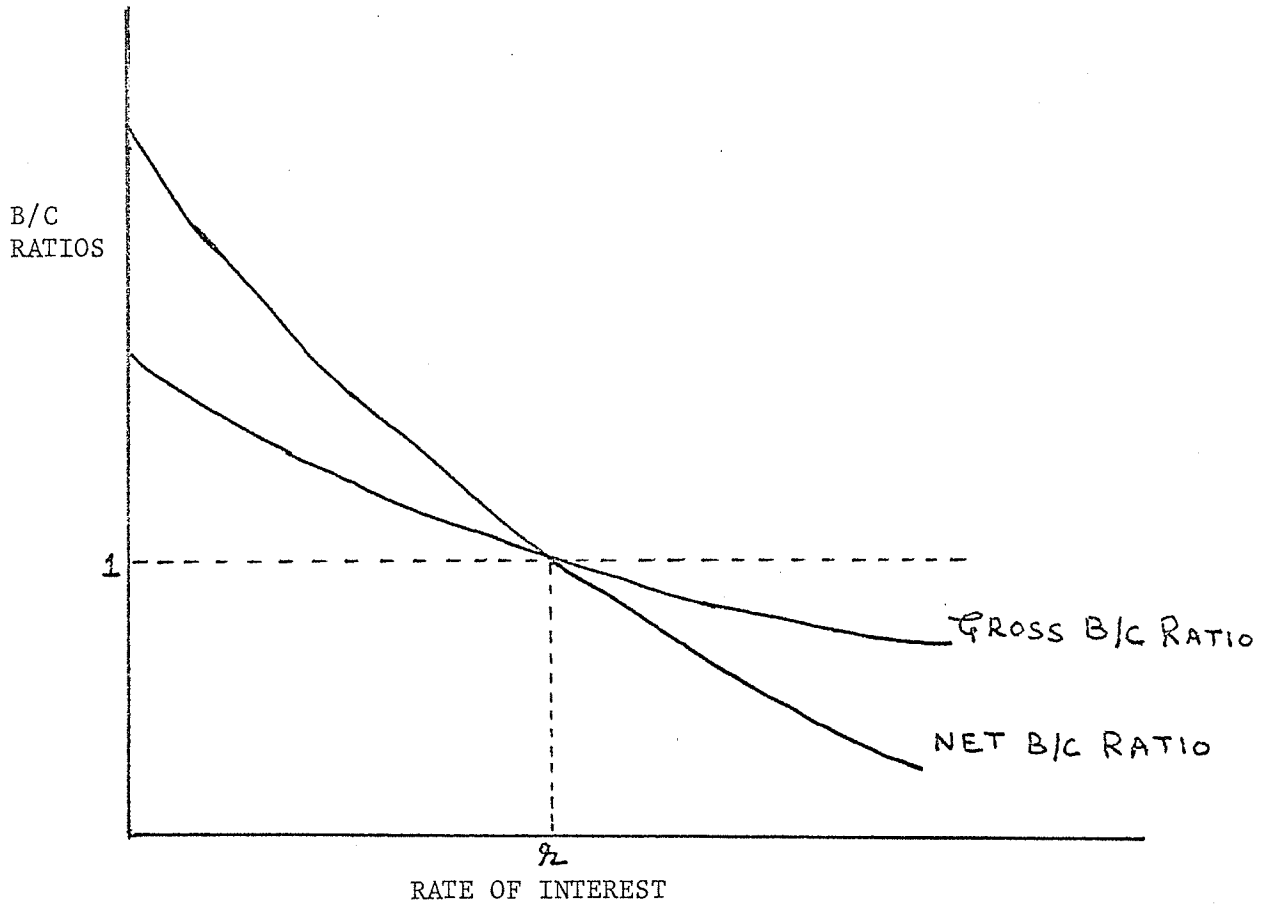
Comparison of Alternative Criteria

In general, all the alternative criteria discussed above are interrelated. They lead more or less to the same conclusions. At a given interest rate, if the net present value is greater than zero then the Internal Rate of Return will exceed the Cost of Capital, the net and gross benefit/cost ratios will be greater than 1

[15] Ibid., p. 17.

FIGURE 2.2

B/C RATIOS AS A FUNCTION OF INTEREST RATE



and the Payback Period will be less than or equal to the life of the project.

Any of these measures can be computed depending upon the circumstances, and data available. However, each has some distinct interpretation.

The NPV measures the total net profit from a project at a particular period of time, i.e., the absolute gain in the firm's wealth. This criteria is more useful when a choice is to be made between alternative projects using identical amounts of capital. NPV does not relate net benefit to the size of funds assigned for a project.

The Internal Rate of Return concept is similar to the concept of percentage return on capital. It takes into account the difference in timings of payments and receipts. But, the IRR has also certain weak points. It is difficult to compute. Sometimes multiple rates may exist, and at other times no rate may exist.

B/C ratios also measure the return on funds committed. If capital expenditures are clearly defined, the net B/C ratio is more suitable, otherwise the gross ratio. Widely differing results may be obtained for the net and gross ratios depending upon the capital intensity of the investment and the size of the annual expenses.

The payback period is independent of other measures. Projects with same NPV or IRR may have different payback periods. Investors, other things remaining the same, would prefer a project with a shorter payback period. It may be used in combination with

other methods. Quirin[16] has given some general guidelines for the evaluation of an investment criteria. Any criteria must provide, at least, a means of distinguishing between acceptable and unacceptable projects. It must also solve the problem of choosing techniques; if there are two acceptable ways of doing something, it must choose between them.

In reaching decisions, any suitable criteria must respect the following principles:

a) The "Bigger the Better" Principle - Other things being equal, bigger benefits are preferable to smaller ones; and

b) The "Bird in the Hand" Principle - Other things being equal, early benefits are preferable to later benefits.

Quirin ultimately comes to the conclusion that since the "other things" are seldom equal, these principles can be hardly used themselves as criteria. Some means should be found out of taking account of both in the same yardstick. Also, the criterion should be applicable to at least fairly similar projects. The discounted benefit-cost ratio criterion meets the principles laid down by Quirin.

It satisfies the "Bigger the Better" principle as it takes into account all benefits that accrue from a project, in the present as well as in the future. It also satisfies the "Bird in the Hand" principle as the process of discounting gives more weight to values in nearer future than to values in the farther future.

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[16] Quirin, op. cit., pp. 27-28.

Main analysis will therefore be concerned with calculation of discounted gross B/C ratios for the three soil capability classes. These ratios will be expanded for the total number of farmers who cleared land in each soil class and also for the whole study area. Net benefit-cost ratios will also be calculated for the three soil classes for the sake of comparison. No other measures discussed in this chapter will be used.

CHAPTER III

REVIEW OF LITERATURE

Large scale land clearing is a phenomenon common to new countries like Canada, Australia and New Zealand. In the early parts of this century large areas were cleared and made suitable for agriculture. The process is still in vogue in differing proportions in these countries. A scarcity of published research exists as such on land clearing and evaluation of agricultural programmes.

Norton and MacMillan[1] have conducted a study on another aspect of agricultural development in the Interlake area. They agree about the absence of applied economic analysis relevant to policy decisions. They make use of both benefit-cost analysis and a regression model in their approach, in estimating the impact of drainage on the agricultural sector of the economy and in identifying the more important variables affecting reconstruction and maintenance of drainage on individual farms. Norton and MacMillan found drainage to be a means of distributing income to low income farmers even though farmers with high incomes were found to reap larger percentage of benefits. Individual farmers were found to reap positive, negative or no benefits from the project. The overall benefit-cost ratio was found

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[1] G. A. Norton and J. A. MacMillan, op. cit.

to be favourable. In short, the study strengthens the need for more research work in related areas like land clearing programmes, to bring out the usefulness of such projects and also to isolate the individual impact of various programmes.

A study was conducted in Australia by S. R. Harrison and C. B. Campbell on the clearing of "gidya scrub" for grazing of beef cattle.[2] The authors use the discounted cash flow analysis and come to the conclusion that the development is quite profitable under the stated assumptions of grazing performance, costs and returns.

Programmes like 'land clearing' and drainage reconstruction lead to increased improved acreage on farms and thereby affect the economic condition of a farmer and the area.

Pinola and Sher[3] in a recent survey of land use alternatives in Alberta, came across similar trends. They note that new acreage is being brought under cultivation in the Wapti region and the percent of occupied acreage in improved status is rapidly increasing. The study estimated that on an average additional 98 acres per farm were available for bringing into improved status. They believe most of the increase in the size of the farm will lead to a decrease in the number of smaller size categories of farms. This would lead to creation of more economic units (profitable farms). Further impacts need to be

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[2] S. R. Harrison and C. B. Campbell, Discounted Cash Flow Analysis of Beef Development Projects (Brisbane: Queensland Department of Primary Industries, 1970), p. 12.

[3] R. Pinola and W. Sher, A Pilot Study of Land Use Alternatives in Alberta (Edmonton: ARDA, 1968).

investigated.

Another study exists for Australia. In J. W. VanHolst Pellikaan's study[4], benefit-cost analysis was carried out involving only primary benefits and costs of clearing 'brigalow' lands. The cleared lands were used for feed and fodder crops for livestock farming. Other opportunities existed for growing wheat, sorghum and cotton on cleared lands. A ratio of 1 was used as a lower limit for justification of the project. The project was found to be useful. The authors state:

> "It was clear from preliminary investigations that the areas under study were admirably suited to more intensive development of cattle grazing which could be achieved by pulling and grassing brigalow lands and the incorporation of winter fodder crops into the grazing system."

Yet another study is avilable for Australia[5]. Here also, land clearing for beef production was the major part of the project.

Current thinking in the developed countries, especially in the United States and Canada is not to encourage the clearing of more land for agricultural purposes. Wheat surpluses in both countries, inspite of government efforts to the contrary have been going up over the last many years. In Canada, the Federal Task

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[4] J. W. VanHolst Pellikaan, "The Application of Benefit-Cost Analysis to the Evaluation of Brigalow Land Development," Quarterly Review of Agricultural Economics, XIII, No. 1 (Canberra, January 1964), pp. 14-23.

[5] K. McGuire, "Land Development for Beef Production in the Wallum," Quarterly Review of Agricultural Economics, XXI, No. 3 (Canberra, July 1968), pp. 140-157.

Force on Agriculture, in its report in 1970[6], recommended a moratoriam on the further clearing of land, especially in the prairie provinces:

> ". . . the Task Force recommends that a general moratoriam be placed on the development of new lands for agricultural purposes by both federal and provincial governments. There appears to be little justification for the use of public funds to expand the agricultural land base during the next decade."

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[6] Canada Department of Agriculture, Federal Task Force on Agriculture, Final Report, (Ottawa: Queen's Printer, 1969), p. 110.

CHAPTER IV

RESULTS I

Calculations were performed using data collected by the Interlake Land Clearing Evaluation Survey, to estimate gross benefit-cost ratios for the three soil capability classes (hereafter called soil classes only). Gross benefit-cost ratios were also estimated for groups of farmers who produced crops for various number of years after clearing the land, to demonstrate the difference in benefits associated with the number of years of production. Finally, to show the impact of the land clearing programme on the whole Interlake area, expanded costs, returns and weighted gross benefit-cost ratios were calculated. These ratios were projected in future for a period of two years and up to twenty-five years. The results of the analysis are presented below.

Calculation of Gross Benefit-Cost Ratios

For the estimation of benefit-cost ratios the following formula was used:

$$\text{Gross B/C ratio} = \frac{PV_b}{PV_k + PV_c}$$

where:

PV_b = present value of benefits or gross returns from the project,

PV_k = present value of capital outlays,

PV_c = present value of annual operating costs.

In case of the land clearing programme, the PV_b, PV_k and PV_c were as follows:

PV_b = dollar value of gross returns to the participating farmer from production on the land, cleared under the programme. In other words, this includes the income[1] to the farmer from sale of crops or any other product grown directly on the first authorization.[2]

PV_k = the present value of the capital outlay. It includes the amount of money spent by the farmer on clearing the land less the amount of subsidy[3] received from the government on a per acre basis. The various items under capital outlay, in the present study, were as below:

(i) Cost of Knockdown of bush on the additionally cleared land,

(ii) Cost of piling of bush that has been knocked down,

(iii) Cost of burning and stumping the bush and stubs on the cleared land,

(iv) Cost of breaking and root removal on the cleared land. While the three costs take care of the things above ground, the fourth cost takes care of things below the ground. Without breaking the soil and removing roots, some of which may be stubborn, successful cultivation is not possible.

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[1] Income here refers to the total value of production (gross returns) from the first authorization assuming the market value of the product at the time of production.

[2] First authorization refers to that portion of land which was passed for clearing for the first time, under the present scheme, by the Manitoba Department of Agriculture.

[3] Subsidy here refers to the payment of dollars 4.00 per acre of cleared land, to the farmer, from the government.

(v) Cost of repiling - the process of repiling involves piling up of the leftovers from the first operation as well as parts of roots, etc.

(vi) Cost of drainage, fencing or access roads - some of these costs are very much associated with the process of clearing extra land.

(vii) Other costs - other costs include the cost of stone picking. Some lands have abnormal quantities of stones and efficient production calls for their removal.

To get the actual value of PV_k, we added up all costs from (i) to (vii) and subtracted the total amount of subsidy received by the farmer.

PV_c = present value of annual operating costs. Once the land is cleared, to bring it into production, certain other costs are to be incurred. These are annual operating costs or which are called as variable costs in economic jargon. In this study, these costs were:

(i) Cost of seedbed preparation

(ii) Cost of seed and seeding

(iii) Cost of fertilizer used and its application, if any

(iv) Cost of chemicals and their spray, i.e., cost of herbicides, pesticides, insecticides, etc., and their application on the additionally cleared land

(v) Cost of crop and hail insurance

(vi) Cost of keeping the land under summer fallow

(vii) Cost of haying

(viii) Cost of harvesting

(ix) Cost of fall tillage

(x) Lease fee and taxes

(xi) Other costs - any other cost incurred in production and

not listed above.

All farmers first make capital outlays to bring land in a condition suitable for production. After this, production costs are incurred to actually cultivate the land. Returns are a result of both these costs.

On the basis of available data, for the three soil classes, discounted costs and returns were estimated first and then the gross benefit-cost ratios. A discount rate of 5 percent was used. All returns and costs are discounted back to the base year, i.e., January 1, 1968. (It was assumed for simplification that all costs and benefits accrued on the 1st of January, each year). Land clearing for purpose of the present study began on the 1st of September 1967. It was continued to the 31st of March 1968. The peak of land clearing activity took place during the month of January, which is the middle of the time period mentioned above. January 1 was taken as the appropriate initial date for discounting.

ESTIMATES OF DISCOUNTED CAPITAL OUTLAYS:

Tables 4.0, 4.1 and 4.2 present the estimated discounted capital outlays for first authorizations in the three soil classes.

TABLE 4.0

SOIL CLASS 3: DISCOUNTED TOTAL LAND CLEARING COSTS

FOR THE YEARS 1968-1970

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Clearing Costs	Farmer	1968	-	51,585	51,585.00
2	"	"	1969	5%	2,989	2,840.71
3	"	"	1970	5%	3,064	2,779.04
					TOTAL	57,204.75

* Source: Interlake Land Clearing Evaluation Survey, 1971, Appendix C, Table 6.

TABLE 4.1

SOIL CLASS 4: DISCOUNTED TOTAL LAND CLEARING COSTS

FOR THE YEARS 1968-1970

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Clearing Costs	Farmer	1968	-	41,367	41,367.00
2	"	"	1969	5%	9,504	9,050.65
3	"	"	1970	5%	2,980	2,702,86
					TOTAL	53,120.51

* Source: Ibid.

TABLE 4.2

SOIL CLASS 5: DISCOUNTED TOTAL LAND CLEARING COSTS

FOR THE YEARS 1968-1970

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Land Clearing Costs	Farmer	1968	-	41,800	41,800.00
2	"	"	1969	5%	7,144	6,803.23
3	"	"	1970	5%	4,976	4,513.23
					TOTAL	53,116.46

* Source: Ibid.

After finding out the discounted land clearing costs or capital outlay by the farmer, estimates are made of discounted production costs (PV_c) for all the soil classes.

ESTIMATES OF DISCOUNTED OPERATING OR PRODUCTION COSTS:

Tables 4.3, 4.4 and 4.5 present estimates of discounted production costs for first authorizations in the three soil classes.

TABLE 4.3

SOIL CLASS 3: DISCOUNTED TOTAL PRODUCTION COSTS

FOR THE YEARS 1968-1970

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Production Costs	Farmer	1968	-	3,901	3,901.00
2	"	"	1969	5%	13,600	12,951.28
3	"	"	1970	5%	14,340	13,006.38
					TOTAL	29,858.66

* Source: Interlake Land Clearing Evaluation Survey, 1971, Appendix C, Table 7.

TABLE 4.4

SOIL CLASS 4: DISCOUNTED TOTAL PRODUCTION COSTS

FOR THE YEARS 1968-1970

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Prod-uction Costs	Farmer	1968	-	566	566.00
2	"	"	1969	5%	13,732	13,076.98
3	"	"	1970	5%	13,883	12,591.88
					TOTAL	26,234.86

* Source: Ibid.

TABLE 4.5

SOIL CLASS 5: DISCOUNTED TOTAL PRODUCTION COSTS

FOR THE YEARS 1968-1970

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Prod-uction Costs	Farmer	1968	-	1,070	1,070.00
2	"	"	1969	5%	6,347	6,044.24
3	"	"	1970	5%	8,958	8,124.90
					TOTAL	15,234.14

* Source: Ibid.

After estimating the discounted capital outlay and operating costs, estimates will now be made for the discounted total benefits.

ESTIMATES OF DISCOUNTED BENEFITS:

Tables 4.6, 4.7 and 4.8 depict estimates of discounted total benefits for first authorization in the three soil classes.

TABLE 4.6

SOIL CLASS 3: DISCOUNTED GROSS BENEFITS FOR THE YEARS 1968-1970

Period Number	Item of Revenue	Returns Incurred To	Year Returns Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Sale of Produce	Farmer	1968	-	4,544	4,544.00
2	"	"	1969	5%	18,972	18,067.03
3	"	"	1970	5%	19,872	18,023.90
					TOTAL	40,634.93

* Source: Interlake Land Clearing Evaluation Survey, 1971, Appendix C, Table 8.

TABLE 4.7

SOIL CLASS 4: DISCOUNTED GROSS BENEFITS FOR THE YEARS 1968-1970

Period Number	Item of Revenue	Returns Incurred	Year Returns Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Sale of Produce	Farmer	1968	-	40	40.00
2	"	"	1969	5%	23,406	22,289.53
3	"	"	1970	5%	20,954	19,005.27
					TOTAL	41,334.80

* Source: Ibid.

TABLE 4.8

SOIL CLASS 5: DISCOUNTED GROSS BENEFITS FOR THE YEARS 1968-1970

Period Number	Item of Revenue	Returns Incurred	Year Returns Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Sale of Produce	Farmer	1968	-	726	726.00
2	"	"	1969	5%	10,151	9,666.79
3	"	"	1970	5%	16,786	15,222.18
					TOTAL	25,614.97

* Source: Ibid.

We are now equipped with discounted total capital outlays, operating costs and benefits for all the three soil classes. The gross benefit-cost ratios for the three soil classes are calculated below.

Estimation of Gross Benefit-Cost Ratios:

The gross benefit cost ratios are calculated by using the formula:

$$\text{Gross B/C ratio} = \frac{PV_b}{PV_k + PV_c}$$

I. SOIL CLASS 3: GROSS-BENEFIT COST RATIO

PV_b = \$40,634.93

PV_k = \$57,204.75 - \$5,384.00 = \$51,820.75

PV_c = \$29,858.66

$$\text{Gross B/C ratio} = \frac{\$40,634.93}{\$51,830.75 + \$29,858.66}$$

$$= \frac{\$40,634.93}{\$81,679.41}$$

$$= .497$$

II. SOIL CLASS 4: GROSS BENEFIT-COST RATIO

PV_b = \$41,334.80

PV_k = \$53,120.51 - \$4,988.00 = \$48,132.51

PV_c = \$26,234.86

$$\text{Gross B/C ratio} = \frac{\$41,334.80}{\$48,132.51 + \$26,234.86}$$

$$= \frac{\$41,334.80}{\$74,367.37}$$

$$= .555$$

III. SOIL CLASS 5: GROSS BENEFIT-COST RATIO

PV_b = \$25,614.97

PV_k = \$53,116.46 - \$7,324.00 = \$45,792.46

PV_c = \$15,243.14

$$\text{Gross B/C ratio} = \frac{\$25,614.97}{\$45,792.46 + \$15,243.14}$$

$$= \frac{\$25,614.97}{\$61,035.60}$$

$$= .419$$

The consolidated gross benefit-cost ratios are 0.497, 0.555 and 0.419 for soil classes 3, 4 and 5. All the three ratios are well below 1. This is in contrast to gross benefit-cost ratios for individual farmers which range from well below unity to well above unity. In a consoldated ratio for the whole sample in each soil class these ratios average out to a ratio, which is below unity. There are many reasons to explain this phenomenon. In fact, a low ratio, ordinarily indicates low returns to the farmers. Gross returns to farmers are dependent on many variables. As these variables fluctuate, gross returns also fluctuate. Some of these variables, which have significantly affected the ratios in our sample are listed below:

i) Variations in the Cost of Clearing

In the initial periods at least, the variations in the cost of clearing from one farmer to another are a significant source of variations in the ratios. High costs of clearing would increase the payback period and keep the ratio low in earlier periods than in later years. A farmer with low clearing costs would have chances to get a relatively high benefit-cost ratio, other things remaining the same.

ii) Whether the Land is Under Production and What is Being Produced on it?

Perhaps, the most significant and powerful of all the variables affecting the gross benefit-cost ratio, are the factors:

a) Whether the land has come under production immediately after clearing or not; and

b) If it has come under production, what crops are being taken on it.

If a farmer has spent thousands of dollars in clearing land and has not taken up crop production for three years, the benefit-cost ratio would be near zero or sometimes even negative. Similarly, the ratios of those farmers who take superior crops like wheat, flax, etc., would be better than those farmers who use the land for purposes of grazing or summer fallow, etc.

However, this does not reflect the failure of the programme, as it is assumed that all farmers are rational and would take up crop production, as soon as the cleared parcel is available. In practice, due to some natural or other reasons, some farmers behave otherwise. In such a situation, the best thing is to show through additional analysis, the difference between the ratios of two groups of farmers, i.e., between groups who have produced for three years and those who have not produced for three years.

iii) Other Things Which May Affect the Benefit-Cost Ratios, Mainly Indirectly, Are Prices, Managerial Skills, and Level of Education of the Farmer

Prices, managerial skills and levels of education of individual farmers may in some cases be responsible for affecting returns on a farm.

Estimates of Gross Benefit-Cost Ratios on the Basis of Number of Years Produced and Comparison with General Benefit-Cost Ratios:

Estimates are now made for gross benefit-cost ratios of farmers who produced crops on the cleared land for a period of two years after clearing and for those who produced crops for a period of three years after clearing. These ratios will then be compared with the ratios for the general group of farmers.

Estimates of Discounted Total Costs, Benefits and Ratios for Farmers Who Produced for Two Years In SOIL CLASS 3:

Tables 4.9, 4.10 and 4.11 show discounted total clearing costs, production costs and benefits for farmers in soil class 3 who produced for two years:

TABLE 4.9

SOIL CLASS 3: DISCOUNTED TOTAL LAND CLEARING COSTS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Cost Item	Cost Incurred By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Costs of Land Clearing	Farmer	1968	-	24,526	24,526.00
2	"	"	1969	5%	889	846.33
3	"	"	1970	5%	928	841.69
					TOTAL	26,214.02

* Source: Land Clearing Evaluation Survey, 1971. Data have been taken from individual questionnaires.

TABLE 4.10

SOIL CLASS 3: DISCOUNTED TOTAL PRODUCTION COSTS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Cost Item	Cost Incurred By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Costs of Production	Farmer	1968	-	997	997.00
2	"	"	1969	5%	8,804	8,381.41
3	"	"	1970	5%	7,634	6,924.03
					TOTAL	16,302.44

* Source: Ibid.

TABLE 4.11

SOIL CLASS 3: DISCOUNTED TOTAL RETURNS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Item of Revenue	Return Incurred To	Year Return Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Sale of Produce	Farmer	1968	-	753	753.00
2	"	"	1969	5%	15,073	14,349.49
3	"	"	1970	5%	11,468	10,401.47
					TOTAL	23,997.96

* Source: Ibid.

A study of the three tables above, shows that clearing expenses were incurred for three years. Same was the case with operating expenses, although land was put under production for two years only. Some fixed costs like taxes, etc., are to be paid whether the farmer raises crops or not. This leads to negative returns in the first year and total returns are less than they could have been otherwise.

Estimation of Gross Benefit-Cost Ratio

PV_b = \$23,997.96

PV_k = \$26,214.02 - \$2,268.00 = \$23,946.02

PV_c = \$16,302.44

$$\text{Gross B/C ratio} = \frac{\$23,997.96}{\$23,946.02 + \$16,302.44}$$

$$= \frac{\$23,997.96}{\$40,148.46}$$

$$= .598$$

A benefit-cost ratio of .598 is an improvement over the general ratio for soil class three estimated earlier. This is, however, still less than 1, probably because these farmers did not produce anything for one complete year.

Similarly estimates are now made for soil class 4. Tables 4.12, 4.13 and 4.14 show the necessary discounted costs and benefits. Gross benefit-cost ratio for this group is calculated thereafter.

TABLE 4.12

SOIL CLASS 4: DISCOUNTED TOTAL LAND CLEARING COSTS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Cost Item	Cost Incurred By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Cost of Clearing	Farmer	1968	-	31,085	31,085.00
2	"	"	1969	5%	6,885	6,554.52
3	"	"	1970	5%	1,670	1,514.69
					TOTAL	39,154.21

* Source: Interlake Land Clearing Survey, 1971. Data have been taken from individual questionnaires.

TABLE 4.13

SOIL CLASS 4: DISCOUNTED TOTAL PRODUCTION COSTS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Cost Item	Cost Incurred By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Amount Received ($)
1	Cost of Prod-uction	Farmer	1968	-	287	287.00
2	"	"	1969	5%	13,571	12,953.86
3	"	"	1970	5%	13,149	11,926.13
					TOTAL	25,166.99

* Source: Ibid.

TABLE 4.14

SOIL CLASS 4: DISCOUNTED TOTAL RETURNS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Item of Revenue	Return Incurred To	Year Return Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Sale of Produce	Farmer	1968	-	-80	-80.00
2	"	"	1969	5%	23,189	22,154.45
3	"	"	1970	5%	20,724	18,796.66
					TOTAL	40,871.11

* Source: Ibid.

A quick survey of the above tables once again shows that expenditures were made for a period of three years but crops were raised only for two years.

Gross Benefit-Cost ratio for Soil Class 4

PV_b = \$40,871.11

PV_k = \$39,154.21 - \$1,752.00 = \$37,402.21

PV_c = \$25,166.99

$$= \frac{\$40,871.11}{\$25,166.99 + \$37,402.21}$$

$$= \frac{\$40,871.11}{\$62,569.20}$$

$$= .653$$

A ratio of .653 is certainly an improvement over the previous one for soil class 4 but still below unity, for reasons specified earlier.

Estimates for Soil Class 5

Tables 4.15, 4.16 and 4.17 present estimates of discounted total costs and benefits for farmers producing for two years only, in soil class 5.

TABLE 4.15

SOIL CLASS 5: DISCOUNTED TOTAL CLEARING COSTS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Clearing Costs	Farmer	1968	-	27,445	27,445.00
2	"	"	1969	5%	277	263.98
3	"	"	1970	5%	166	150.56
					TOTAL	27,859.54

* Source: Interlake Land Clearing Evaluation Survey, 1971. Data have been taken from individual questionnaires.

TABLE 4.16

SOIL CLASS 5: DISCOUNTED TOTAL PRODUCTION COSTS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost In Incurred ($)
1	Prod-uction Costs	Farmer	1968	-	344	344.00
2	"	"	1969	5%	5,646	5,380.63
3	"	"	1970	5%	6,019	5,459.23
					TOTAL	11,183.86

* Source: Ibid.

TABLE 4.17

SOIL CLASS 5: DISCOUNTED TOTAL RETURNS FOR FARMERS WHO PRODUCED FOR TWO YEARS ONLY

Period Number	Item of Revenue	Returns Incurred To	Year Returns Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Sale of Produce	Farmer	1968	-	-345	-345.00
2	"	"	1969	5%	7,634	7,313.32
3	"	"	1970	5%	14,693	13,326.55
					TOTAL	20,294.87

* Source: Ibid.

A perusal of the tables confirms earlier observation. Expenses have been made for all the three years while there are negative returns in the first year.

Gross B/C Ratio for Soil Class 5:

PV_b = \$20,294.87

PV_k = \$27,859.54 − \$4,732.00 = \$23,127.54

PV_c = \$11.183.86

$$\text{Gross B/C ratio} = \frac{\$20,294.87}{\$23,127.54 + \$11,183.86}$$

$$= \frac{\$20,294.87}{\$34,311.40}$$

$$= .592$$

A comparison of the gross benefit-cost ratios for farmers who produced for two years and for the whole sample in general shows that the ratios for the former group were higher than for the latter group. To see whether the trend is also true for farmers who produced for full three years after clearing, we now calculate the gross benefit-cost ratios for this group.

Estimates of Discounted Total Costs, Benefits and Ratios for Farmers Who Produced for Three Years:

Estimates were made for farmers producing for three years in all the three soil capability classes. Unfortunately no farmer produced crops for all three years after clearing in soil class IV. No such estimates for soil class IV were made. The number of farmers who produced for three years in soil classes three and four was also small. There were only two in class three and one in class five.

Production here refers to crop production.

Estimates for Class Three:

Tables 4.18, 4.19 and 4.20 show estimates of total discounted costs and benefits for farmers who produced for three years.

TABLE 4.18

SOIL CLASS 3: TOTAL DISCOUNTED LAND CLEARING COSTS FOR FARMERS CULTIVATING FOR THREE YEARS

Period Number	Cost Item	Cost Incurred By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Clearing Costs	Farmer	1968	-	5,285	5,285.00
2	"	"	1969	5%	580	552.16
3	"	"	1970	5%	670	607.69
					TOTAL	6,444.85

* Source Interlake Land Clearing Survey, 1971. Data have been taken from individual questionnaires.

TABLE 4.19

SOIL CLASS 3: DISCOUNTED TOTAL PRODUCTION COSTS FOR FARMERS PRODUCING FOR THREE YEARS

Period Number	Cost Item	Cost Incurred By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Cost of Prod-uction	Farmer	1968	-	2,397	2,397.00
2	"	"	1969	5%	2,193	2,087.73
3	"	"	1970	5%	2,166	1,964.56
					TOTAL	6,449.29

* Source: Ibid.

TABLE 4.20

SOIL CLASS 3: DISCOUNTED TOTAL RETURNS FOR FARMERS PRODUCING FOR THREE YEARS

Period Number	Item of Revenue	Return Incurred To	Year Return Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Value of Crops from Sale	Farmer	1968	-	4,544	4,544.00
2	"	"	1969	5%	2,768	2,635.13
3	"	"	1970	5%	2,250	2,040.75
					TOTAL	9,219.88

* Source: Ibid.

Estimation of B/C Ratio

PV_b = \$9,219.88

PV_c = \$6,449.29

PV_k = \$6,444.85 - \$560.00 = \$5,878.85

Gross B/C ratio = $PV_b/PV_k + PV_c = \frac{\$9,219.88}{\$6,449.29 + \$5,878.85}$

$= \frac{\$9,219.88}{\$12,328.14}$

$= .748$

Estimates for Soil Class 5

No farmer in soil class IV produced crops for all the three years in succession and therefore, we omit the groups for the time being and calculate the ratios for soil class V. In soil class V, only one farmer produced crops. If we include grazing, two farmers produced for three years. However, we consider only those farmers who raised crops. Tables 4.21, 4.22 and 4.23 depict the discounted costs and benefits for this group.

TABLE 4.21

SOIL CLASS 5: DISCOUNTED TOTAL CLEARING COSTS FOR FARMERS PRODUCING FOR THREE YEARS

Period Number	Item Cost	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Clearing Costs	Farmer	1968	-	355	355.00
2	"	"	1969	-	-	-
3	"	"	1970	-	-	-
					TOTAL	355.00

* Source: Interlake Land Clearing Evaluation Survey, 1971. Data have been taken from individual questionnaires.

TABLE 4.22

SOIL CLASS 5: DISCOUNTED TOTAL PRODUCTION COSTS FOR FARMERS PRODUCING FOR THREE YEARS

Period Number	Cost Item	Cost Paid By	Year Cost Incurred	Discount Rate	Amount of Cost Incurred ($)*	Present Value of Cost Incurred ($)
1	Prod-uction Costs	Farmer	1968	-	203	203.00
2	"	"	1969	5%	195	185.64
3	"	"	1970	5%	213	193.19
					TOTAL	581.83

* Source: Ibid.

TABLE 4.23

SOIL CLASS 5: DISCOUNTED TOTAL BENEFITS FOR FARMERS PRODUCING FOR THREE YEARS

Period Number	Item of Return	Return To	Year Return Incurred	Discount Rate	Amount Received ($)*	Present Value of Amount Received ($)
1	Sale of Crops	Farmer	1968	-	500	500.00
2	"	"	1969	5%	240	228.48
3	"	"	1970	5%	280	253.96
					TOTAL	982.44

* Source: Ibid.

Estimation of Gross Benefit-Cost Ratio:

We thus have:

PV_b = \$982.44

PV_c = \$581.83

PV_k = \$355.00 - \$76.00 = \$279.00

$$\text{Gross B/C ratio} = \frac{PVb}{PV_k + PV_c}$$

$$= \frac{\$982.44}{\$279.00 + \$581.83}$$

$$= \underline{1.141}$$

The present ratio of 1.141 is above unity and thus favourable. This indicates that the chances for the success of the project could have been more if every one produced for three years. This would be investigated more further on.

Calculation of Net Benefit-Cost Ratios

The gross benefit-cost ratios were not favourable in most of the cases. We now calculate the net benefit-cost ratios for purposes of comparison. Generally speaking, a net benefit-cost ratio would not differ significantly from a gross ratio, but sometimes it may show an improvement over the gross ratio.

For calculating the net benefit-cost ratios we use the following formula:

$$\text{Net benefit/cost ratio} = \frac{PV_b - PV_c}{PV_k}$$

Where:

PV_b = Present value of benefits

PV_c = Present value of production costs

PV_k = Present value of clearing costs

Most of the values needed for calculations have already been calculated in the previous pages. We simply substitute them in the formula and find out the ratios.

Net Benefit-Cost Ratios for All the Farmers in the Three Soil Classes

Soil Class III

PV_b = \$40,634.93

PV_c = \$29,858.66

PV_k = \$51,820.75

$$\text{Net B/C ratio} = \frac{\$40,634 - \$29,858.66}{\$51,820.75}$$

$$= \frac{\$10,876.27}{\$51,820.75}$$

$$= .21$$

Soil Class IV

PV_b = \$41,334.80

PV_c = \$26,234.86

PV_k = \$48,132.51

$$\text{Net B/C ratio} = \frac{\$41,334.80 - \$26,234.86}{\$48,132.51}$$

$$= \frac{\$15,099.94}{\$48,132.51}$$

$$= .31$$

Soil Class V

PV_b = \$25,614.97

PV_c = \$15,243.14

PV_k = \$45,792.46

$$\text{Net B/C ratio} = \frac{\$25,614.97 - \$15,243.14}{\$45,792.46}$$

$$= \frac{\$10,371.83}{\$45,792.46}$$

$$= .22$$

Net Benefit-Cost Ratios for Farmers Producing for Two Years Only

Soil Class III

PV_b = \$23,997.96

PV_c = \$16,302.44

PV_k = \$23,946.02

$$\text{Net B/C ratio} = \frac{\$23,997.96 - \$16,302.44}{\$23,946.02}$$

$$= \frac{\$\ 7,695.52}{\$23,946.02}$$

$$= .32$$

Soil Class IV

PV_b = \$40,871.11

PV_c = \$25,166.99

PV_k = \$37,402.21

$$\text{Net B/C ratio} = \frac{\$40,871.11 - \$25,166.99}{\$37,402.21}$$

$$= \frac{\$15,704.12}{\$37,402.21}$$

$$= \underline{.42}$$

Soil Class V

PV_b = \$20,294.87

PV_c = \$11,183.86

PV_k = \$23,127.54

$$\text{Net B/C ratio} = \frac{\$20,294.87 - \$11,183.86}{\$23,127.54}$$

$$= \frac{\$\ 9,111.01}{\$23,127.54}$$

$$= \underline{.39}$$

Net Benefit-Cost Ratios for Farmers Producing for Three Years

Soil Class III

PV_b = \$9,219.88

PV_c = \$6,449.29

PV_k = \$5,878.85

$$\text{Net B/C ratio} = \frac{\$9,219.88 - \$6,449.29}{\$5,878.85}$$

$$= \frac{\$2,770.59}{\$5,878.85}$$

$$= \underline{.47}$$

Soil Class V

PV_b = \$982.44

PV_c = \$581.83

PV_k = \$279.00

$$\text{Net B/C ratio} = \frac{\$982.44 - \$581.83}{\$279.00}$$

$$= \frac{\$400.61}{\$279.00}$$

$$= \underline{1.43}$$

Since we have calculated the gross and net benefit-cost ratios, let us put them together for purposes of comparison. Table 4.24 shows such a comparison.

TABLE 4.24

GROSS AND NET BENEFIT-COST RATIOS: ALL SOIL CLASSES

	All Farmers		Farmers Producing For Two Years		Farmers Producing For Three Years	
Soil Class	Gross B/C Ratio	Net B/C Ratio	Gross B/C Ratio	Net B/C Ratio	Gross B/C Ratio	Net B/C Ratio
III	.497	.21	.598	.32	.748	.47
IV	.555	.31	.654	.42	-	-
V	.419	.22	.592	.39	1.141	1.43

A comparison of these ratios show a similar trend for the net ratios as is evident for the gross ratios. Net ratios are lower than gross ratios in general, except in one case, i.e., soil class V and for farmers producing for three years. Low net ratios indicate high capital outlays, low benefit or both. As the net ratios in general are lower than gross ratios we proceed further on the basis of gross ratios.

Calculation of Projected Benefits, Costs and Gross Ratios

The foregoing analysis was limited to a three year period. To ascertain whether the project would become profitable in future and if so when, it is essential to make projections for future. Projections were made on the basis of the following assumptions:

i) Estimates are made on the basis of those farmers only who produced crops for all the three years under study. (This assumption was relaxed for farmers in soil class IV, as no farmer produced crops for three years. Projections for class IV were therefore made on the basis of farmers who produced for two years.) Grazing returns are not included.[4]

ii) Projections were made on the basis of average benefits and costs over the three year period. This was done to even out the effect of random factors.

iii) It was assumed that benefits would remain constant at the above rate for the rest of the period of projection.

iv) A constant rate of interest, i.e., 5%.

v) No more clearing costs would incur in future.

vi) All costs and benefits accrue on first of January, 1968.

vii) Prices would remain constant.

Keeping these assumptions in mind, projections were made for a period of 5 years, 10 years and 15 years, i.e., for 1973, 1978, and 1983. After finding the present values of costs and benefits, gross benefit costs ratios were calculated. The clearing costs remain fixed.

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[4] Grazing returns are not included because of apparent inconsistencies in the data.

When constant benefits are assumed, present value of future benefits can be derived by the use of the following formula:[5]

The present value of amounts 'a' received at the end of each n years, is given by

$$PV = a \frac{(1+i)^n - 1}{i(1+i)^n}$$

where:

i = annual rate of interest

The use of the formula could be illustrated as below:

The present value of $100.00 received at the end of each 4 years, at 7% rate of interest would be:

$$PV = \$100 \frac{(1.07)^4 - 1}{.07(1.07)^4}$$

$$= \$338.72$$

However, tables of present value are available and calculations can be done directly.[6]

Soil Class 3: PROJECTED BENEFIT-COST RATIOS FOR 1973, 1978 and 1983[7]

We have:

Total Returns = $9,562

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[5] G. B. Whitlam, et al., op cit., p. 12.

[6] Calculations here are done on the basis of tables in "Standard Mathematical Tables," 16th edition, The Chemical Rubber Company, Ohio, 1968. Present value of an annuity of unit value for a period of 5 years at 5% rate of interest = 4.4. Similarly for 10 years, 7.72 and 15 years 10.4.

[7] Data used have been sorted out from individual questionnaires.

Average Returns[8] = $3,187.33

Total Production Costs = $6,756

Average Production Costs = $2,252

Total Clearing Costs = $5,975 (Less $4 per acre subsidy received).

Projection for 5 Years (1973)

Present Value of Gross Benefits = $3,187.33 x 4.4

(PV_b) = $14,024.25

Present Value of Production Costs = $2,252 x 4.4

(PV_c) = $9,908.80

Gross Benefit-Cost Ratio $= \frac{PV_b}{PV_c + PV_k}$

$= \frac{\$14,024.25}{\$9,908.80 + \$5,975.00}$

$= \frac{\$14,024.25}{\$15,883.80}$

$= .88$

Projection For 10 Years (1978)

PV_b = $3,187.33 x 7.72 = $24,606.18

PV_c = $2,252.00 x 7.72 = $17,385.44

Gross B/C ratio $= \frac{\$24,606.18}{\$17,385.44 + \$5,975.00}$

---

[8] Averages are taken on the basis of 3 years production period.

$$= \frac{\$24,606.18}{\$23,360.44}$$

$$= \underline{1.05}$$

Projection For 15 Years (1983)

PV_b = \$3,187.33 x 10.4 = \$33,148.2

PV_c = \$2,252 x 10.4 = \$23,420.8

$$\text{Gross B/C ratio} = \frac{\$33,148.2}{\$23,420.8 + \$5,975.00}$$

$$= \frac{\$33,148.2}{\$29,395.8}$$

$$= \underline{1.12}$$

Soil Class 4: PROJECTED BENEFIT-COST RATIOS FOR 1973, 1978 and 1983

We have:

Total Returns = \$43,993.00

Average Returns = \$14,664.33

Total Production Costs = \$27,043.00

Average Production Costs = \$ 9,014.33

Total Clearing Costs = \$36,544.00 (Less \$4 per acre subsidy received).

Projection For 5 Years (1973)

PV_b = \$14,664.33 x 4.4 = \$64,523.05

PV_c = \$9,014.33 x 4.4 = \$39,663.05

$$\text{Gross B/C ratio} = \frac{\$64,523.05}{\$39,663.05 + \$36,544.00}$$

$$= \frac{\$64,523.05}{\$76,217.05}$$

$$= \underline{.846}$$

Projection For 10 Years (1978)

PV_b = \$14,664.33 x 7.72 = \$113,208.62

PV_c = \$9,014.33 x 7.72 = \$ 64,590.62

$$\text{Gross B/C ratio} = \frac{\$113,208.62}{\$69,590.62 + \$36,544.00}$$

$$= \frac{\$113,208.62}{\$106,134.62}$$

$$= \underline{1.06}$$

Projection For 15 Years (1983)

PV_b = \$14,664.33 x 10.4 = \$152,509.03

PV_c = \$9,014.33 x 10.4 = \$ 93,749.03

$$\text{Gross B/C ratio} = \frac{\$152,509.03}{\$93,749.03 + \$36,544.00}$$

$$= \frac{\$152,509.03}{\$130,293.03}$$

$$= \underline{1.17}$$

Soil Class 5: BENEFIT-COST RATIOS FOR 1973, 1978 and 1983

We have:

Total Returns = \$1,020.00

Average Returns = \$ 340.00

Total Production Costs = \$ 611.00

Average Production Costs = \$ 203.66

Total Clearing Costs = \$ 279.00 (Less \$4 per acre subsidy received).

Projection For 5 Years (1973)

PV_b = \$340.00 x 4.4 = \$1,496.00

PV_c = \$203.66 x 4.4 = \$ 896.10

Gross B/C ratio = $\frac{\$1,496.00}{\$896.10 + \$279.00}$

= $\frac{\$1,496.00}{\$1,175.10}$

= 1.27

Projection For 10 Years (1978)

PV_b = \$340.00 x 7.72 = \$2,624.80

PV_c = \$203.66 x 7.72 = \$1,572.25

Gross B/C ratio = $\frac{\$2,624.80}{\$1,572.25 + \$279.00}$

= $\frac{\$2,624.80}{\$1,851.25}$

= 1.41

Projection For 15 Years (1983)

PV_b = \$340.00 x 10.4 = \$3,536.0

PV_c = \$203.66 x 10.4 = \$2,118.06

Gross B/C ratio = $\frac{\$3,536.00}{\$2,118.06 + \$279.00}$

= $\frac{\$3,536.00}{\$2,397.06}$

= 1.47

Table 4.25 presents a summary of projected benefit-cost ratios for the three soil classes for purposes of comparison.

Table 4.25

PROJECTIONS: A SUMMARY TABLE

Soil class	Projected Discounted Gross Benefit-Cost Ratio		
	5 yrs. (1973)	10 yrs. (1978)	15 yrs. (1983)
III	.88	1.05	1.12
IV	.846	1.06	1.17
V	1.27	1.41	1.47

A study of table 4.25 shows that the projected gross benefit-cost ratios increase gradually over time, in all the three soil classes. While the benefit-cost ratios in soil class III and IV are fairly close to each other, ratios in soil class V are higher. A study of background information suggests that the land clearing costs in Class V are significantly lower than in the other two soil classes. Average per acre land clearing costs for soil class III and IV were 42.82 and 43.91 dollars in comparison to only 29.13 dollars for soil class V (Table 6, Appendix C). Similarly, production costs for soil classes III and IV over all the three years of analysis were considerably higher than those for group V. In 1970, average production costs per acre for soil class III and IV were 10.65 and 11.13 dollars per acre respectively. On the other hand, production costs per acre for class V were only dollar 4.84, which are much

lower (Table 7, Appendix C).

Although returns on soil class V are also comparatively lower than in soil classes III and IV (Table 8, Appendix C), both, lower clearing costs and lower production costs, in comparison to soil classes III and IV, lead to higher gross benefit-cost ratios. Soil class, production costs, returns and clearing costs all affect the benefit-cost ratio.

EXPANDED RETURNS AND COSTS, WEIGHTED BENEFIT-COST RATIOS AND PROJECTIONS

Expanded costs and returns were estimated for the total number of farmers clearing land in all the soil classes on the basis of expanded costs and returns for the farmers of each soil class. This was achieved by using an expansion factor for each soil class. The expansion factor was calculated on the basis of number of farmers producing crops for two years or more (grazing excluded). In soil classes III and V there were farmers who produced up to three years, but in soil class IV, no farmers produced more than two years. The expansion factor was calculated by:

$$\text{Expansion Factor} = \frac{\text{No. of farmers who produced for two years or more in a soil class}}{\text{No. of farmers in a soil class sample.}} \times \text{Total No. of farmers clearing land in a soil class.}$$

Expanded returns and costs were estimated on the basis of average returns and costs to farmers i.e. total returns and costs divided by the total number of years in production during the period of analysis. The average returns and costs thus obtained were taken to accrue on 1st of January 1968, the base year, for reasons described earlier. These average

returns and costs were then multiplied by the expansion factor calculated earlier, for each soil class. On the basis of these figures weighted average gross benefit-cost ratios were estimated for each soil class, for the base year.

Once the expanded returns and costs were available for each soil class, these were added up to determine the total expanded benefits and costs for the whole area of study and a weighted average gross-benefit-costs ratio was estimated. To project the expanded average benefits and costs, present values of these estimates for two years and up to 25 years in the future were calculated using a 5% rate of discount. On the basis of these present values, discounted weighted gross benefit-cost ratios were estimated.

SOIL CLASS 3: ESTIMATION OF EXPANDED COSTS AND RETURNS

Total No. of farmers who cleared land in soil class three	= 195
Size of sample studied	= 33
No. of farmers who produced for three years	= 2
Average returns to farmers who produced for three years	= $3,187.33
Average production costs of farmers who produced for three years	= $2,252.00
Average clearing costs of farmers who produced for three years	= $1,991.83

$$\underline{\text{Expansion Factor For Soil Class III}} = \frac{2}{33} \times 195 = 11.81$$

Expanded Average Returns = 11.81 x 3,187.33 = $37,833.61

Expanded Average Production Costs = 11.81 x 2,252.00 = $26,731.24

Expanded Average Clearing Costs = 11.81 x 1,991.83 = $23,643.02

Weighted Average Gross B/C Ratio for Soil Class III =

$$\text{B/C ratio} = \frac{\$37,833.61}{\$50,374.26} = .751$$

SOIL CLASS IV: Estimates of Expanded Costs and Returns

Total No. of farmers who cleared land in soil class IV = 344

Size of sample studied = 27

No. of farmers who produced for 2 years = 12

Average returns to farmers who produced for 2 years = $14,654.33

Average production costs of farmers who produced for 2 years = $ 9,014.33

Average clearing costs of farmers who produced for 2 years = $12,181.00

$$\underline{\text{Expansion Factor For Soil Class IV}} = \frac{12}{27} \times 344 = 152.88$$

Expanded Average Returns = 152.88 x 14,664.33 = $2,241,882.77

Expanded Average Production Costs = 152.88 x 9,014.33 = $1378,110.77

Expanded Average Clearing Costs = 152.88 x 12,181.00 = $1,862,231.28

Weighted Average Gross B/C Ratio for Soil Class IV =

$$\frac{\$2,241,882.77}{\$3,240,342.05} = .692$$

SOIL CLASS 5: Estimates of Expanded Costs and Returns

Total No. of farmers who cleared land in soil class V = 61

Size of sample studied = 30

No. of farmers who produced for three years = 1

Average returns to farmers who produced for 3 years = $340.00

Average production costs for farmers who produced for 3 years = $203.66

Average clearing costs for farmers who produced for 3 years = $ 93.00

$$\frac{\text{Expansion Factor}}{\text{For Soil Class V}} = \frac{1}{30} \times 61 = 2$$

Expanded Average Returns = 2 x 340.00 = $680.00

Expanded Average Production Costs = 2 x 203.66 = $407.32

Expanded Average Clearing Costs = 2 x 93.00 = $186.00

Weighted Average Gross B/C ratio for Soil Class V =

$$\frac{\$680.00}{\$593.32} = 1.146$$

Total Expanded Costs and Benefits

(i) Total Expanded Average Returns =

$37,833.61 + $2,241,882.77 + $680.00 = $2,280,396.38

(ii) Total Expanded Average Production Costs =

$26,731.24 + $1,378,110.77 + $407.32 = $1,405,249.33

(iii) Total Expanded Average Clearing Costs =

$$\$23,643.02 + \$1,862,231.28 + \$186.00 = \$1,886,060.30$$

Weighted Average Gross B/C Ratio for the Whole Area
(Soil Class III + IV + V)

$$\frac{\$2,280,396.38}{\$3,291,309.63} = .692$$

The weighted ratio has a downward bias. The ratio would likely be higher if some farmers in soil class IV had produced for three years instead of only two.

PROJECTED EXPANDED BENEFITS, COSTS AND RATIOS

To estimate the projected expanded gross benefit cost ratios, the present values of the expanded average returns and costs for the Interlake area were calculated for a period of two years and above up to twenty-five years in the future. On the basis of these figures benefit-cost ratios were estimated to judge the future profitability of the project. The ratios are calculated by using the same formula.

Weighted Gross Benefit/Cost Ratios: PROJECTIONS

For 2 years: $\frac{\$4,241,537.27}{\$4,499,824.05} = .942$

For 3 years: $\frac{\$6,202,678.15}{\$5,708,338.48} = 1.086$

For 4 years: $\frac{\$8,095,407.15}{\$6,874,695.42} = 1.177$

For 5 years: $\frac{\$9,874,116.33}{\$7,970,789.90} = 1.238$

Table 4.26

PROJECTED PRESENT VALUES AND BENEFIT COST RATIOS[a)]

	Number of Years Projected in Future from January 1, 1968							
	1970 (2 yrs.)	1971 (3 yrs.)	1972 (4 yrs.)	1973 (5 yrs.)	1978 (10 yrs.)	1983 (15 yrs.)	1988 (20 yrs.)	1993 (25 yrs.)
Present values of Future Benefits	4,241,537.27	6,202,678.15	8,095,407.15	9,874,116.33	17,604,660.05	23,670,514.42	28,413,738.89	32,153,589.96
Present Values of Future Production Costs	2,613,763.75	3,822,278.18	4,988,635.12	6,084,729.60	10,848,524.83	14,586,488.05	17,509,406.65	19,814,015.55
Clearing Costs (Constant)	1,886,060.30	1,886,060.30	1,886,060.30	1,886,060.30	1,886,060.30	1,886,060.30	1,886,060.30	1,886,060.30
Benefit Cost Ratios	.942	1.086	1.177	1.238	1.381	1.436	1.464	1.481

a) Calculated by expanding average returns for those who produced at least two years.

For 10 years: $\frac{\$17,604,660.05}{\$12,734,585.13} = 1.381$

For 15 years: $\frac{\$23,670,514.42}{\$16,472,548.35} = 1.436$

For 20 years: $\frac{\$28,413,738.89}{\$19,395,466.95} = 1.464$

For 25 years: $\frac{\$32,153,588.96}{\$21,700,075.85} = 1.481$

The present values of returns, costs and the projected ratios are now presented in Table 4.26 for purposes of comparison and inference.

Table 4.26 of projected B/C ratios reveals that the ratio becomes greater than one after a period of three years. This is calculated from receipts and expenses from farmers producing at least for two years. Benefits and costs are discounted to January 1, 1968, about the middle of the first year of the land clearing policy, i.e. September 1, 1967 to March 31, 1968. The January 1 date is also about the peak of land clearing activity. The table results were obtained by expanding average returns and costs for those who produced at least two years. The benefit/cost ratio results would be substantially lower if farmers who produced one year only or not at all were included. They are not included to provide information on the results obtainable if all farmers produced on the cleared land.

DISCOUNTED BENEFITS AND COSTS AND GROSS BENEFIT COSTS RATIOS WITH HIGHER DISCOUNTING RATES:

All calculations so far have been done on the basis of a 5% rate of discount. On the basis of our theoretical knowledge we can say even without any further calculations that the project would become even less profitable by using rates of discount higher than 5%. However, some

estimates are made for the general group of farmers, using discount rates of 6%, 8% and 10%. The results are then compared with the estimates already made by using a 5% rate of discount.

Table 4.27, shows the total present values of land clearing costs, production costs, benefits and gross benefit-cost ratios for all farmers in Soil Class 3, with discounting rates of 6%, 8% and 10%.

TABLE 4.27

SOIL CLASS 3: TOTAL PRESENT VALUES AND BENEFIT-COST RATIOS WITH DISCOUNT RATES OF 5, 6, 8 and 10 PERCENT

Discount Rate	Total Present Value of Land Clearing Costs (Less Subsidy) ($)	Total Present Value of Production Costs ($)	Total Present Value of Benefits ($)	Gross Benefit-Cost Ratio = $\frac{PV_b}{PV_c + PV_k}$
5%	$51,820.75	$29,858.66	$40,634.93	$\frac{\$40,634.93}{\$81,679.41} = .497$
6%	51,746.58	29,488.40	40,120.13	$\frac{\$40,120.13}{\$81,234.49} = .494$
8%	51,594.65	28,783.98	39,142.37	$\frac{\$39,142.37}{\$80,378.63} = .487$
10%	51,448.46	28,108.24	38,203.81	$\frac{\$38,203.81}{\$79,556.70} = .480$

A study of table 4.27 shows that as the discount rate increases, the gross B/C ratio decreases, which signifies that the project becomes less profitable at higher rates of discount.

We now examine the results for Soil Class 4. These are presented in table 4.28 below:

TABLE 4.28

SOIL CLASS 4: TOTAL PRESENT VALUES AND BENEFIT-COST RATIOS WITH DISCOUNT RATES OF 5, 6, 8 and 10 PRECENT

Discount Rate	Total Present Value of Land Clearing Costs (Less Subsidy) ($)	Total Present Value of Production Costs ($)	Total Present Value of Benefits ($)	Gross Benefit-Cost Ratio = $\frac{PV_b}{PV_c + PV_k}$
5%	$48,132.51	$26,234.86	$41,334.80	$\frac{\$41,334.80}{\$74,367.37} = .555$
6%	47,993.73	25,871.14	40,760.91	$\frac{\$40,760.91}{\$73,864.91} = .551$
8%	47,733.50	25,179.59	39,608.66	$\frac{\$39,608\ 66}{\$72,913.09} = .543$
10%	47,479.61	24,515.73	38,624.05	$\frac{\$38,624.05}{\$71,995.34} = .536$

Table 4.28 depicts the same tendency for farmers in Soil Class 4. The gross benefit ratio gradually declines as the discount rate climbs up gradually from 5 to 10%. This signifies once again that at a higher discount rate, the project becomes even less and less profitable.

An analysis for Soil Class 5 presents the same story. Table 4.29 presents all the discounted costs, returns and gross benefit-cost

ratios for this group.

TABLE 4.29

SOIL CLASS 5: TOTAL PRESENT VALUES AND BENEFIT-COST RATIOS WITH DISCOUNT RATES OF 5, 6, 8 and 10 PERCENT

Discount Rate	Total Present Value of Land Clearing Costs (Less Subsidy) ($)	Total Present Value of Production Costs ($)	Total Present Value of Benefits ($)	Gross Benefit-Cost Ratio = $\frac{PV_b}{PV_c + PV_k}$
5%	$45,792.46	$15,243.14	$25,614.97	$\frac{\$25,614.97}{\$61,035.60} = .419$
6%	45,641.03	15,027.84	25,237.93	$\frac{\$25,237.93}{\$60,668,87} = .415$
8%	45,355.77	14,624.32	24,511.42	$\frac{\$24,511.42}{\$59,980.00} = .408$
10%	45,080.06	14,238,72	23,818.49	$\frac{\$23,818.49}{\$59,318.78} = .401$

A study of table 4.29 confirms our earlier findings. As the discount rate increases, the gross benefit-cost ratio falls and profitability of the project declines.

It has been amply demonstrated that in its initial years, the project is not profitable even at a low discount rate of 5% and it becomes even more so at higher rates of discounting. Under such circumstances, performing more calculations with higher discount rates would prove to be

a mere mechanical exercise. However, we turn to the next chapter and study some other results.

CHAPTER V

RESULTS-II

The last chapter presented the results of the benefit-cost analysis of the land clearing programme in the Interlake area of Manitoba. On the basis of projections based on expanded costs and returns, the programme became profitable to producing farmers after a period of three years. It is not known whether or not the number of farmers producing increases after three years.

The success or failure of a programme also depends upon how the people of an area feel about it? What has been their attitude towards it? Moreover, it was thought useful to study the economic characteristics of the farmers who assumed leadership and proved more successful than others. Did they significantly differ from other farmers in the Interlake region? Some of these things are discussed below.

FARMERS' ATTITUDE:

The success of a project or programme certainly depends upon its economic performance. However, the attitude of the people for whom it has been designed also counts. It was thought important to know whether Interlake farmers were satisfied with the programme in its present form and if not what improvements they would like to see in it.

The Interlake Land Clearing Evaluation Survey, 1971, carried a question to this effect. The answers are presented in Table 5.0. Farmer responses were divided into three categories of; those who considered the programme to be satisfactory and adequate; those who considered that the incentive grants were inadequate, and other responses.

TABLE 5.0

LAND CLEARING PROGRAMME: ASSESSMENT OF FARMER RESPONSES *

	Type of Response							
	Satisfactory and Adequate		Incentive Grants Inadequate		Other Remarks		Total	
	No.	%	No.	%	No.	%	No.	%
Soil Class III	14	42.4	11	33	8	24.6	33	100
Soil Class IV	13	48.1	9	33	5	18.9	27	100
Soil Class V	15	50.0	10	33	5	17.0	30	100

* Data taken from individual questionnaires.

Table 5.0 shows that almost 50 percent of all the farmers interviewed were satisfied with the programme and thought the incentive grant to be adequate. On the other hand 33 percent of the farmers were of the view that the incentive grant was inadequate and should be increased. The rest, however, expressed different viewpoints.

CHARACTERISTICS OF MORE SUCCESSFUL FARMERS:

In earlier analysis it was noted that some farmers in the sample produced for a period of three years after clearing, while others either produced for two years or less. The benefit-cost ratios of those who produced for three years were found to be more favourable than others. In the following analysis we compare the various groups and isolate the characteristics of the more successful ones.

Table 5.1 compares the average age of the operators, average academic qualification and average farm size in acres.

TABLE 5.1

LAND CLEARING EVALUATION: COMPARISON OF FARMER CHARACTERISTICS BASED UPON NUMBER OF YEARS IN PRODUCTION, 1970[a)]

No. of Years in Production	No. of Farmers	Average Age of Operator	Average Academic Qualification	Average Farm Size in Acres
0	19	51.2	6.7	799
1	22	49.7	7.1	934
2	41	50.1	7.3	727
3	8	43.5	8.5	1,264
All.	90	49.6	7.2	840

a) Source: Interlake Land Clearing Evaluation Survey, 1971, Appendix C, Table 19.

A study of Table 5.1 shows that farmers who produced for three years, and whose benefit-cost ratios were found to be higher than other farmers were distinguishable clearly from the other farmers in the sample. There were only 8 such farmers out of a sample of 90, who used the cleared land for production for a period of three years. Some of the characteristics are discussed below:

Age:: The age of the farmers who produced for three years were found lower than who did not. The average age of the farmers producing for three years was only 43.5 years compared to 51.2 of those who did not produce at all, 49.7 of those who produced for one year and 50.1 for those who produced for two years only. More successful farmers were thus found to be relatively younger.

Education: Academic qualifications reflected the same trend. Those who produced for three years were found to be more educated than others,

and the ones who never produced were those with lowest education. More educated ones were therefore the more successful ones. Those who produced for three years had an education of 8.5 in comparison to 6.7 for those who did not produce.

Farm Size: A review of farm size in acres confirms the earlier observations. Those who produced for three years were found to possess larger acres in farm size, as compared to other categories. The more successful types possessed on an average 1,264 acres of land against the sample average of 840 acres.

Table 5.2 depicts the average total farm receipts, expenses, net farm income and total farm assets of farmers on the basis of number of years in production.

TABLE 5.2

LAND CLEARING EVALUATION: COMPARISON OF FARMER CHARACTERISTICS BASED ON NUMBER OF YEARS IN PRODUCTION, 1970*

No. of Years in Production	Number of Farmers	Average Total Farm Receipts a)	Average Selected Farm Expenses b)	Average Net Farm Income c)	Average Total Farm Assets d)
0	19	$6,965	$3,204	$3,761	$56,139
1	22	7,107	4,323	2,784	67,364
2	41	8,665	3,962	4,703	64,460
3	8	11,090	2,990	8,100	59,294
All.	90	8,141	3,804	4,337	62,954

* Source: Interlake Land Clearing Evaluation Survey, 1971, Appendix C, Table 19.

a) farm receipts refer to sale of livestock, livestock products, crops and custom work in 1970.

b) farm expenses include fuel; oil and grease; livestock purchases, purchase of feed, fertilizers and chemicals, cash rent for land and equipment, interest payments and custom work in 1970.

c) net farm income refers to the difference between total farm receipts and selected farm expenses, in 1970.

d) total farm assets include estimated value of all the owned farm machinery and equipment, buildings, land, livestock and grain, less the farm liability.

A study of Table 5.2 also indicates that the farmers who produced for three years were clearly distinguishable from those who did not. In general, the more successful farmers had higher receipts, lower expenses, higher net income and reasonable farm assets.

Farm Receipts: Average total farm receipts for those who produced for three years after clearing were found to be much higher in comparison to those who produced for lesser number of years. Those who did not produce at all earned almost only half as much as those who produced for three years ($6,965 to $11,090).

Farm Expenses: Farmers who produced for three years were also more successful in production as selected farm expenses were much lower as compared to other groups. Farmers producing for three years spent on an average only $2,990 as compared to the $3,804 on an average for the sample.

Net Farm Income: Higher farm receipts and lower farm expenses earned highest average net income for the farmers who produced for three years in comparison to the ones who did not. A net farm income of $8,100 was up to four times that of certain other groups and almost twice to the $4,377 for the whole sample.

Total Farm Assets: The size of total farm assets for farmers who produced for three years was found to be lower than the size of farm assets possessed by other groups.

Comparison of Farm Characteristics: A comparison of per acre average clearing costs, production costs and gross returns per acre of clearing farmers on the basis of main enterprise and number of years in production establish livestock farmers to be more successful than crop farmers. Table 5.3 depicts the average per acre costs and returns for clearing farmers.

TABLE 5.3

LAND CLEARING FARMERS: COMPARISON OF FARM CHARACTERISTICS, COSTS AND RETURNS*

No. of Years in Production	No. of Livestock Farmers	No. of Crop Farmers	Average/Acre Land Clearing Costs (Main Enterprise**)		Average/Acre Production Costs (Main Enterprise)		Average/Acre Gross Returns (Main Enterprise)	
			Livestock	Crops	Livestock	Crop	Livestock	Crop
3 years	7	1	8.96	14.05	4.77	13.58	5.25	4.06
2 years	31	10	16.17	12.83	9.81	6.67	15.82	10.81
1 year	16	6	9.06	9.90	3.30	3.69	4.49	4.02
0 year	13	6	9.98	14.84	0.67	0.81	-	-
All Farmers	67	23	12.39	12.71	6.11	4.65	9.13	7.31

* Source: The Interlake Land Clearing Evaluation Survey, 1971, Appendix C, Table 18.

** Main Enterprise is one of which the gross sales exceed the gross sales of other enterprise.

TABLE 5.4

INCOME DISTRIBUTION RANGE OF CLEARING FARMERS*

Soil Class	Number of Farmers Clearing Land	Distribution of Gross Receipts. ($) 0 - 5,000	% of Total	($) 5,001-10,000	% of Total	($) 10,001-15,000	% of Total	15,001 and above	% of Total
III	33	12	36.36	15	45.45	5	15.15	1	3.04
IV	27	11	40.74	7	25.92	4	14.82	5	18.52
V	30	14	46.66	4	13.34	7	25.33	5	16.67

* Source: The Interlake Land Clearing Evaluation Survey, 1971. Data are derived from Appendix C, Table 15.

A study of Table 5.3 indicates that livestock farmers were more successful in clearing their land at lower acre costs in comparison to crop farmers. Clearing costs for livestock farmers were lower in general than crop farmers.

On the other hand, if we consider the net returns i.e. the difference between average per acre production costs and average per acre gross returns of livestock and crop farmers we find the difference between the two groups negligible. In case of livestock farmers the net return is 3.02 (9.13 - 6.11) and for crop farmers 2.66 (7.31 - 4.65). The difference between the two groups is only thirty six cents per acre.

Income Distribution Impact: The land clearing programme was designed to upgrade the economic condition of the farmers in the Interlake area, by increasing improved acreage of land. Small farmers were expected to be benefited more than large farmers. Table 5.4 depicts the income distribution range and the percentage number of clearing farmers in each income range and soil class.

A study of Table 5.4 shows that a large percentage of clearing farmers were from lower income groups. 36.36 percent in soil class III, 40.74 percent in soil class IV and 46.66 percent in soil class V were in the income group $5,000 or less per annum. The $5,001-$10,000 income group was also fairly large with 45.54, 25.92 and 13.34 percent farmers in soil class III, IV and V respectively. On the other hand, the $15,001 and above group, which may be considered as a high income group had only 3.04, 18.52 and 16.67 percent of farmers in soil class III, IV and V respectively. This indicates that major benefits of the land clearing programme accrued to the relatively small farmers.

CHAPTER VI

NATIONAL IMPLICATIONS

The Interlake land clearing programme, like all other programmes will create benefits and costs at the national level in addition to benefits and costs at the farm level. Before discussing the national implications of the land clearing project an attempt is made to define national benefits and costs in general, followed by a discussion of specific implications of the present project.

National Economic Benefits

Gunter Schramm defines national economic benefits as follows:

> "National economic development benefits are increases in the output of goods and services which are measurable in economic terms. These may be measured in terms of actual or estimated market prices. If such prices cannot be established, imputed values can be assigned."[1]

These benefits would include:

1. The value of additional goods and services as output of a project. This should be measured in terms of actual or estimated market prices;

2. The value of goods and services produced which do not have market prices. These benefits should be different than the ones

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[1] Gunter Schramm, et al., An Analysis of Federal Water Resource Planning and Evaluation Procedures (Ann Arbor: The University of Michigan, 1970). The following discussion is based on notes from the above book. p. 62.

mentioned in part one. Such benefits might be measured through socially agreed upon values;

3. The value of national product resulting from externalities to producers and consumers, from the implementation of a programme;

4. The value of any payment to otherwise unemployed or underemployed resources, which are used more efficiently after the implementation of the project. Such benefits need not be limited to the immediate areas.

On the basis of the above guidelines we shall shortly discuss the national benefits from the land clearing project. Before that, national costs are defined.

National Economic Costs

> The national economic development costs are expenditures or losses of goods and services which may be measured in economic terms.[2] Such costs would include:

1. Resources required for the project. These would be measured by the willingness to pay by the possible users;

2. Any losses in goods and services which defy an economic measurement. Such losses should be measured on the basis of socially agreed upon values.

3. If a project leads to an increase in the unemployment or underemployment of certain resources, these would come under national costs; and,

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[2] Ibid.

4. If an alternative project or programme under a plan does not lead to maximization of national income gains, the difference between the two, would be a national cost.

In relation to the land clearing projects, the national benefits include the value of the increased output of goods and services measurable in economic terms, i.e., the increase in output of crops measured at the current prices in the market. These benefits would also include gains to shippers and exporters of the output, plus gains to unemployed or under-employed resources measurable through gain in labour hours and the number of hours of machine work, etc. Another component of the national benefits would be the increased income tax revenue due to increase in incomes of land clearing farmers.

On the other hand, the national costs, due to land clearing programmes in general, would include the cost of required resources plus assigned value of losses in wildlife habitat and recreational sites. The land clearing programmes would not lead to any kind of underemployment of resources. But, the project, due to additional production of wheat and other crops on the cleared acres may cause additional wheat subsidies. Agricultural production, for the time being, is characterized by surpluses. Any addition would either lead to payment of subsidies for maintenance of 'fair' prices to the farmers or production will have to be curtailed through acreage payment, on acres taken out of production. All this extra payment made to the farmers would become a component of national costs.

As a principle, as long as national benefits are greater than national costs, it would be worthwhile to carry on a project. Even if the national benefits equal the national costs and benefit-cost ratio for the farmer is greater than one the project can be carried out. In

case, national costs exceed national benefits, but the farmer's ratio in a particular area is greater than 1, the project could be allowed to continue consistent with local interests or discontinued consistent with the federal objective to reduce agricultural production.

Income Distribution Impacts and Allocation of Benefits of the Land Clearing Programmes

Land clearing benefits have accrued in the following order of importance:

a) land clearing farmers in the Interlake area;

b) others in the Interlake area;

c) others in the Province of Manitoba; and,

d) others in Canada as a whole.

This study lays emphasis on the initial beneficiaries. Subsequent benefits become widely diffused throughout the economy, and a measurement is difficult. Direct benefits accrue to the participating farmers while secondary benefits are divided among a large number of groups. These would be firms concerned with processing and marketing of farm products, in and out of Interlake. Firms involved in manufacturing, distribution and servicing the inputs required in agriculture would also benefit. Land clearing operations give employment to contractors. The income would again be diffused in the economy to give successive rounds of development through multiplier effects. All these things describe a favourable impact on local and regional economy, which, in general, should have a favourable impact on the national economy also. A rough allocation of these impacts can be made through locating the processing and manufacturing plants of farm products in the Interlake and

Manitoba, as well as finding out the locations of manufacturers and suppliers of agricultural inputs. But, an exact estimation is difficult as many other projects are operating in the Interlake area and all of them are simultaneously having similar impacts.

Task Force Recommendation

Land clearing by farmers have been taking place for decades now. It is of course new in its present form in the Interlake area. In spite of a developed economy in Canada, the Interlake area was lagging behind. A ten year plan for development of the area started in 1967. The land clearing project was a part of that plan. When the plan came into existence, there was a heavy demand for Canadian wheat. Soon after, conditions in the world market changed and the Canadian wheat economy, changed into a surplus economy.

Almost simultaneously the federal government appointed a special Task Force on agriculture to study the problems faced by Canadian agriculture in the sixties and make recommendations for the seventies. The Task Force made several far-reaching recommendations. One of its recommendations was related to land use in the Prairies.

> . . . the Task Force recommends that a general moratoriam be placed on the development of new lands for agricultural purposes by both federal and provincial governments. There appears to be little justification for the use of public funds to expand the agricultural land base during the next decade."[3]

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[3] Canada Department of Agriculture, Federal Task Force on Agriculture, Final Report (Ottawa: Queen's Printer, 1969), p. 110.

Dr. W. J. Craddock,[4] in a special study for Economic Council of Canada, arrives at almost similar conclusions.

The Task Force was prompted to make this recommendation on the basis of the troubles faced by Prairie grain growers over the last couple of years. The important ones of these problems being the massive carry-over of grain stocks, unstable and uncertain grain prices, dwindling exports and the like.

In support of its recommendation the Task Force cities:

> "Total acreage in all grain production in the Prairie Provinces has increased from 40.5 million acres in the late 1950's to approximately 45.5 million acres in the late 1960's. The improved land on the Prairies has increased by about one million acres per year since 1946, and the acreage devoted to all crops and summer fallow has increased steadily during this period. If these past trends were to continue at a somewhat slower pace, the total acreage in all grains in the Prairies could amount to 51 million acres by 1980; this would represent a five million acre increase over the late 1960's."[5]

The Task Force, in support of its recommendation also made certain other observations including increasing wheat surpluses, emergence of new competitors in the field of wheat marketing and improving food situation in the developing countries.

Critical Appraisal of the Task Force Recommendation and its Implications for Canada and the Interlake Land Clearing Programme

Considering the current wheat situation in Canada, the Task Force recommendation sounds logical. When the Task Force report was

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[4] W. J. Craddock, Interregional Competition in Canadian Cereal Production, Economic Council of Canada, (Ottawa: Queen's Printer, 1970), pp. 80-81.

[5] Task Force, op. cit.

being drafted, the situation was even worse. Clearing of additional land for crop production clearly appeared against national interests. However, the Task Force seems to have over-emphasized some points. Its argument suffers from the following weaknesses:

a) It is true that the agricultural land base of the Prairieshas increased gradually over the past 25 years. But, it is a mistake to relate it to the current problem of wheat surpluses, which is due mainly to several other reasons like increased competition in the international market, and, 'green revolution' in the under-developed countries. Canada is a 'new' country with millions of acres of virgin land available. Population has been steadily increasing due to immigration and clearing up of new lands by settlers was perfectly normal. Moreover, the increased land base of the Prairies in the past earned valuable foreign exchange for the country and was rather responsible for rapid development of the country. It was only in the late sixties that the problem of surpluses developed and depending on export markets their significance may decline.

b) The problem of surpluses in the late sixties has also proved to be a purely temporary phenomenon. It was due chiefly to plentiful harvests in many European, Communist and Asian countries and a surge in the number of competitors. Australia, Argentina and France all became wheat exporting nations. Since 1970, wheat exports have been once again steadily increasing. Only recently, large wheat sale agreements with the Soviet Union, China and Brazil have been announced. The situation has eased up considerably.

c) If the 'wheat surplus' situation persists, some of the available acreage could be diverted to the production of barley, oil

seeds and beef. Of late, Canada's exports for barley and oil seeds have been increasing. Beef production is also important. Even the Task Force has recognized the importance of beef production and feels that in years to come, demand for beef is expected to outstrip its supply in the world.

d) Land is an important input in agricultural production. But it is only a single input. Moreover, its relative importance as an input has been gradually decreasing over the past decades. This is so because there are other inputs which are substitutes for land in agriculture. Fertilizers, irrigation, improved seeds, insecticides and improved managerial skills are all being increasingly used. An increasing use of these inputs suggests a positive marginal value product for them at prevailing prices. Thus, a suggestion for controlling farm surpluses by controlling land - a single input - may not be feasible. Not only this, there seems to be a basic contradiction in policy. On the one hand, the objective seems to be controlling farm surplus by controlling land input. On the other hand, the Federal and Provincial governments support agricultural credit programmes which provide cheap capital to the farmers, which in turn makes other inputs cheap. This indirectly supports the farmers in substituting other inputs for land. Subsidies for land reclamation and conservation may also have similar impact. With a restriction on the use of land, the incentive to use other inputs would grow even

stronger.[6,7]

Hathaway states in case of the U. S. A.:

> "A combination of selecting the best land, fertilizer, improved seed, summer fallow and other improved practices has meant that despite a reduction in planted acreage of 30% approximately the same output was produced under allotment."

Let us take the Canadian example. Table 6.0 depicts total acreage, yield per acre, total production and precentage change for the years 1968 and 1969.

A study of Table 6.0 shows wheat acreage in 1969 was only 24,968 thousand acres in comparison to 29,422 thousand acres in 1968 that is a decrease of approximately 16%, but wheat yields per acre increased from 22.1 bu. to 27.4 bu., an increase of approximately 24%. The total production instead of decreasing, showed an approximately 5% increase that is from 649,844 thousand bu. to 684,819 thousand bu. This establishes that a control of land input alone may not help in curtailing surpluses unless restrictions are also put on the availability of cheap credit and other inputs.

e) Coming from Canada to the prairie agriculture the same thing can be argued in two ways:

(i) The prairie economy is an agricultural economy. It may

6, 7 The current discussion and some to follow draws heavily upon the following two sources:

G. S. Shepherd, Farm Policy: New Directions (Ames: Iowa State University Press, 1964).

D. E. Hathaway, Government and Agriculture: Public Policy in a Democratic Society (New York: The MacMillan Co., 1963).

TABLE 6.0

CANADA: TOTAL ACREAGE, YIELD PER ACRE AND TOTAL PRODUCTION, 1968 and 1969.[a)]

	1000 Acres			Yield/Acre in Bu.			Production 1000 Bu.		
	1968	1969	%Change	1968	1969	%Change	1968	1969	%Change
Canada									
All Wheat	29,422	24,968	-16	22.1	27.1	+24	649,844	684,819	+5

a) Quoted in the Task Force Report. Original Source: Coarse Grains Quarterly (August 1969), D. B. S., Canada

be advantageous for the economy as a whole to curtail production. A loss in the incentive to clear lands will reduce the marginal value product of labour and capital in agriculture and may increase the marginal value product of land. This may lead to withdrawal of labour and capital in agriculture and may increase the marginal value product of land. This may lead to withdrawal of labour and capital from prairie agriculture and a non-optimum use of the economy's resources. The prairie economy has no outlets to absorb them at present.

(ii) It can also be argued from another point of view. A restriction on the use of land resource in the Prairies, removes a resource which has little or no productive use elsewhere in the economy. And, by disturbing the current marginal value productivity of various resources, it would encourage additional use of other inputs (eg. capital), which have a productive value in other sectors of the economy. Thus, resource allocation within prairie agriculture and between prairie agriculture and rest of the economy would become less efficient.

f) The Task Force argument, examined in relation to the Interlake economy may not be relevant. The Interlake economy is a mainly livestock economy. Results of the Land Clearing Evaluation Survey, 1971, show that clearing farmers remained livestock farmers and that tendency rather strengthened. This will be demonstrated with the help of following tables and discussion.

It can be concluded that the major issue is to determine and compare the marginal value product of the increments of cleared land

with the marginal value product of using additional inputs on already improved land. If the marginal value product of cleared land is less than the marginal value product of other inputs, there may be a case for putting a moratoriam on clearing additional land. On the other hand, if the marginal value product of other inputs is less than that for increments of cleared land, a case might be made for controlling the use of other inputs.

Table 6.1 depicts selected economic characteristics of the farmers who cleared land, for the years 1969 and 1970 and percentage changes in them over the period.

A study of Table 6.1 shows that the land clearing farmers remained mainly livestock farmers. The value of livestock purchased during this period went up by 153.7% in 1970 over 1969 in Soil Class IV. Similarly, the percentage value of receipts from sale of livestock products went up in 1970 over 1969 and is depicted in column (2) of the table. On the contrary, receipts from crop sales in 1970 were low in comparison to 1969. Column (4) of the table shows percentages of 23.4, 29.4, and 9.3 in Soil Classes III, IV and V respectively. A decrease in the purchase of fertilizers and chemicals (Column (5)) and crops and forage on improved land (Column (8)) also supports the view that cleared Interlake land was not devoted to crop production.

Table 6.2 depicts the exact number of acres of cleared land that went for livestock farming and crop farming in the Interlake area.

TABLE 6.1

Interlake: Comparison of Economic Characteristics of Clearing Farmers for 1969 and 1970.*

Economic Indicators / Soil Class	Purchase of Livestock (1)			Receipt from Livestock Production (2)			Estimated Market Value of Livestock (3)			Receipt from Crop Sales (4)			Fertilizers and Chemicals (5)			Feed Purchased (6)			Improved Pasture (7)			Crops and Forage on Improved Land (8)		
	1969	1970	Change	1969	1970	Change	1969	1970	Change	1969	1970	Change	1969	1970	Change	1969	1970	Change	1969	1970	Change	1969	1970	Change
Soil Class III	$15,719	$23,408	48.9	$46,360	$49,244	6.2	$298,016	$355,658	19.3	$91,488	$70,146	-23.4	$17,240	$14,104	-18.2	$23,506	$24,856	5.7	$2,423	$2,495	2.9	$8,738	$8,591	-1.7
Soil Class IV	17,559	44,560	153.7	59,520	63,059	5.9	280,285	310,944	10.9	47,008	33,196	-29.4	12,399	10,126	-18.0	15,539	16,535	6.4	1,031	1,071	3.8	5,674	5,457	-3.9
Soil Class V	15,795	20,093	27.2	35,321	37,953	7.5	363,765	430,770	18.4	42,810	38,857	-9.3	12,993	13,061	0.5	19,158	22,064	15.1	2,773	3,171	15.1	7,403	7,311	-1.3

* Source: Interlake Land Clearing Evaluation Survey, 1971. Derived from Appendix C, Tables 12, 13 and 14.

Table 6.2 shows that about 75% of cleared land was utilized for livestock farming and only 25% was used for crop production.

On the basis of the above information it can be argued that land clearing for the Interlake area does not contribute substantially to wheat surpluses. Moreover, Interlake human resource and machinery are underemployed and additional cleared land opens up avenues for their fuller use. The land clearing programme may have undesirable aspects at the national level but considering special conditions and economic needs of an area such as the Interlake it is likely that the economic benefits are greater than the costs.

TABLE 6.2

LAND CLEARING ACREAGE: DISTRIBUTION
IN LIVESTOCK AND CROP FARMS*

No. of Years Authorized Parcel in Production	No. of Cleared Acres	Livestock Farms		Crop Farms	
		Number of Acres	Percentage	Number of Acres	Percentage
3 Years	499	464	92.98	35	7.02
2 Years	2,039	1,493	73.22	546	26.78
1 Year	1,165	898	77.08	267	22.92
0 Year	741	440	59.37	301	40.63
TOTAL	4,444	3,295	74.14	1,149	25.86

* Interlake Land Clearing Evaluation Survey, 1971, Appendix C, Table 18.

In summary, it can be said that control of agricultural production is an appealing solution to the problem of surpluses in Canadian agriculture. However, as we have seen, in practice this is not successful as most of the emphasis goes on restricting the land input which has many substitutes. Also, output controls, regardless of the methods used, would result in unemployment and underemployment of some of the resources in agriculture. This would lead to an increase in the national cost of achieving the objective. Moreover, depending upon the particular characteristics of an area, land clearing may create national economic benefits greater than economic costs.

CHAPTER VII

SUMMARY AND CONCLUSIONS

This study was confined to the Interlake area of Manitoba, situated north of Metropolitan Winnipeg. Economic conditions in the area lead to its characterization as a depressed region. Farming dominated as an occupation and plenty of bush lands were available.

Provincial and Federal Governments were involved in the betterment of the area through FRED and ARDA programmes. One of the projects designed to help the farmers of the Interlake was the "Land Clearing Project", which began in 1967, in its present form. Under this project all help and encouragement was offered to the participating farmers including a subsidy payment of $4.00 per acre on the cleared land and concessions in income tax.

The more important objectives of this project and by implication, of this study, were effecting improvement in the resource base of the Interlake farmers, improvement in the distribution of income among farmers and creating more employment for labour and machinery.

The process of development involves sound decision making, economic evaluation of decisions and modifications in plans and projects in the light of experiences gained. It was therefore important to judge the profitability of "land clearing" for the farmers of the Interlake area and deduce implications for the provincial and national economies.

Benefit-cost analysis was selected as the tool for assessing the profitability of the project. The methodology was described in detail in Chapter II. Review of literature was done in Chapter III and results were presented in Chapter IV. Additional results based on the information collected in the land clearing evaluation survey were presented in Chapter V. A sample of 90 farmers was chosen representing three soil capability classes. Gross benefit-cost ratios were calculated for the three groups separately. These ratios did not turn out to be satisfactory. The reasons were evident. Many of the farmers did not produce anything during the last three years of the analysis. Many others used the land for grazing cattle or summer fallowing, which resulted in very low or negative returns.

Farmers in the sample were therefore stratified into groups of those who produced for two years and those who produced for three years. Unfortunately, for the analysis there were only two farmers who produced for three years on soil class III, and one on soil class V. No farmer raised crops for three years successively on soil class IV.[1] However, the benefit-cost ratios were better for these groups than for the general group of farmers. Benefit-cost ratios in all soil classes for farmers who produced for two years were better than for the general group, and benefit-cost ratios for those who produced for three years were still better. For soil class III it was .88 and for soil class V, 1.14.

This study laid emphasis on gross benefit-cost ratios, which relate gross annual returns for the project to total costs, including capital expenditure and annual operating costs. But, net benefit-cost

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[1] Grazing returns are not included because of apparent inconsistencies in the data.

ratios which give the net operating return per dollar of capital outlay were also estimated for the sake of comparison. The net benefit-cost ratios were found to be lower than gross benefit-cost ratios. This reflected high operating costs or high initial expenditure or both. Thus, both gross and net benefit cost ratios greater than one were not present due to an absence of production on the part of a large number of farmers, within the three year period of analysis. This indicates a need to have a longer than three year follow-up on the programme to determine the proportion of cleared land brought into production. Benefit/cost ratios will remain low if an increase in the number of farmers producing on cleared land does not occur in the future. Calculations were also performed, using higher discount factors of 6, 8 and 10 percent. An increase in the rate of discount was found associated with a decline in the benefit-cost ratios.

At the time of study, data were available for a period of only three years. Maximum benefits could not be realized by the farmers over such a short period of time, while costs in the initial period were higher. This was quite expected. In addition, most of the people could not start cultivation in the first year of land clearing due to a variety of reasons, including excessive moisture in the soil. Some of the farmers were discouraged from seeding because of a slump in the wheat market and indecision about a substitute crop.

A three year period was therefore too short for an unbiased appraisal of a project which would yield benefits over the life time of the farmers. It was, consequently, necessary to project the stream of benefits and costs into the future and see whether the benefit-cost

ratios become greater than one at some future date and if so, when. Present values of projected benefits and costs were calculated at a fixed rate of interest (5% per annum) assuming constant benefits equivalent to the average benefits realized by farmers who produced for three years in succession. Because no farmer on Soil Class IV produced for three years, projections were made on the basis of farmers who produced for two years. Present values of projected benefits and costs were calculated for periods of five years, ten years and fifteen years in the future, so as to demonstrate the gradually increasing profitability of the project. Project benefit-cost ratios indicated a long term profitability of the project.

Finally, on the basis of data for the sample, benefits and costs were estimated for the total number of farmers who cleared land. Expanded weighted benefit-cost ratios were calculated for each of the three soil capability classes and for the whole area. Projections were made on the basis of expanded costs and returns for a period of two years and up to 25 years in the future. Various soil classes were found not to affect significantly, the level of performance.

Additional calculations were made on the basis of information available in the Interlake Land Clearing Evaluation Survey, 1971, to test the attitude of participating farmers towards the programme and also to isolate the characteristics of the more successful farmers. About 50% of the participating farmers were found to be satisfied with the programme and the role of government in it, while 33% of the farmers found government financial assistance inadequate. The rest were not very certain. The more successful farmers were found to be younger in

age, to have more formal education, and to have lower operating expenses and larger farm size.

The study also discounted fears on the part of many that land clearing would lead to a further slump in the market for wheat, and would create larger surpluses. Numerous crops other than wheat were produced on the cleared land, including flax, barley and hay. Interlake agriculture relies heavily on beef production. Output of livestock and livestock products in the area increased since the inception of the programme. The land clearing programme increased the incomes of farmers in the area, provided more employment for labour and machinery and helped the area's economy in many other direct and indirect ways.

Bearing in mind the data problems and temporary market difficulties, it could be said that the programme was reasonably successful in attaining its objectives. Given a more purposive sample and data over a little longer period, the programme's usefulness would probably have been shown much more clearly.

On its face value the programme appears to be not very successful. But a moments reflection shows that there were two distinct groups of farmers (the successful[2] farmers and the less successful farmers). The successful ones benefitted more than the less successful ones. The programme thus lead to income distribution in favour of the successful ones. This might further accentuate the discrepancies in income. To avoid this, steps should be taken to help the less successful farmers.

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[2] Successful farmers are assumed to be those who took advantage of the cleared land and produced for all the three years. The less successful ones were, of course, those who did not produce for a full three year period of analysis.

The performance of the programme could be improved by providing farm-management training and agricultural extension services directed towards less successful group of farmers.

The programme should provide more information on economic methods of land clearing, suitable time period for land clearing and profitable alternative crop and livestock programmes. In this way, the programme could achieve more than its present level.

Suggestions for Improvement in Future Research:

Future research in the area could be improved by taking note of the following suggestions:

a) Data should be collected for a longer period of time;

b) Initial benefits should also include the returns from wood (fallen trees) if any;

c) Data should also be collected on the amount of funds borrowed, borrowing agencies and rate of interest paid. This would help in arriving at a more suitable rate for discounting benefits and costs.

The present study, however, provides valuable information to decision makers about the performance of land clearing under the FRED plan. It also furnishes insights about the impact of such programmes over the national economy and a guideline to other research workers contemplating similar projects.

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APPENDIX A

THE SOIL CAPABILITY CLASSIFICATION FOR AGRICULTURE

The Soil Capability Classification

The soil capability classification for agricultural purposes is one of a number of interpretive groupings that may be made from soil survey data. As with all interpretive groupings, the capability classification is developed from the soil-mapping units. In this classification the mineral soils are grouped into seven classes according to their potentialities and limitations for agricultural use.

The capability classification, applied in Canada, consists of two main catagories: (1) the capability class, and (2) the capability subclass.

The class, the broadest category in this classification, is a grouping of subclasses that have the same relative degree of limitation or hazard. The limitation or hazard becomes progressively greater from Class 1 to Class 7. The class indicates the general suitability of the soils for agricultural use.

The subclass is a grouping of soils with similar kinds of limitations and hazards.

The capability classification is applied to virgin as well as to presently cultivated lands, with the exception of organic soils. Research data, recorded observations, and experience are used as the basis for placing soils in capability classes, and subclasses. The level of generalization of the soil capability classification for our

purposes is the quarter section.

Assumptions

This soil capability classification is based on certain assumptionswhich must be understood by those using the soil capability maps and statistical data derived from these maps if they are to obtain full benefit from such information and avoid making erroneous deductions.

1. The soil capability classification is an interpretive classification based on the effects of combinations of climate and soil characteristics, on limitations in use of the soils for agriculture, and their general productive capacity for common field crops. Shrubs, trees or stumps are not considered as limitations to use unless it is unfeasible to remove them.
2. Good soil management practices that are feasible and practical under a largely mechanized system of agriculture are assumed.
3. The soils within a capability class are similar with respect to degree but not to kind of limitations in soil use for agricultural purposes. Each class includes many different kinds of soil and many of the soils within any one class require unlike management and treatment. The subclass provides information on the kind of limitation and the class indicates the intensity of the limitation. Capability Class 1 has no subclasses. Information for specific soils is included in soil survey reports and in

other sources of information.

4. Soils considered feasible for improvement by draining, by irrigating, by removing stones, by altering soil structure, or by protecting from overflow, are classified according to their continuing limitations or hazards in use after the improvements have been made. The term "feasible" implies that it is within present day economic possibility for the farmer to make such improvements and it does not require a major reclamation project to do so. Where such major projects have been installed, the soils are grouped according to the soil and climate limitations that continue to exist. A general guide to what is considered a major reclamation project is that such projects require co-operative action among farmers or between farmers and governments. (Minor dams, small dykes, or field conservation measures are not included).

5. The capability classification of the soils in an area may be changed when major reclamation works are installed that permanently change the limitations in use for agriculture.

6. Distance to market, kind of roads, location, size of farms, characteristics of land-ownership and cultural patterns, and the skill or resources of individual operators are not criteria for capability groupings.

7. Capability groupings are subject to change as new information about the behaviour and responses of the soils becomes available.

Capability Classes

(In the Interlake FRED area of Manitoba, there is no occurance of soil capability classes 1 and 2. Our discussion will be restricted to soil capability classes on which land clearing was done, i.e., soil classes 3, 4 and 5).

Class 3 - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.

Soils in Class 3 have more severe limitations than those in Class 2 and conservation practices are more difficult to apply and maintain. Under good management these soils are fair to moderately high in productivity for a fairly wide range of field crops adapted to the region.

In this class, the limitations that restrict cultivation, ease of tillage, planting and harvesting, the choice of crops, the application and maintenance of conservation practices, or a combination of two of those described under Class 2 or one of the following: moderate climatic limitations including frost pockets; moderately severe effects of erosion; intractable soil mass or very slow permeability; low fertility correctable with consistent heavy applications of fertilizers and usually lime; moderate to strong slopes; frequent overflow accompanied by crop damage; poor drainage resulting in crop failures in some years; low water-holding capacity or slowness in release of water to plants; stoniness sufficiently severe to seriously handicap cultivation and necessitating some clearing; restricted rooting zone; moderate salinity.

Each soil in this class may have one or more alternative uses or practices required for use but the alternatives may be fewer than for soils in Class 2.

Class 4 - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices or both.

Soils in Class 4 have such limitations that they are only suitable for a few crops, or the yield for a range of crops is low, or the risk of crop failure is high. The limitations may seriously affect such farm practices as the timing and ease of tillage, planting and harvesting, and the application and maintenance of conservation practices. These soils are low to medium in productivity for a narrow range of crops but may have higher productivity for a specially adapted crop.

The limitations include the adverse effects of a combination of two or more of those described in Classes 2 and 3 or one of the following: moderately-severe climate; very low water-holding capacity; low fertility difficult or unfeasible to correct; strong slopes; severe past erosion; very intractable mass of soil or extremely slow permeability; frequent overflow with severe effects on crops; severe salinity causing some crop failures; extreme stoniness requiring considerable clearing to permit annual cultivation; very restricted rooting zone, but more than one foot of soil over bedrock or an impermeable layer.

Class 4 soils in subhumid and some arid regions may produce good yields of regionally cultivated crops in years of high rainfall; low yields in years of average rainfall and failures in years below

average rainfall. During years of low precipitation even though no crop is expected, special management practices are required to minimize wind erosion, maintain productivity and conserve moisture. These measures include emergency tillage and crops used only for the primary purpose of preventing soil deterioration. These treatments and others must be applied more frequently and more intensively than on soils in Class 3.

Class 5 - Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible.

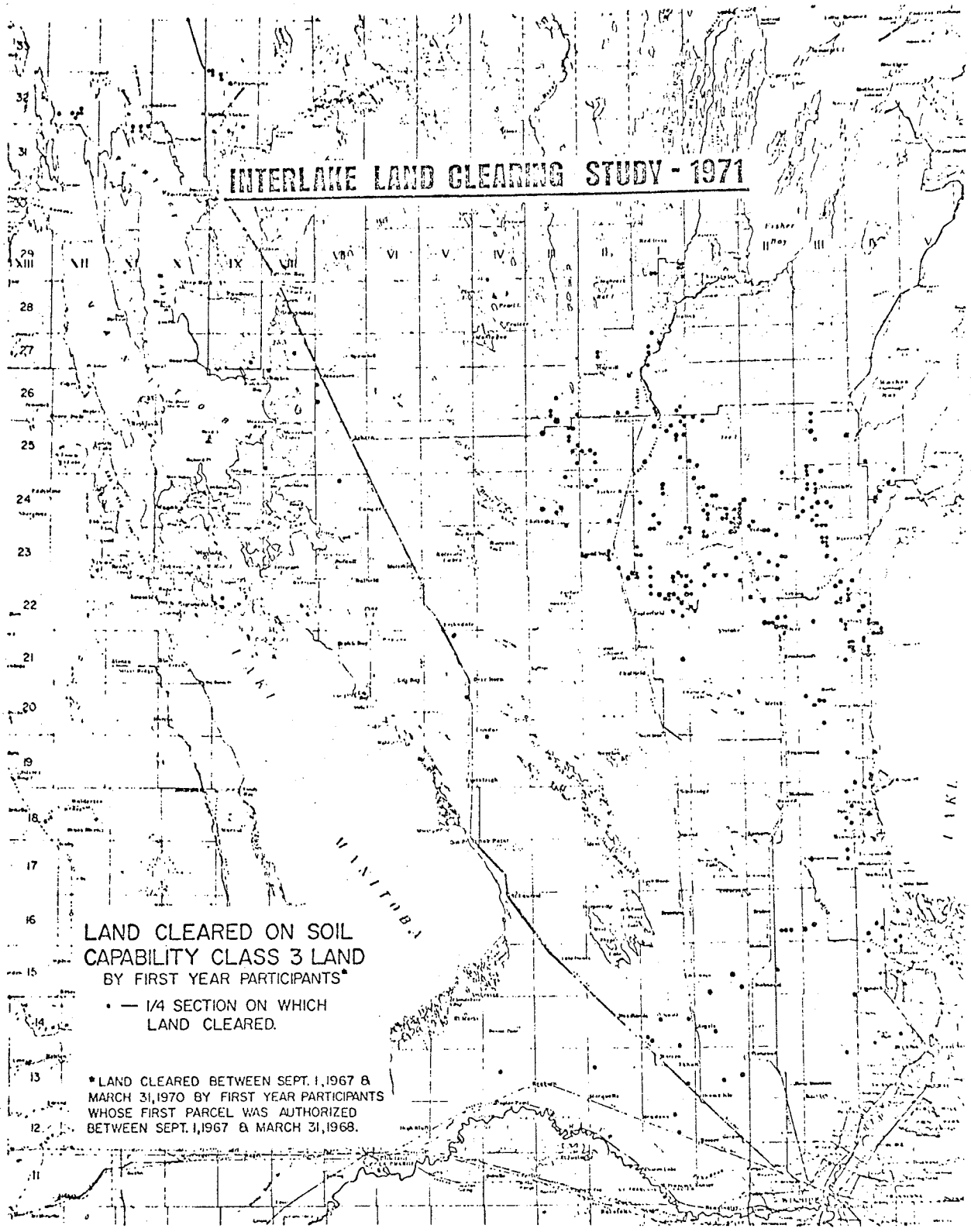
Soils in Class 5 have such serious soil, climatic or other limitations that they are not capable of use for sustained production of annual field crops. However, they may be improved by the use of farm machinery for the production of native or tame species of perennial forage plants. Feasible improvement practices include clearing of bush, cultivation, seeding, fertilizing and water control.

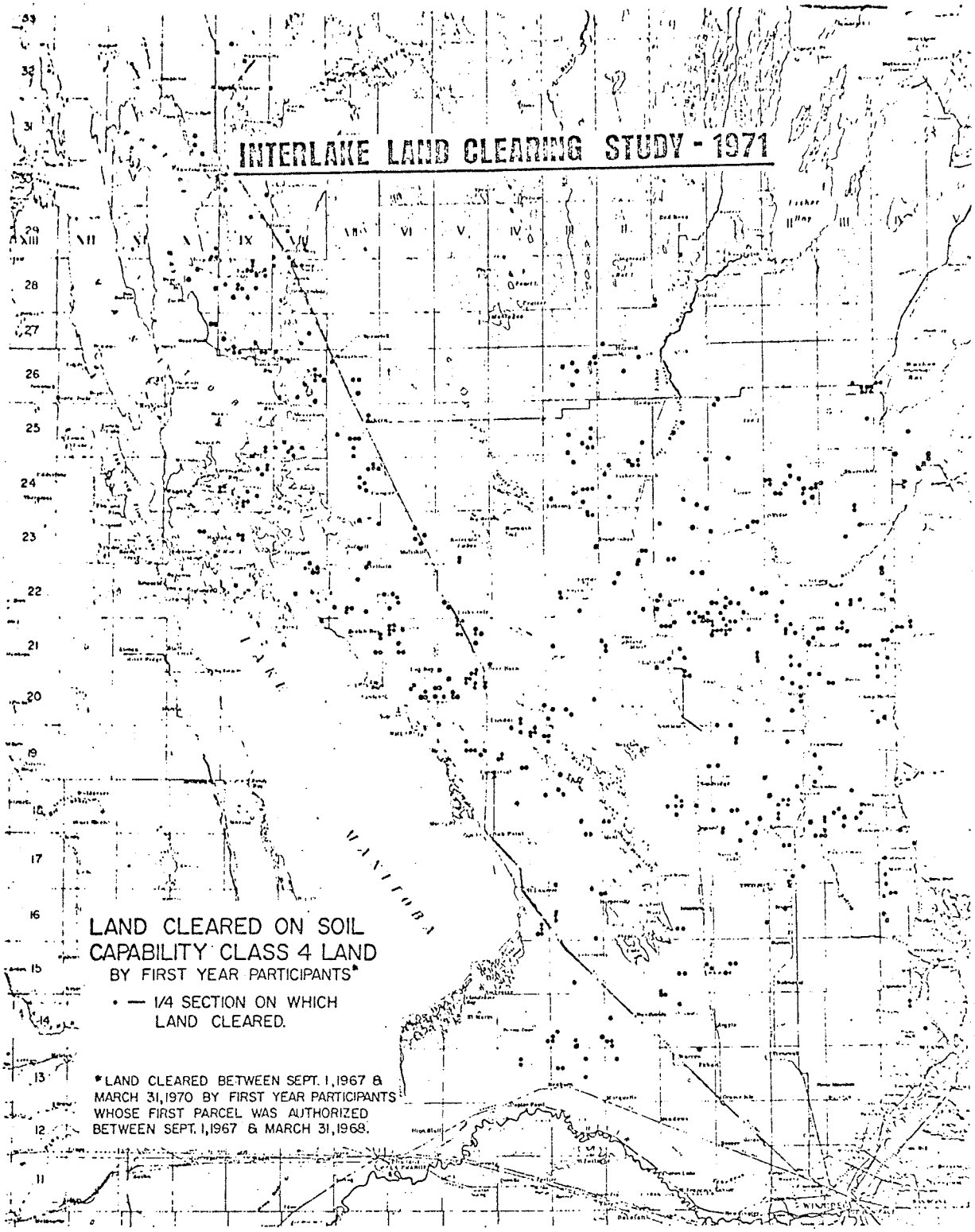
The limitations in Class 5 include the adverse effects of one or more of the following: severe climate; low water-holding capacity; severe past erosion; steep slopes; very poor drainage; very frequent overflow; severe salinity permitting only salt tolerant forage crops to grow; stoniness or shallowness to bedrock that make annual cultivation impractical.

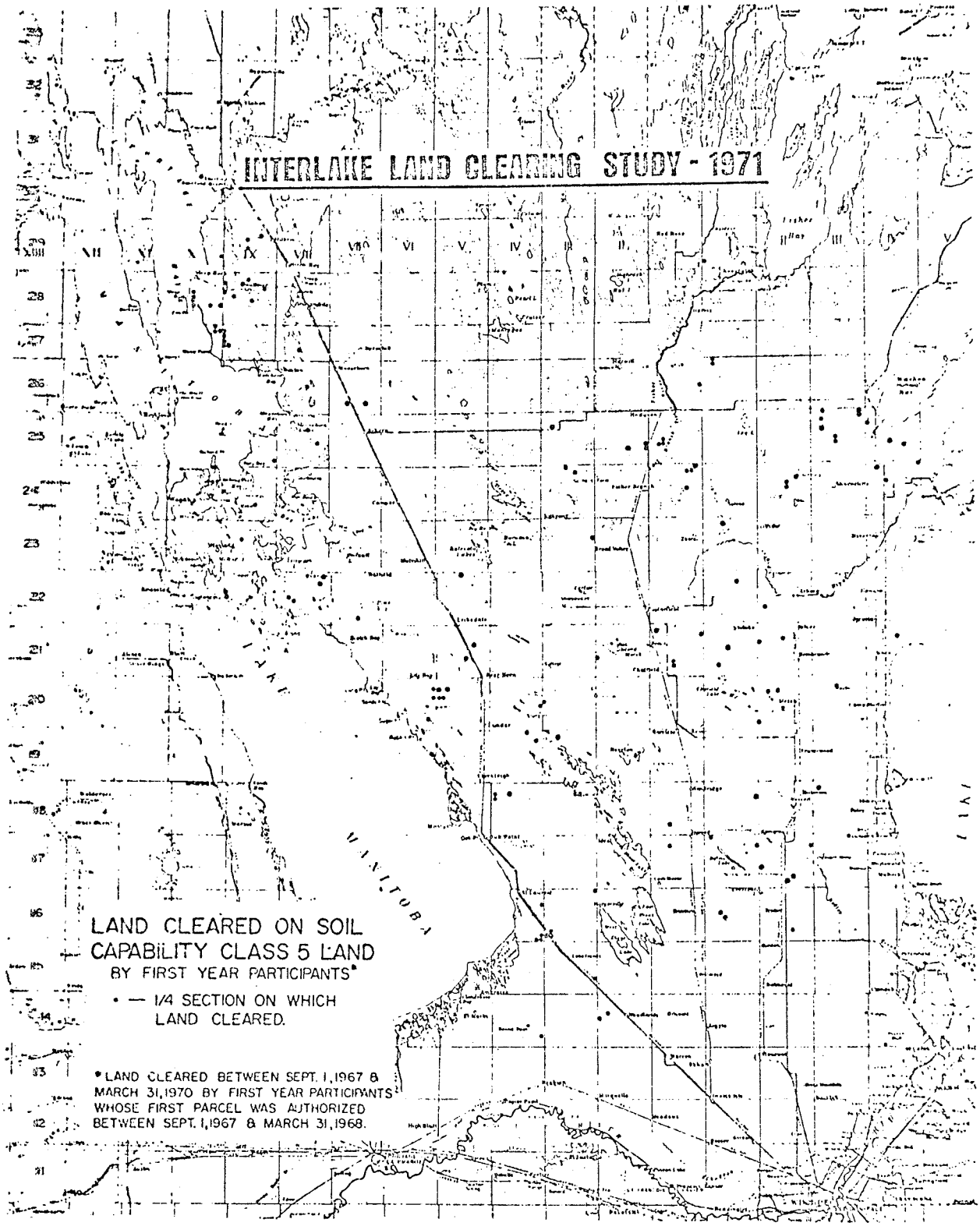
Some soils in Class 5 can be used for cultivated field crops provided unusually intensive management is used. Some of the soils in this class are also adapted to special crops such as blueberries, orchard

crops, or the like, requiring soil conditions unlike those needed by the common crops. Cultivated field crops may be grown in Class 5 areas where adverse climate is the main limitation but crop failure occur under average conditions.

Source: Extracts from Canada Department of Forestry 1965. The Canada Land Inventory: Soil Capability Classification for Agriculture. Report No. 2, Ottawa.


INTERLAKE LAND CLEARING STUDY - 1971
LAND CLEARED ON SOIL CAPABILITY CLASS 3 LAND
BY FIRST YEAR PARTICIPANTS*
• — 1/4 SECTION ON WHICH LAND CLEARED.
*LAND CLEARED BETWEEN SEPT. 1, 1967 & MARCH 31, 1970 BY FIRST YEAR PARTICIPANTS WHOSE FIRST PARCEL WAS AUTHORIZED BETWEEN SEPT. 1, 1967 & MARCH 31, 1968.
MANITOBA


INTERLAKE LAND CLEARING STUDY - 1971
LAND CLEARED ON SOIL CAPABILITY CLASS 4 LAND BY FIRST YEAR PARTICIPANTS*
• — 1/4 SECTION ON WHICH LAND CLEARED.
*LAND CLEARED BETWEEN SEPT. 1, 1967 & MARCH 31, 1970 BY FIRST YEAR PARTICIPANTS WHOSE FIRST PARCEL WAS AUTHORIZED BETWEEN SEPT. 1, 1967 & MARCH 31, 1968.
MANITOBA


INTERLAKE LAND CLEARING STUDY - 1971
LAND CLEARED ON SOIL CAPABILITY CLASS 5 LAND
BY FIRST YEAR PARTICIPANTS*
• — 1/4 SECTION ON WHICH LAND CLEARED.
* LAND CLEARED BETWEEN SEPT. 1, 1967 & MARCH 31, 1970 BY FIRST YEAR PARTICIPANTS WHOSE FIRST PARCEL WAS AUTHORIZED BETWEEN SEPT. 1, 1967 & MARCH 31, 1968.
MANITOBA

APPENDIX B

Sample No._____

Client's Name_____

Enumerator_____

Date_____

Soil Capability Class 1____, 2____, 3____,
4____, 5____.

Department of Agricultural Economics
University of Manitoba

INTERLAKE LAND
CLEARING EVALUATION 1971

Checked by_____

Date_____

Farmer's Evaluation of Land Clearing Incentive Program

From whom did you first hear about the government's $4 per acre land clearing incentive program (neighbour, contractor, agricultural representative, news media, etc.)?_____

_____

_____

_____ 9 [ ][ ]

Why did you clear parcels of land on your farm?
Check appropriate space.

Authorization

	1	2	3	4	5	
1. Incentive						10
2. Increase Cereal Grains						11
3. Increase Cash Crops						12
4. Increase Hay and Forage						13
5. Others (specify)						14
6.						15

How did you finance your clearing?
Check the appropriate space.

Authorization

	1	2	3	4	5	
1. Savings (cash)						160
2. Bank & Credit Union						161
3. M.A.C.C.						162
4. F.C.C.						163
5. Other (specify)						164

What changes would you suggest to improve the usefulness of the present land clearing program?

_____

_____

_____

_____

_____

_____ 58 [ ]

What would the program have to be like for you to clear all of your potentially productive agricultural land? 59 [ ]

_____

_____

_____

_____

✓

FACTORS AFFECTING CLEARING COSTS

		Authorization 1	Authorization 2	Authorization 3	Authorization 4	Authorization 5
Number of Acres	1010		2010	3010	4010	5010
Knockdown Method Used	1011		2011	3011	4011	5011
Horse Power	1012		2012	3012	4012	5012
1 2 Frost, Non Frost	1013	1 2	2013 1 2	3013 1 2	4013 1 2	5013 1 2
Piling						
Horse Power	1014		2014	3014	4014	5014
1 2 Frost, Non Frost	1015	1 2	2015 1 2	3015 1 2	4015 1 2	5015 1 2

COMMENTS:

Sample No. _____

CLEARING COSTS

Authorization No. 1000 [ ] Acres, 1001 [ ]

	1967-68		1968-69		1969-70	
Knockdown (Farmer)	1110		1210		1310	
(Contractor)	1111		1211		1311	
Method Used	1112		1212		1312	
Piling (Farmer)	1113		1213		1313	
(Contractor)	1114		1214		1314	
Breaking & Root Removal	1115		1215		1315	
Burning & Stumping	1116		1216		1316	
Re-Piling (Farmer)	1117		1217		1317	
(Contractor)	1118		1218		1318	
Drainage	1119		1219		1319	
Other (access, fencing, etc.)	1120		1220		1320	
Other (Specify)_____	1121		1221		1321	
Total Costs for Clearing	1122		1222		1322	
Total Clearing Costs Per Acre	1123		1223		1323	

Comments: _____

CLEARING COSTS

Authorization No. 2000 [ ] Acres, 2001 [ ]

	1967-68	1968-69	1969-70
Knockdown (Farmer)	2110	2210	2310
(Contractor)	2111	2211	2311
Method Used	2112	2212	2312
Piling (Farmer)	2113	2213	2313
(Contractor)	2114	2214	2314
Breaking & Root Removal	2115	2215	2315
Burning & Stumping	2116	2216	2316
Re-Piling (Farmer)	2117	2217	2317
(Contractor)	2118	2218	2318
Drainage	2119	2219	2319
Other (access, fencing, etc.)	2120	2220	2320
Other (Specify)_____	2121	2221	2321
Total Costs for Clearing	2122	2222	2322
Total Clearing Costs Per Acre	2123	2223	2323

Comments: _____

Sample No. 137

CLEARING COSTS

Authorization No. 3000 [ ] Acres, 3001 [ ]

	1967-68	1968-69	1969-70
Knockdown (Farmer)	3110	3210	3310
(Contractor)	3111	3211	3311
Method Used	3112	3212	3312
Piling (Farmer)	3113	3213	3313
(Contractor)	3114	3214	3314
Breaking & Root Removal	3115	3215	3315
Burning & Stumping	3116	3216	3316
Re-Piling (Farmer)	3117	3217	3317
(Contractor)	3118	3218	3318
Drainage	3119	3219	3319
Other (access, fencing, etc.)	3120	3220	3320
Other (Specify)_____	3121	3221	3321
Total Costs for Clearing	3122	3222	3322
Total Clearing Costs Per Acre	3123	3223	3323

Comments: _____

Sample No.

CLEARING COSTS

Authorization No. 4000: [ ] Acres, 4001 [ ]

	1967-68	1968-69	1969-70
Knockdown (Farmer)	4110	4210	4310
(Contractor)	4111	4211	4311
Method Used	4112	4212	4312
Piling (Farmer)	4113	4213	4313
(Contractor)	4114	4214	4314
Breaking & Root Removal	4115	4215	4315
Burning & Stumping	4116	4216	4316
Re-Piling (Farmer)	4117	4217	4317
(Contractor)	4118	4218	4318
Drainage	4119	4219	4319
Other (access, fencing, etc.)	4120	4220	4320
Other (Specify)_____	4121	4221	4321
Total Costs for Clearing	4122	4222	4322
Total Clearing Costs Per Acre	4123	4223	4323

Comments: _____

Sample No. 139

CLEARING COSTS

Authorization No. 5000 [ ] Acres, 5001 [ ]

		1967-68		1968-69		1969-70
Knockdown (Farmer)	5110		5210		5310	
(Contractor)	5111		5211		5311	
Method Used	5112		5212		5312	
Piling (Farmer)	5113		5213		5313	
(Contractor)	5114		5214		5314	
Breaking & Root Removal	5115		5215		5315	
Burning & Stumping	5116		5216		5316	
Re-Piling (Farmer)	5117		5217		5317	
(Contractor)	5118		5218		5318	
Drainage	5119		5219		5319	
Other (access, fencing, etc.)	5120		5220		5320	
Other (Specify)_____	5121		5221		5321	
Total Costs for Clearing	5122		5222		5322	
Total Clearing Costs Per Acre	5123		5223		5323	

Comments: _____

Sample No. _____

Authorization No. 1005 [ ] Acres 1006 [ ]

Production Costs		Before Clearing		1968		1969		1970	
Seedbed Preparation	1130		1230		1330		1430		
Seed & Seeding	1131		1231		1331		1431		
Fertilizer & Application	1132		1232		1332		1432		
Spray & Application	1133		1233		1333		1433		
Crop & Hail Insurance	1134		1234		1334		1434		
Summer Fallow	1135		1235		1335		1435		
Number of Trips (Times Over)	1136		1236		1336		1436		
Haying (Cut, Rake, Bale, Stack)	1137		1237		1337		1437		
Harvesting (Binder, Swath, Comb.)	1138		1238		1338		1438		
Fall Tillage	1139		1239		1339		1439		
Rent and or Taxes	1140		1240		1340		1440		
Other Costs (Specify) _____	1141		1241		1341		1441		
Total Production Costs	1142		1242		1342		1442		
Total Production Costs Per Acre	1143		1243		1343		1443		

Returns		Before Clearing		1968		1969		1970	
Yield Per Acre (Cash Crop)	1144		1244		1344		1444		
Grade or Type	1145		1245		1345		1445		
Total Production	1146		1246		1346		1446		
Farm Price Per Bushel	1147		1247		1347		1447		
Yield Per Acre (Forage)	1148		1248		1348		1448		
Type	1149		1249		1349		1449		
Total Production	1150		1250		1350		1450		
Farm Price per Ton	1151		1251		1351		1451		
Gross Returns (Authorization)	1152		1252		1352		1452		
Gross Returns per Acre	1153		1253		1353		1453		
Net Returns per Acre	1154		1254		1354		1454		

Comments: _____

Sample No. _____

Authorization No. 2005 ____ Acres 2006 ____

Production Costs	Before Clearing	1968	1969	1970
Seedbed Preparation	2130	2230	2330	2430
Seed & Seeding	2131	2231	2331	2431
Fertilizer & Application	2132	2232	2332	2432
Spray & Application	2133	2233	2333	2433
Crop & Hail Insurance	2134	2234	2334	2434
Summer Fallow	2135	2235	2335	2435
Number of Trips (Times Over)	2136	2236	2336	2436
Haying (Cut, Rake, Bale, Stack)	2137	2237	2337	2437
Harvesting (Binder, Swath, Comb.)	2138	2238	2338	2438
Fall Tillage	2139	2239	2339	2439
Rent and or Taxes	2140	2240	2340	2440
Other Costs (Specify) _____	2141	2241	2341	2441
Total Production Costs	2142	2242	2342	2442
Total Production Costs Per Acre	2143	2243	2343	2443

Returns	Before Clearing	1968	1969	1970
Yield Per Acre (Cash Crop)	2144	2244	2344	2444
Grade or Type	2145	2245	2345	2445
Total Production	2146	2246	2346	2446
Farm Price Per Bushel	2147	2247	2347	2447
Yield Per Acre (Forage)	2148	2248	2348	2448
Type	2149	2249	2349	2449
Total Production	2150	2250	2350	2450
Farm Price per Ton	2151	2251	2351	2451
Gross Returns (Authorization)	2152	2252	2352	2452
Gross Returns per Acre	2153	2253	2353	2453
Net Returns per Acre	2154	2254	2354	2454

Comments: _____

Sample No. _____

Authorization No. 3005 ____ Acres 3006 ____

Production Costs		Before Clearing	1968	1969	1970
Seedbed Preparation	3130		3230	3330	3430
Seed & Seeding	3131		3231	3331	3431
Fertilizer & Application	3132		3232	3332	3432
Spray & Application	3133		3233	3333	3433
Crop & Hail Insurance	3134		3234	3334	3434
Summer Fallow	3135		3235	3335	3435
Number of Trips (Times Over)	3136		3236	3336	3436
Haying (Cut, Rake, Bale, Stack)	3137		3237	3337	3437
Harvesting (Binder, Swath, Comb.)	3138		3238	3338	3438
Fall Tillage	3139		3239	3339	3439
Rent and or Taxes	3140		3240	3340	3430
Other Costs (Specify) _____	3141		3241	3341	3441
Total Production Costs	3142		3242	3342	3442
Total Production Costs Per Acre	3143		3243	3343	3443

Returns		Before Clearing	1968	1969	1970
Yield Per Acre (Cash Crop)	3144		3244	3344	3444
Grade or Type	3145		3245	3345	3445
Total Production	3146		3246	3346	3446
Farm Price Per Bushel	3147		3247	3347	3447
Yield Per Acre (Forage)	3148		3248	3348	3448
Type	3149		3249	3349	3449
Total Production	3150		3250	3350	3450
Farm Price per Ton	3151		3251	3351	3451
Gross Returns (Authorization)	3152		3252	3352	3452
Gross Returns per Acre	3153		3253	3353	3453
Net Returns per Acre	3154		3254	3354	3454

Comments: _____

Sample No. _____

Authorization No. 4005 ____ Acres 4006 ____

Production Costs		Before Clearing		1968		1969		1970	
Seedbed Preparation	4130		4230		4330		4430		
Seed & Seeding	4131		4231		4331		4431		
Fertilizer & Application	4132		4232		4332		4432		
Spray & Application	4133		4233		4333		4433		
Crop & Hail Insurance	4134		4234		4334		4434		
Summer Fallow	4135		4235		4335		4435		
Number of Trips (Times Over)	4136		4236		4336		4436		
Haying (Cut, Rake, Bale, Stack)	4137		4237		4337		4437		
Harvesting (Binder, Swath, Comb.)	4138		4238		4338		4438		
Fall Tillage	4139		4239		4339		4439		
Rent and or Taxes	4140		4240		4340		4430		
Other Costs (Specify) _____	4141		4241		4341		4441		
Total Production Costs	4142		4242		4342		4442		
Total Production Costs Per Acre	4143		4243		4343		4443		

Returns		Before Clearing		1968		1969		1970	
Yield Per Acre (Cash Crop)	4144		4244		4344		4444		
Grade or Type	4145		4245		4345		4445		
Total Production	4146		4246		4346		4446		
Farm Price Per Bushel	4147		4247		4347		4447		
Yield Per Acre (Forage)	4148		4248		4348		4448		
Type	4149		4249		4349		4449		
Total Production	4150		4250		4350		4450		
Farm Price per Ton	4151		4251		4351		4451		
Gross Returns (Authorization)	4152		4252		4352		4452		
Gross Returns per Acre	4153		4253		4353		4453		
Net Returns per Acre	4154		4254		4354		4454		

Comments: _____

Sample No. _____

Authorization No. 5005 [ ] Acres 5006 [ ]

Production Costs		Before Clearing	1968	1969	1970
Seedbed Preparation	5130		5230	5330	5430
Seed & Seeding	5131		5231	5331	5431
Fertilizer & Application	5132		5232	5332	5432
Spray & Application	5133		5233	5333	5433
Crop & Hail Insurance	5134		5234	5334	5434
Summer Fallow	5135		5235	5335	5435
Number of Trips (Times Over)	5136		5236	5336	5436
Haying (Cut, Rake, Bale, Stack)	5137		5237	5337	5437
Harvesting (Binder, Swath, Comb.)	5138		5238	5338	5438
Fall Tillage	5139		5239	5339	5439
Rent and or Taxes	5140		5240	5340	5440
Other Costs (Specify) _____	5141		5241	5341	5441
Total Production Costs	5142		5242	5342	5442
Total Production Costs Per Acre	5143		5243	5343	5443

Returns		Before Clearing	1968	1969	1970
Yield Per Acre (Cash Crop)	5144		5244	5344	5444
Grade or Type	5145		5245	5345	5445
Total Production	5146		5246	5346	5446
Farm Price Per Bushel	5147		5247	5347	5447
Yield Per Acre (Forage)	5148		5248	5348	5448
Type	5149		5249	5349	5449
Total Production	5150		5250	5350	5450
Farm Price per Ton	5151		5251	5351	5451
Gross Returns (Authorization)	5152		5252	5352	5452
Gross Returns per Acre	5153		5253	5353	5453
Net Returns per Acre	5154		5254	5354	5454

Comments: _____

Sample No. _____

Authorization No. 1003 [ ] Acres 1004 [ ]

Production Costs		Ave. Yearly		Ave. Yearly		Ave. Yearly		Ave. Yearly		Ave. Yearly
Seedbed Preparation	1160		2160		3160		4160		5160	
Seed & Seeding	1161		2161		3161		4161		5161	
Fert. & Application	1162		2162		3162		4162		5162	
Spray & Application	1163		2163		3163		4163		5163	
Crop & Hail Ins.	1164		2164		3164		4164		5164	
Summer Fallow	1165		2165		3165		4165		5165	
No. of Trips (Times Over)	1166		2166		3166		4166		5166	
Haying	1167		2167		3167		4167		5167	
Harvesting	1168		2168		3168		4168		5168	
Fall Tillage	1169		2169		3169		4169		5169	
Rent And Or Taxes	1170		2170		3170		4170		5170	
Other Costs(specify) _____	1171		2171		3171		4171		5171	
Total Product. Costs	1172		2172		3172		4172		5172	
Total Product. Costs Per Acres	1173		2173		3173		4173		5173	

Returns		Ave. Yearly		Ave. Yearly		Ave. Yearly		Ave. Yearly		Ave. Yearly
Yield Per Acre(cash)	1174		2174		3174		4174		5174	
Grade or Type	1175		2175		3175		4175		5175	
Total Production	1176		2176		3176		4176		5176	
Farm Price per Bus.	1177		2177		3177		4177		5177	
Yield/Acre (Forage)	1178		2178		3178		4178		5178	
Type	1179		2179		3179		4179		5179	
Total Production	1180		2180		3180		4180		5180	
Farm Price per Ton	1181		2181		3181		4181		5181	
Gross Returns (Auth)	1182		2182		3182		4182		5182	
Gross Returns/Acre	1183		2183		3183		4183		5183	
Net Returns per Acre	1184		2184		3184		4184		5184	

From your farm operations what were your receipts for the sale of the following products in 1969 and 1970.

		1969		1970	
Sale of Livestock	210		310		
Major Types_____	211		311		
Sale of Livestock Products (Milk, Cream, Eggs & Subsidies)	212		312		
Sale of Crops (include Wheat Board Payments	213		313		
Do you have a Permit Book? Yes 1 ☐ No 2 ☐	214		314		
Income from Custom Work	215		315		

In 1969 & 1970 what was the amount paid out for the following farm expenses?

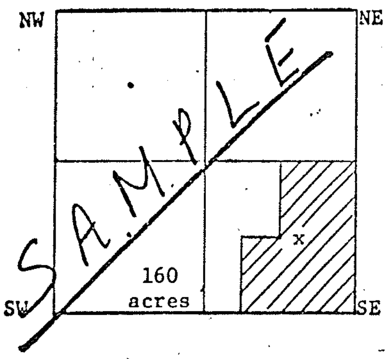
		1969		1970	
Fuel, Oil, and Grease	220		320		
Livestock Purchased	221		321		
Major Types_____	222		322		
Feed Purchased (Forages, Grains, Premixed Feed, Minerals and Vitamins, etc.)	223		323		
Fertilizer Purchased	224		324		
Crop Chemicals	225		325		
Cash Rent for Land and Equipment (include Community Pasture Payments)	226		326		
Interest Payment	227		327		
Custom Work	228		328		

What was the estimated market value of the following as of December 31, 1969 and December 31, 1970.

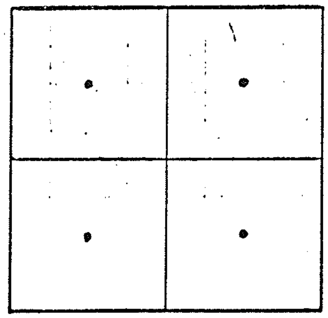
		Dec. 31/69		Dec. 31/70	
Farm Machinery & Equipment	230		330		
Buildings Owned (include house)	231		331		
Land (owned)	232		332		
Livestock	233		333		
Major Types_____	234		334		
Grain on Hand	235		335		
Total Liabilities	236		336		

Acres Owned	238			338	
Acres Rented and Leased	239			339	
Total Acres	240			340	
Allocate Total Operated Acres According To:					
Improved Land					
Crops& Forage	241			341	
Summer Fallow	242			342	
Pasture	243			343	
Other	244			344	
Total	245			345	
Unimproved Land					
Brushland, Pasture & Native Hayland	246			346	
Marsh	247			347	
or Other	248			348	
Total	249			349	

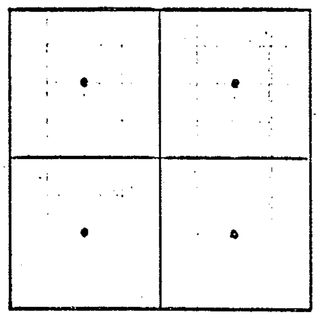
Parcel __x__ Acres __100__
SESec.2 Tp.24 Rge 6W



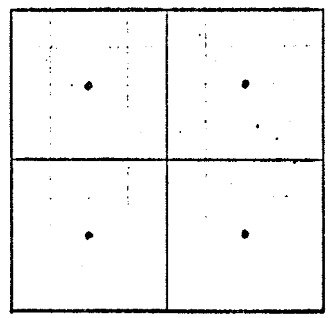
Parcel_____ Acres_____
___Sec.___Tp.____Rge_____



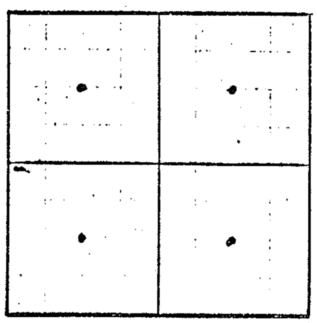
Parcel_____ Acres_____
___Sec.___Tp.____Rge_____



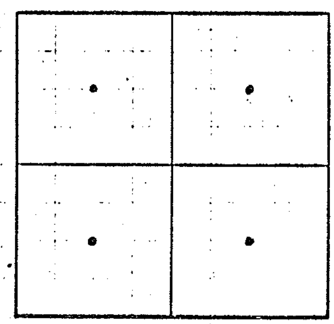
Parcel_____ Acres_____
___Sec.___Tp.____Rge_____



Parcel_____ Acres_____
___Sec.___Tp.____Rge_____



Parcel_____ Acres_____
___Sec.___Tp.____Rge_____



APPENDIX C

INTERLAKE LAND

CLEARING EVALUATION 1971

TABLE 4

SUMMARY OF RESPONDENTS' COMMENTS ON THE LAND CLEARING PROGRAM

Type of Comment	No. of Times Comment Was Made		
	Soil Class 3	Soil Class 4	Soil Class 5
1. Program is adequate; generally satisfied	14	13	17
2. Suggested an increase in incentive payment. (specifically for breaking or discing)	10 (7)	9 (2)	13 (4)
3. Voiced some disagreement or dissatisfaction with the program	15	3	3
4. Miscellaneous (difficult to categorize and lengthy) comments.	5	8	0
5. No comment or indifference conveyed	1	3	1
Total number of comments from each sample group interviewed.	45	36	34

TABLE 5

SOME FACTORS AFFECTING KNOCKDOWN AND PILING[1/] COSTS

(First Authorization Only)

Some Factors Affecting Knockdown and Piling Costs	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
	#	#	#
1. Method of Knockdown			
Number using Dozer	17	15	18
Number using Brushcutter	16	12	8
Number using other methods	0	0	4
2. Horsepower of Contractors' Equipment[2/]	h.p.	h.p.	h.p.
Ave. horsepower reported for knockdown	156	140	148
Ave. horsepower reported for piling	144	136	134
3. Frost or Non-Frost Conditions	#	#	#
No. reporting frost conditions for knockdown	31	24	29
No. reporting non-frost conditions for knockdown	2	3	1
Total reporting	33	27	30
No. reporting frost conditions for piling	14	12	18
No. reporting non-frost conditions for piling	19	15	12
Total reporting	33	27	30

1/ Knockdown may have been followed immediately by piling or after a considerable lapse of time.

2/ Source: Land Clearing Authorization Forms, Manitoba Department of Agriculture.

TABLE 6

LAND CLEARING COSTS[1] (FIRST AUTHORIZATION ONLY)

Acreages and Costs	Soil Class 3 (Sample Size 33)		Soil Class 4 (Sample Size 27)		Soil Class 5 (Sample Size 30)	
	acres		acres		acres	
Total no. of acres cleared in first authorization[2]	1,346		1,247		1,851	
Ave. Size of 1st Authorization	40.8		46.2		61.9	
SUMMARY OF CLEARING COSTS	$		$		$	
Total cost of clearing 1st authorization 1967-68	51,585		41,367		41,800	
Total cost of clearing 1st authorization 1968-69	2,989		9,504		7,144	
Total cost of clearing 1st authorization 1969-70	3,064		2,980		4,976	
Total cost of clearing 1st authorization	57,638		54,751		53,920	
Ave. cost per acre[3] of clearing 1st authorization	42.82		43.91		29.13	
Revised[4] total cost of clearing 1st authorization	45,916		50,382		34,721	
Revised[4] ave. cost/acre[3] of clearing 1st authorization	34.11		40.40		18.76	
Ave. no. of years clearing required	2.0 yrs.		1.8 yrs.		1.7 yr	
COSTS OF KNOCKDOWN	$		$		$	
Total cost of work done by farmers themselves	590		480		4,561	
Ave. cost/acre of farmers' work	(75)[5]	7.87	(24)	20.00	(776)	5.88
Total cost of work done by contractors	11,853		12,147		11,464	
Ave. cost/acre of contract work	(1271)	9.33	(1223)	9.93	(1075)	10.66
Total cost of all knockdown	12,443		12,627		16,025	
Ave. cost/acre of all knockdown	9.24		10.12		8.66	
	#		#		#	
Method used: brushcutter	16		12		8	
dozer	17		15		18	
other	0		0		4	
Total reporting	33		27		30	
COSTS OF PILING	$		$		$	
Total cost of work done by farmers themselves	2,000[6]		540		5,895	
Ave. cost/acre of farmers' work	(155)	12.90[6]	(58)	9.31	(862)	6.84
Total cost of work done by contractors						
Total cost of work done by contractors	13,495[6]		13,245		10,167	
Ave. cost/acre of contract work	(1191)	11.33	(1189)	11.14	(989)	10.28
Total cost of all piling	15,495		13,785		16,062	
Ave. cost/acre of all piling	11.51		11.05		8.68	

TABLE 6 (Cont'd)

LAND CLEARING COSTS[1] (FIRST AUTHORIZATION ONLY)

Acreages and Costs	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
COST OF KNOCKDOWN & PILING	$	$	$
Total cost of knockdown & piling	27,938	26,412	32,087
Ave. cost/acre of knockdown and piling	20.76	21.18	17.33
Total revised[4] cost of knockdown and piling	21,324	22,991	16,840
Ave. revised[4] cost/acre for knockdown & piling	(1111) 19.19	(1174) 19.58	(959) 17.56
Acres cleared exclusively by contractors	1,111	1,174	959
Cleared Acres on 1st authorization	1,346	1,247	1,856
COST OF LAND DEVELOPMENT EXCLUSIVE OF KNOCKDOWN AND PILING (on 1st authorization for 1967-68, 68-69, 69-70)	$	$	$
Total cost of breaking and root removal	21,842	17,110	15,151
Total cost of burning & stumping	1,683	676	908
Total cost of repling -			
-by farmers themselves	993	1,315	1,074
-by contractors	1,876	938	1,663
Total cost of drainage	338	130	490
Total cost of access, fencing, etc.	132	1,039	611
Total cost of stone picking	2,198	6,339	1,549
Total other costs	638	792	298
TOTAL COST OF LAND DEVELOPMENT EXCLUSIVE OF KNOCKDOWN & PILING	29,700	28,339	21,744
Ave. cost/acre of LAND DEVELOPMENT OTHER THAN KNOCKDOWN AND PILING	22.07	22.73	11.72

1/ Land clearing costs refer to total land development before seed-bed preparation where applicable. They also include any breaking, root removal, burning, stumping, repiling; stone-picking and drainage costs after production began but prior to March 31, 1970.

2/ The sample was taken from Interlake farmers who were authorized between September 1, 1967 and March 31, 1968 to clear land under the Interlake Land Clearing Program.

3/ Total cost and revised total cost, respectively, of clearing first authorizations divided by the total number of acres cleared (total acres in first authorization of each sample).

4/ Where "revised" appears the invoice figures, rather than the respondent's estimates for knockdown and piling costs were used. Invoice figures apply only to authorized acres which were knocked-down and piled exclusively by a contractor(s).

5/ (75) refers to the number of acres knocked down by the farmers themselves.

6/ Where the piling acreage was not separated into piling done by farmers and piling done by contractors the total acreage and cost was assigned to contractors.

TABLE 7

PRODUCTION COSTS ON FIRST AUTHORIZATION

	Soil Class 3	Soil Class 4	Soil Class 5
ACREAGE CATEGORY	Acres	Acres	Acres
Total no. of acres cleared (1st authorization)	1,346	1,247	1,851
Total no. acres in production[1] before clearing (1st authorization)	60	134	364
Total no. acres in production in 1968 (1st authorization)	115	97	253
Total no. of acres in production in 1969 (1st authorization)	640	773	668
Total no. of acres in production in 1970 (1st authorization)	805	763	1,170
SUMMARY OF PRODUCTION COSTS:			
TOTAL PRODUCTION COSTS	$	$	$
Before Clearing	941	535	1,308
In 1968	3,901	566	1,070
In 1969	13,600	13,732	6,347
In 1970	14,340	13,883	8,958
AVE. TOTAL PRODUCTION COSTS PER ACRE[2]			
	$/acre	$/acre	$/acre
Before clearing	.70	.43	.71
In 1968	2.90	.45	.58
In 1969	10.10	11.01	3.43
In 1970	10.65	11.13	4.84
PRODUCTION COSTS OF:			
1. SEED BED PREPARATION[3]	$	$	$
Total cost before clearing	0	0	0
Total cost in 1968	390	0	40
Total cost in 1969	2,214	1,743	1,077
Total cost in 1970	2,623	1,721	1,253
	$/acre	$/acre	$/acre
Per acre[4] cost before clearing	-	-	-
Per acre cost in 1968	3.39	-	.16
Per acre cost in 1969	3.46	2.25	1.61
Per acre cost in 1970	3.26	2.25	1.07
2. SEED AND SEEDING	$	$	$
Total cost before clearing	0	0	0
Total cost 1968	637	33	40
Total cost 1969	2,932	3,035	1,135
Total cost 1970	2,630	2,806	1,758
	$/acre	$/acre	$/acre
Per acre cost[4] before clearing	-	-	0
Per acre cost in 1968	5.54	.34	.16
Per acre cost in 1969	4.58	3.93	1.70
Per acre cost in 1970	3.27	3.68	1.50
3. FERTILIZER & APPLICATION	$	$	$
Total cost before clearing		0	0
Total cost in 1968	105	0	25
Total cost in 1969	577	2,169	631
Total cost in 1970	611	2,211	841
	$/acre	$/acre	$/acre
Per acre cost[4] before clearing	-	-	-
Per acre cost in 1968	.91	-	.10
Per acre cost in 1969	.90	2.81	.94
Per acre cost in 1970	.76	2.90	.72

TABLE 7 - Cont'd

	Soil Class 3	Soil Class 4	Soil Class 5
4. SPRAY AND APPLICATION	$	$	$
Total cost before clearing	0	0	0
Total cost in 1968	316	0	0
Total cost in 1969	739	323	123
Total cost in 1970	734	370	224
	$/acre	$/acre	$/acre
Per acre cost[4/] before clearing	-	-	-
Per acre cost in 1968	2.75	-	-
Per acre cost in 1969	1.15	.42	.18
Per acre cost in 1970	.91	.48	.19
5. CROP AND HAIL INSURANCE	$	$	$
Total cost before clearing	0	0	0
Total cost in 1968	0	0	0
Total cost in 1969	55	119	0
Total cost in 1970	42	114	0
	$/acre	$/acre	$/acre
Per acre cost[4/] before clearing	-	-	-
Per acre cost in 1968	-	-	-
Per acre cost in 1969	.09	.15	-
Per acre cost in 1970	.05	.15	-
6. SUMMER FALLOW	$	$	$
Total cost before clearing	0	0	0
Total cost in 1968	336	0	341
Total cost in 1969	1,614	608	726
Total cost in 1970	1,628	1,046	320
	$/acre	$/acre	$/acre
Per acre cost[5/] before clearing	-	-	-
Per acre cost in 1968	(123)* 2.73	-	(62) 5.50
Per acre cost in 1969	(177) 9.12	(104) 5.85	(109) 9.19
Per acre cost in 1970	(196) 9.15	(131) 7.98	(102) 3.20

* No. of acres in summer fallow.

Ave. no. of trips (times over) reported on summer fallow parcel in 1968	No. times 4.5	No. times 0	No. times 2.5
on summer fallow parcel in 1969	3.7	4.0	4.7
on summer fallow parcel in 1970	5.0	5.0	2.5
7. HAYING	$	$	$
Total cost before clearing	0	0	0
Total cost in 1968	0	0	0
Total cost in 1969	152	125	92
Total cost in 1970	157	328	703
	$/acre	$/acre	$/acre
Per acre cost [6/] before clearing	-	-	-
Per acre cost in 1968	-	-	-
Per acre cost in 1969	(25)* 6.08	(34) 3.68	(31) 2.97
Per acre cost in 1970	(50) 3.14	(91) 3.60	(89) 7.90

* No. of acres on which there were haying costs. There was additional acreage in forage which reported harvesting rather than haying costs.

TABLE 7 - Cont'd

	Soil Class 3	Soil Class 4	Soil Class 5
8. HARVESTING	$	$	$
Total cost before clearing	0	0	0
Total cost in 1968	800	0	45
Total cost in 1969	2,466	3,175	1,154
Total cost in 1970	3,236	2,896	1,563
	$/acre	$/acre	$/acre
Per acre cost[7] before clearing	-	-	-
Per acre cost in 1968	(115)* 6.96	-	(10) 4.50
Per acre cost in 1969	(640) 3.85	(629) 5.05	(323) 3.57
Per acre cost in 1970	(727) 4.45	(607) 4.77	(445) 3.51
9. FALL TILLAGE	$	$	$
Total cost before clearing	0	0	0
Total cost in 1968	375	0	50
Total cost in 1969	1,466	1,373	822
Total cost in 1970	1,646	1,608	905
	$/acre	$/acre	$/acre
Per acre cost[7] before clearing	-	-	-
Per acre cost in 1968	(115)* 3.26	-	(10) 5.00
Per acre cost in 1969	(640) 2.26	(629) 2.18	(323) 2.54
Per acre cost in 1970	(727) 2.26	(607) 2.65	(445) 2.03
10 LEASE FEES AND TAXES	$	$	$
Total costs before clearing	941	516	558
Total cost in 1968	942	514	529
Total cost in 1969	945	645	556
Total cost in 1970	963	732	582
	$/acre	$/acre	$/acre
Per acre costs[8] before clearing	.70	.41	.30
Per acre costs in 1968	.70	.41	.29
Per acre costs in 1969	.70	.52	.30
Per acre costs in 1970	.72	.59	.31
11. OTHER PRODUCTION COSTS[9]	$	$	$
Total other production costs before clearing	0	19	750
Total other production costs in 1968	0	19	0
Total other production costs in 1969	460	449	24
Total other production costs in 1970	65	189	809
	$/acre	$/acre	$/acre
Per acre other production costs[8] before clearing	-	.02	.41
Per acre other production costs in 1968	-	.02	-
Per acre other production costs in 1969	.34	.36	.01
Per acre other production costs in 1970	.05	.15	.44

* Acres on which a cereal or cash crop was produced.

* Acreage on which a cereal or cash crop was produced.

TABLE 7 (Cont'd)

FOOTNOTES:

1/ Total acres in production is the acreage reporting returns from crop and hay production, and grazing.

2/ The total production costs per acre were derived by dividing the total production costs by the total number of acres cleared in the first authorization sample.

3/ Where a farmer's seed-bed preparation costs were excessively high and it was obvious that he was still trying to break virgin ground, such costs were transferred back to breaking. The maximum cost allowed for seed-bed preparation was $4/acre. The remainder became part of the breaking cost.

4/ The per acre cost is derived by dividing total cost by total acres in production.

5/ Per acre cost of summer fallow is derived by dividing total summer fallow costs by the acres in summer fallow.

6/ Per acre cost of haying is derived by dividing the total haying costs by the number of acres on the authorizations where hay crops were produced.

7/ Per acre costs of harvesting and fall tillage were derived by dividing the total resprective costs by the number of acres in cereal and cash crop production for each of the years.

8/ Per acre lease fees, taxes and other production costs were derived by dividing the total costs by the number of cleared acres in the first authorization sample for each of the years.

9/ Examples of other production costs are major repairs and grain drying.

TABLE 8

RETURNS ON FIRST AUTHORIZATION

Acreages and Returns	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
ACRES CLEARED AND IN PRODUCTION[1]	acres	acres	acres
Total no. of acres cleared (1st authorization)	1,346	1,247	1,851
Total acres in production (1st authorization), before clearing	60	134	364
Total acres in production (1st authorization) in 1968	115	97	253
Total acres in production (1st authorization) in 1969	640	773	668
Total acres in production (1st authorization) in 1970	805	763	1,170
GROSS RETURNS[2] ON FIRST AUTHORIZATION	$	$	$
TOTAL GROSS RETURNS FOR ENTIRE SAMPLE:			
- before clearing	80	175	2,703
- in 1968	4,544	40	726
- in 1969	18,972	23,406	10,151
- in 1970	19,872	20,945	16,783
GROSS RETURNS PER AUTHORIZED ACRE	$	$	$
- before clearing	.06	.14	1.46
- in 1968	3.37	.03	.39
- in 1969	14.09	18.77	5.48
- in 1970	14.76	16.80	9.07
GROSS RETURNS PER AUTHORIZED ACRE IN PRODUCTION	$	$	$
- before clearing	1.33	1.31	7.43
- in 1968	39.51	.41	2.87
- in 1969	29.64	30.28	15.20
- in 1970	24.69	27.45	14.34
NET RETURNS ON FIRST AUTHORIZATION	$	$	$
TOTAL NET RETURNS* FOR ENTIRE SAMPLE (TOTAL[3] GROSS RETURNS - TOTAL PRODUCTION COSTS)			
- before clearing	-861	-360	1,395
- in 1968	643	-526	-344
- in 1969	5,372	9,674	3,804
- in 1970	5,532	7,062	7,825
NET RETURNS PER AUTHORIZED ACRE[4]	$/acre	$/acre	$/acre
- before clearing	-.64	-.29	.75
- in 1968	.48	-.42	-.15
- in 1969	3.99	7.76	2.01
- in 1970	4.11	5.66	4.21

TABLE 8 (Cont'd)

RETURNS ON FIRST AUTHORIZATION

Acreages and Returns	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
TOTAL NET RETURNS FOR AUTHORIZED ACRES IN PRODUCTION**	$	$	$
- before clearing (the product may have been sold, used on the farm or may still be in storage.	43	111	1,911
- in 1968	1,903	-41	479
- in 1969	7.250	9,944	5,037
- in 1970	6,332	7,662	15,971
NET RETURNS PER AUTHORIZED ACRE IN PRODUCTION	$/acre	$/acre	$/acre
- before clearing	.72	.83	5.25
- in 1968	16.55	-.42	1.89
- in 1969	11.33	12.86	7.54
- in 1970	7.87	10.04	13.65

1/ Authorized acres in production refers to the authorized acreage on which some gross returns were reported. This acreage is equivalent to the total authorized acreage less the idle and fallow land.

2/ Gross returns refers to the total value of production from the 1st authorization assuming the market value of the product at the time of production.

3/ Total gross returns and total production costs refers to all acreage (in production, fallow and idle) in the first authorizations.

4/ These returns include negative net returns on non-producing (idle or fallow) land.

TABLE 9

NUMBER OF YEARS THE FIRST AUTHORIZATION REMAINED IDLE AFTER CLEARING*

No. of Years	Number of First Authorizations Reporting Soil Class 3	Soil Class 4	Soil Class 5
0	2	3	5
1	4	13	13
2	10	4	7
3 or more	7	7	5
Total first authorizations for sample	33	27	30

* More specifically, after knockdown and usually piling was completed.

TABLE 10

SELECTED FARM RECEIPTS FOR 1969 AND 1970

Farm Receipts[1] 1969 and 1970	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
	$	$	$
SUMMARY OF FARM RECEIPTS:			
Total Farm Receipts in 1969	261,641	214,742	300,076
Total Farm Receipts in 1970	230,250	227,084	275,328
Average Receipts per farm in 1969	7,929	7,953	10,002
Average Receipts per farm in 1970	6,977	8,411	9,178
	%	%	%
Crop Sales as % of Total Farm Receipts in 1969	35	22	14
Crops Sales as % of Total Farm Receipts in 1970	30	14	14
1. RECEIPTS FROM THE SALE OF LIVESTOCK	$	$	$
TOTAL for Sample in 1969	115,605	107,414	177,499
TOTAL for Sample in 1970	102,599	128,983	168,524
Average Livestock Sales per farm in Sample in 1969	3,503	3,978	5,917
Average Livestock Sales per Farm in Sample in 1970	3,109	4,777	5,617
Average Livestock Sales per Farm reporting in 1969	(25)[2]4,624	(26)4,131	(27)6,574
Average Livestock Sales per Farm Reporting in 1970	(25)4,104	(25)5,159	(26)6,482
	No. Farms	No. Farms	No. Farms
No. of Farms by Major type[3] of Livestock Sold in 1969			
Cattle	17	24	25
Hogs	5	0	1
Chickens	3	1	0
Turkeys	0	1	1
No Livestock Sold -	8	1	3
Total farms	33	27	30
No. of Farms by Major Type of Livestock Sold in 1970			
Cattle	18	23	24
Hogs	5	0	1
Chickens	2	1	0
Turkeys	0	1	1
No Livestock Sold -	8	2	4
Total farms	33	27	30

TABLE 10 - Cont'd

Farm Receipts (Continued)	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
	$	$	$
2. RECEIPTS FROM THE SALE OF LIVESTOCK PRODUCTS			
Total for Sample in 1969	46,360	59,520	35,121
Total for Sample in 1970	49,244	63,059	37,983
Average per farm in Sample in 1969	1,405	2,204	1,171
Average per farm in Sample in 1970	1,492	2,336	1,266
Average per farm reporting in 1969	(19) 2,440	(18) 3,307	(12) 2,927
Average per farm reporting in 1970	(19) 2,592	(17) 3,709	(12) 3,165
No. of farms by major types[3/] of livestock product sold in 1969	#	#	#
cream	15	15	10
milk	1	0	1
Cream & milk	0	0	1
eggs	3	2	0
urine	0	1	0
No livestock products sold	14	9	18
Total farms	33	27	30
No. of farms by major types of livestock product sold in 1970	#	#	#
cream	15	15	10
milk	1	0	1
Cream & milk	0	0	1
eggs	3	2	0
urine	0	1	0
No livestock products sold	14	9	18
Total farms	33	27	30
3. RECEIPTS FROM THE SALE OF CROPS			
Total for sample in 1969	91,488	47,008	42,810
Total for sample in 1970	70,146	33,196	38,857
Average per farm in sample in 1969	2,772	1,741	1,427
Average per farm in sample in 1970	2,126	1,229	1,295
Average per farm reporting crop sales in 1969	(29) 3,155	(17) 2,765	(23) 1,861
Average per farm reporting crop sales in 1970	(28) 2,505	(17) 1,953	(19) 2,045
	# Yes / No	# Yes / No	# Yes / No
No. of farmers in sample with a grain permit book in 1969	31 / 2	23 / 4	23 / 7
in 1970	30 / 3	21 / 6	23 / 7
4. RECEIPTS FROM CUSTOM WORK	$	$	$
Total for sample in 1969	8,188	800	45,156
Total for sample in 1970	8,261	1,846	29,964
Average per farm in sample in 1969	$/farm 248	$/farm 30	$/farm 1,505
Average per farm in sample in 1970	250	68	999
Average per farm reporting custom work in 1969	$/farm reporting (7) 1,170	$/farm reporting (2) 400	$/farm report (8) 5,645
Average per farm reporting custom work in 1970	(7) 1,180	(3) 615	(9) 3,329

TABLE 10 - Cont'd

FOOTNOTES:

1/ Farm receipts include those from the sale of livestock, livestock products including cream subsidies (may include extra values for milk quotas with dairy cattle), crops (including wheat board payments) and from custom work done by the farmers in the sample. Where partnerships occur the farm receipts for only one partner were used.

2/ Number of farms which reported livestock sales in 1969 in the soil Class 3 sample.

3/ Major type is determined by the comparative value of sales from the sources listed.

TABLE 11

NUMBER AND % OF FARMS BY VALUE OF SELECTED GROSS FARM RECEIPTS [1]

Selected Gross Farm Receipts 1/ Category [2]	Soil Class 3 1969	Soil Class 3 1970	Soil Class 4 1969	Soil Class 4 1970	Soil Class 5 1969	Soil Class 5 1970	Total Sample 1969	Total Sample 1970
Under $2,500								
No. farms	3	3	3	6	6	5	12	14
% of total in sample	9.1	9.1	11.1	22.2	20.0	16.7	13.3	15.6
$2,500 - $4,999								
No. farms	8	8	10	5	3	9	21	22
% of total in sample	24.2	24.2	37.0	18.5	10.0	30.0	23.3	24.4
$5,000 - $6,999								
No. farms	4	6	4	6	5	1	13	13
% of total in sample	12.1	15.2	14.8	22.2	16.7	3.3	14.4	14.4
$7,000 - $8,999								
No. farms	7	8	2	0	1	2	10	10
% of total in sample	21.2	24.2	7.4	0	3.3	6.7	11.1	11.1
$9,000 - $11,999								
No. farms	5	5	2	2	5	4	12	11
% of total in sample	15.2	15.2	7.4	7.4	16.7	13.3	13.3	12.2
$12,000 - $14,999								
No. farms	3	2	2	3	4	3	9	8
% of total in sample	9.1	6.1	7.4	11.1	13.3	10.0	10.0	8.9
Over $15,000								
No. farms	3	1	4	5	6	6	13	12
% of total in sample	9.1	3.0	14.8	18.5	20.0	20.0	14.4	13.3
Total Number of Farms in Sample	33	33	27	27	30	30	90	90

1. Where partnerships occurred the selected gross farm receipts for only one partner were used. The farm receipts include those from the sale of livestock, livestock products, crops (including wheat board payments), and from custom work done by the farmers in the sample.

2. The gross farm receipts categories are the same ones as those used in the Interlake Fact - 1968.

TABLE 12

SELECTED FARM EXPENSES FOR 1969 AND 1970

Farm Expenses[1] 1969 and 1970	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
SUMMARY OF EXPENSES:	$	$	$
Total[1] Farm Expenses for entire sample in 1969	107,513	85,380	103,313
Total[1] Farm Expenses for entire sample in 1970	118,870	111,699	111,768
Average Expenses per farm in 1969	3,258	3,162	3,444
Average Expenses per farm in 1970	3,602	4,137	3,726
1. FUEL, OIL AND GREASE EXPENSES	$	$	$
Total for Sample in 1969	21,519	19,897	27,164
Total for Sample in 1970	23,334	22,231	27,236
Average per Farm[2] in 1969	652	737	905
Average per Farm[2] in 1970	707	823	908
2. PURCHASES OF LIVESTOCK	$	$	$
Total Purchases for entire sample in 1969	15,719	17,559	15,795
Total Purchases for entire sample in 1970	23,408	44,560	20,093
Average Purchases per Farm in sample in 1969	476	650	527
Average Purchases per Farm in sample in 1970	709	1,650	670
Average Purchases per Farm reporting in 1969	827 (19)[3]	1,351 (13)	987 (16)
Average Purchases per Farm reporting in 1970	1,232 (19)	3,183 (14)	1,256 (16)
No. of Farmers in sample which purchased mostly (by $ value) the following livestock in 1969:	#	#	#
cattle	13	9	13
hogs	3	2	2
chickens	3	1	0
turkeys	0	1	1
no livestock purchased	14	14	14
Total Farms	33	27	30
No. of Farmers in sample which purchased mostly (by $ value) the following livestock in 1970:	#	#	#
cattle	13	10	12
hogs	3	1	2
chickens	3	1	0
turkeys	0	1	1
horses	0	1	0
sheep	0	0	1
no livestock purchased	14	13	14
Total Farms	33	27	30

SELECTED FARM EXPENSES FOR 1969 AND 1970

Farm Expenses[1] 1969 and 1970	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
3. FEED PURCHASES	$	$	$
By entire sample in 1969	23,506	15,539	19,158
By entire sample in 1970	24,856	16,535	22,064
Average per Farm in sample in 1969	712	576	639
Average per Farm in sample in 1970	753	612	735
Average per Farm reporting in 1969	871 (27)	622 (25)	710 (27)
Average per Farm reporting in 1970	956 (27)	661 (25)	849 (26)
4. FERTILIZER AND CROP CHEMICALS PURCHASED	$	$	$
By entire sample in 1969	17,240	12,399	12,993
By entire sample in 1970	14,104	10,126	13,061
Average per Farm in sample in 1969	522	459	433
Average per Farm in sample in 1970	427	375	435
Average per Farm reporting in 1969	594 (29)	590 (21)	481 (27)
Average per Farm reporting in 1970	470 (30)	460 (22)	484 (24)
5. CASH RENT PAID FOR LAND AND EQUIPMENT	$	$	$
By entire sample in 1969	3,261	1,950	6,731
By entire sample in 1970	4,882	3,466	5,477
Average per Farm in sample in 1969	99	72	224
Average per Farm in sample in 1970	148	128	183
Average per Farm reporting in 1969	272 (12)	163 (12)	354 (19)
Average per Farm reporting in 1970	305 (16)	289 (12)	274 (20)
6. INTEREST PAYMENTS	$	$	$
By entire sample in 1969	19,767	10,604	11,528
By entire sample in 1970	22,515	11,046	16,495
Average per Farm in sample in 1969	599	393	384
Average per Farm in sample in 1970	682	409	550
Average per Farm reporting in 1969	791 (25)	530 (20)	607 (19)
Average per Farm reporting in 1970	866 (26)	526 (21)	868 (19)
7. CUSTOM WORK EXPENSES	$	$	$
By entire sample in 1969	6,501	7,432	9,944
By entire sample in 1970	5,771	3,735	7,342
Average per Farm in sample in 1969	197	275	331
Average per Farm in sample in 1970	175	138	245
Average per Farm reporting in 1969	361 (18)	465 (16)	497 (20)
Average per Farm reporting in 1970	289 (20)	267 (14)	459 (16)

[1] Total Farm Expenses is the aggregate of the seven types of expenses listed in the tabl They represent the amounts actually paid out within the calendar year in question. Where partnerships occurred the Selected Farm Expenses for only one partner were used.

[2] All farms in the sample reported this expense.

[3] (19) refers to the number of farms reporting this type of expense.

ESTIMATED MARKET VALUE OF FARM ASSETS YEAR ENDING 1969 AND 1970

Market Value of Assets	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
SUMMARY OF MARKET VALUE OF ASSETS [1]	$	$	$
Total value for entire sample end of 1969	2,177,265	1,502,024	1,738,490
Total value for entire sample end of 1970	2,275,692	1,528,128	1,844,018
Average value per farm in sample end of 1969	65,978	55,631	57,950
Average value per farm in sample end of 1970	68,960	56,597	61,467
1. ESTIMATED MARKET VALUE OF FARM MACHINERY AND EQUIPMENT	$	$	$
Total for entire sample end of 1969	358,932	277,739	334,038
Total for entire sample end of 1970	392,320	290,491	354,698
Average per Farm in sample [2] end of 1969	10,877	10,287	11,135
Average per Farm in sample [2] end of 1970	11,888	10,759	11,823
2. ESTIMATED MARKET VALUE OF OWNED FARM BUILDINGS (including Farm House)	$	$	$
Total for entire sample end of 1969	467,799	274,924	254,826
Total for entire sample end of 1970	479,738	275,720	269,358
Average per Farm in sample end of 1969	14,175	10,182	8,494
Average per Farm in sample end of 1970	14,538	10,212	8,979
Average per Farm reporting end of 1969	14,619(32) [3]	10,182(27)	8,787(29)
Average per Farm reporting end of 1970	14,992(32)	10,212(27)	9,288(29)
3. ESTIMATED MARKET VALUE OF OWNED LAND	$	$	$
Total for entire sample end of 1969	983,395	598,480	724,017
Total for entire sample end of 1970	986,770	622,668	730,097
Average per Farm in sample [4] end of 1969	29,800	22,166	24,134
Average per Farm in sample [4] end of 1970	29,902	23,062	24,337
4. ESTIMATED MARKET VALUE OF LIVESTOCK	$	$	$
Total for entire sample end of 1969	298,016	280,285	363,765
Total for entire sample end of 1970	355,658	310,944	430,770
Average per Farm in sample end of 1969	9,031	10,381	12,125
Average per Farm in sample end of 1970	10,778	11,516	14,359
Average per Farm reporting end of 1969	10,643(28)	11,211(25)	13,991(26)
Average per Farm reporting end of 1970	12,702(28)	12,438(25)	16,568(26)
No. of Farms by Major Type of Livestock (in $ value) Owned end of 1969:	#	#	#
Cattle	24	23	26
Hogs	2	0	0
Chickens	2	1	0
Horses	0	1	0
No livestock owned	5	2	4
Total farms	33	27	30
No. of Farms by Major Type of Livestock (in $ value) Owned end of 1970:	#	#	#
Cattle	24	23	26
Hogs	2	0	0
Chickens	2	1	0
Horses	0	1	0
No livestock owned	5	2	4
Total farms	33	27	30

TABLE 13 - Cont'd

Market Value of Assets	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
5. ESTIMATED MARKET VALUE OF GRAIN ON HAND	$	$	$
Total for entire sample end of 1969	69,123	44,296	61,844
Total for entire sample end of 1970	61,206	46,305	59,095
Average per Farm in sample end of 1969	2,095	1,641	2,061
Average per Farm in sample end of 1970	1,855	1,715	1,970
Average per Farm reporting end of 1969	2,560(27)	2,013(22)	2,474(25)
Average per Farm reporting end of 1970	2,111(29)	2,205(21)	2,364(27)
6. LIABILITIES (TOTAL FARM DEBTS)	$	$	$
Total for entire sample end of 1969	311,554	166,275	233,478
Total for entire sample end of 1970	324,798	189,495	256,006
Average per Farm in sample end of 1969	9,441	6,158	7,783
Average per Farm in sample end of 1970	9,842	7,018	8,534
Average per Farm reporting end of 1969	11,539(27)	8,751(19)	10,613(21)
Average per Farm reporting end of 1970	12,030(27)	9,973(19)	12,800(20)

FOOTNOTES:

1/ Farm Liabilities have been subtracted. Where partnerships occurred the Estimated Market Value of Farm Assets for only one partner were used.

2/ All farms in sample reported some farm machinery and equipment

3/ The number of farms reporting farm buildings at the end of 1969 in Soil Class 3 was 32

4/ All farms in the sample reported ownership of farm land.

TABLE 14

LAND ALLOCATION FOR 1969 AND 1970

ACREAGE CATEGORIES	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
SUMMARY OF LAND TENURE	Acres	Acres	Acres
Total Operated Acreage in sample in 1969	19,369	22,608	32,373
Total Operated Acreage in sample in 1970	19,814	23,568	32,253
Total acres owned in sample in 1969	13,907	16,888	20,615
Total acres owned in sample in 1970	13,842	16,888	20,615
Total acres rented and leased in sample in 1969	5,462	5,720	11,768
Total acres rented and leased in sample in 1970	5,972	6,680	11,648
Total operated acreage per farm in sample in 1969	587	837	1,079
Total operated acreage per farm in sample in 1970	600	873	1,078
Total acres owned per farm in sample in 1969	421	625	6,871
Total acres owned per farm in sample in 1970	419	625	6,871
Total leased or rented acres per farm in sample 1969	166	212	392
Total leased or rented acres per farm in sample 1970	181	247	388
Total leased or rented acres per farm reporting in 1969	303	440	560
Total leased or rented acres per farm reporting in 1970	299	477	582
A. ACREAGE BY USE (IMPROVED LAND):	ACRES	ACRES	ACRES
1. CROPS & FORAGE:			
Total Acres in sample in 1969	8,738	5,674	7,403
Total Acres in sample in 1970	8,591	5,457	7,311
Total Acres per farm in sample in 1969	265	210	247
Total Acres per farm in sample in 1970	260	202	244
Acreage in Crops & Forage as a % of total operated acreage by sample in 1969	45%	25%	23%
in 1970	43%	23%	23%
2. SUMMER FALLOW:			
Total Acres in sample in 1969	2,439	1,622	1,938
Total Acres in sample in 1970	2,900	2,120	2,416
Total Acres per farm in sample in 1969	74	60	65
Total Acres per farm in sample in 1970	88	79	81
Total Acres per farm reporting in 1969	(28)[1/] 87	(21) 74	(21) 92
in 1970	(29) 100	(23) 92	(23) 105

TABLE 14 - Cont'd

ACREAGE CATEGORIES	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
ACREAGE BY USE (IMPROVED LAND) - Cont'd			
3. IMPROVED PASTURE:	Acres	Acres	Acres
Total Acres in sample in 1969	2,423	1,031	2,773
Total Acres in sample in 1970	2,495	1,071	3,171
Total Acres per farm in 1969	73	38	92
Total Acres per farm in 1970	76	40	106
Total Acres per farm reporting in 1969	(17) 143	(11) 94	(18) 154
Total Acres per farm reporting in 1970	(17) 147	(11) 97	(18) 176
4. OTHER IMPROVED ACRES - Total for Sample 1969	196	4	225
Other improved acres - Total for Sample 1970	168	4	172
Average per farm in sample in 1969	6	.1	7
Average per farm in sample in 1970	5	.1	6
Average per farm reporting in 1969	(8) 25	(1) 4	(6) 37
Average per farm reporting in 1970	(7) 24	(1) 4	(5) 34
TOTAL IMPROVED ACRES for entire sample in 1969	13,796	8,331	12,339
for entire sample in 1970	14,154	8,622	13,069
Average per farm reporting in 1969	(33)[2/] 418	(27)[2/] 309	(30)[2/] 411
Average per farm reporting in 1970	(33) 429	(27) 319	(30) 436
B. ACREAGE BY USE (UNIMPROVED LAND)			
5. Native Hayland, Brushland & Pasture			
Total for Entire sample in 1969	5,133	12,711	18,365
Total for Entire sample in 1970	5,205	12,604	17,630
Average per farm in sample in 1969	155	471	612
Average per farm in sample in 1970	158	467	588
Average per farm reporting in 1969	(31) 165	(26) 489	(29) 633
Average per farm reporting in 1970	(31) 168	(26) 485	(29) 608
6. Marshland			
Total for sample in 1969	452	1,561	1,362
Total for sample in 1970	452	1,553	1,362
Average per farm in sample in 1969	14	58	45
Average per farm in sample in 1970	14	58	45
Average per farm reporting in 1969	(7) 65	(15) 104	(16) 85
Average per farm reporting in 1970	(7) 65	(15) 104	(16) 85

TABLE 14 - Cont'd

ACREAGE CATEGORIES	Soil Class 3 (Sample Size 33)	Soil Class 4 (Sample Size 27)	Soil Class 5 (Sample Size 30)
ACREAGE BY USE (UNIMPROVED LAND) - Cont'd	Acres	Acres	Acres
7. Other Unimproved Land			
Total for sample in 1969	9	5	308
Total for sample in 1970	9	5	193
Average per farm in sample in 1969	.3	.2	10.3
Average per farm in sample in 1970	.3	.2	6.4
Average per farm reporting in 1969	(2) 4.5	((1) 5.0	(4) 77
Average per farm reporting in 1970	(2) 4.5	(1) 5.0	(3) 64
TOTAL UNIMPROVED ACREAGE:			
Total for sample in 1969	5,574	14,277	20,035
Total for sample in 1970	5,666	14,162	19,185
Average per farm in sample in 1969	169	529	668
Average per farm in sample in 1970	172	525	639
Average per farm reporting in 1969	(32) 174	(26) 549	(30) 668
Average per farm reporting in 1970	(32) 177	(26) 545	(30) 639

FOOTNOTES:

1/ The number of farms reporting summerfallow on their farm in the soil class 3 sample for 1969 was 28. Where partnerships occurred the land allocations were divided by the number of partners operating each farm unit.

2/ Every farm in each of the three samples reported some improved land.

Table 15

DESCRIPTION OF SAMPLE PARTICIPANTS IN LAND CLEARING PROGRAM

SAMPLE NUMBER	SOIL CLASS OF ALL AUTHORIZATION	FARM OPERATOR BY AGE	FARM LOCATION	FARM SIZE 1970 RECEIPTS	TOTAL ASSETS	IMPROVED	UNIMPROVED	FARM TYPE
3-065	3	51	2	8495	84885	433	67	3
3-067	3	49	5	4602	44890	270	50	3
3-097	3	34	5	10892	43650	375	35	1
3-107	35	35	5	5000	144500	562	2033	1
3-108	3	49	2	9868	85260	460	2	3
3-131	3	58	5	4626	35347	350	130	3
3-141	3	58	2	6050	53500	415	60	3
3-113	3	43	2	8769	66550	420	220	1
3-162	33	54	5	6200	113931	440	200	1
3-194	333	70	5	30	26250	275	422	2
3-077	33	49	5	1474	24300	325	75	3
3-016	34	65	1	7400	64500	1030	250	1
3-147	3	42	5	1429	5749	134	267	3
3-193	33	47	5	4686	26216	390	70	3
3-093	3	66	5	9001	96380	320	0	1
3-091	3	27	5	8000	18425	150	10	3
3-024	35	45	8	6750	81400	860	340	1
3-122	3	53	5	5822	56379	420	60	3
3-191	33	55	5	7428	87080	666	220	1
3-027	35	27	5	4500	51000	460	20	1
3-132	3	65	5	4035	56570	347	99	1
3-195	3	53	5	7261	55592	635	5	1
3-045	3	28	2	11277	66937	333	147	1
3-010	3	60	2	13440	92863	300	20	2
3-083	3	46	2	4100	36865	296	119	1
3-038	3	56	8	8200	119735	265	45	1
3-003	3	44	6	16500	221000	700	100	2
3-017	3	48	6	7358	80100	400	40	1
3-088	3	32	2	4500	31115	320	195	3
3-102	3	56	8	2500	74100	292	188	3
3-031	3	52	5	14230	58628	700	100	1
3-032	3	30	5	10175	69995	436	44	1
3-002	33	53	8	5652	102000	375	25	1
Total for sample				230,250	2,275,692	14153	5675	18 (1) 3 (2)
Average		48		6,977	68,960	429	172	12/33 (3)

Table 15 - Cont'd

DESCRIPTION OF SAMPLE PARTICIPANTS IN LAND CLEARING PROGRAM

SAMPLE NUMBER	SOIL CLASS OF ALL AUTHORIZATION	FARM OPERATOR BY AGE	FARM LOCATION	FARM SIZE 1970 RECEIPTS	FARM SIZE 1970 TOTAL ASSETS	ACRES IMPROVED	ACRES UNIMPROVED	FARM TYPE
4-284	44	54	13	14060	46300	100	280	2
4-087	4	66	13	2031	38625	190	50	3
4-188	44	54	2	1531	18780	148	12	2
4-183	4	40	13	9901	59132	585	481	1
4-154	45	63	3	6435	38312	220	500	1
4-211	4	51	3	13800	48400	60	1380	2
4-308	44	56	4	26984	99337	559	1028	2
4-005	44	34	7	2770	40100	204	116	1
4-110	4	46	5	1990	62300	665	95	3
4-116	4	52	3	6354	61000	200	600	1
4-258	4	40	7	5856	55855	366	878	1
4-185	4	76	3	1500	21800	90	550	2
4-134	44	31	3	15500	87500	1000	1320	1
4-031	44	27	3	3566	36300	115	1085	1
4-270	44	28	1	3363	66250	223	417	1
4-086	444	40	1	5562	68930	250	965	1
4-180	44	51	1	5126	40110	220	260	1
4-112	4	52	10	21276	105775	570	0	2
4-261	4	62	10	6567	42530	292	49	1
4-332	4	54	10	4050	27840	108	42	2
4-316	4	42	2	1354	21525	243	77	1
4-195	444	52	5	23246	64325	555	85	1
4-035	4	35	13	650	28400	90	130	3
4-204	4	56	1	4000	72600	300	60	1
4-019	4	66	5	15975	119335	390	170	1
4-285	44	48	12	10364	66875	728	872	1
4-229	4	54	12	13273	107892	151	2660	1
Total				227084	1,546,128	8621	14161	17(1) 7(2) 3(3)
Average		49		8411	57,264	319	524	

Table 15 - Cont'd

DESCRIPTION OF SAMPLE PARTICIPANTS IN LAND CLEARING PROGRAM

SAMPLE NUMBER	SOIL CLASS OF ALL AUTHORIZATION	FARM OPERATOR BY AGE	FARM LOCATION	FARM SIZE 1970 RECEIPTS	FARM SIZE 1970 TOTAL ASSETS	ACRES IMPROVED	ACRES UNIMPROVED	FARM TYPE
5-049	5	51	5	1400	16900	104	56	3
5-041	5	49	4	0	8330	102	388	0
5-054	5	53	4	4001	54347	426	854	1
5-053	5	54	4	4900	37900	430	690	1
5-028	5	64	3	2000	10800	27	827	1
5-004	5	58	3	14728	41410	160	1120	2
5-005	5	53	1	8300	62300	280	680	1
5-050	5445	42	7	36097	114857	550	3050	1
5-059	54	45	12	8192	38600	278	1432	1
5-019	5	35	12	13000	128000	290	1286	1
5-043	5	40	7	11134	72025	1060	101	3
5-060	5	30	5	2556	32252	145	335	3
5-006	5	60	5	4550	42100	340	780	1
5-042	5	33	5	6900	92500	635	325	3
5-016	5	42	5	780	21033	320	480	3
5-048	5	63	2	11380	74843	760	370	1
5-003	5	59	1	3080	41850	498	142	1
5-040	5	55	2	15000	161700	1590	330	1
5-029	5	53	5	9960	85650	337	623	1
5-055	53	62	5	15463	67048	404	236	1
5-061	54	43	4	3000	64000	500	900	3
5-018	54	56	5	15830	107488	833	491	1
5-036	5	61	5	4202	50100	690	20	3
5-051	5	43	5	13174	97005	777	183	1
5-012	5	48	11	11301	68500	275	1910	1
5-009	5	57	5	3400	29500	380	220	1
5-052	5	48	1	29500	101500	385	89	1
5-047	54	40	1	2200	26000	138	662	1
5-057	55	63	8	3300	39580	170	310	1
5-033	55	43	8	16000	55900	185	295	2
Total				$275,328	$1,844,018	13094	20010	20(1) 2(2) 7(3) 1(0)
Average		50		9,178	61,467	436	667	
TOTAL SAMPLE				732,662	5,665,838	35868	39846	
OVERALL AVERAGE		49		8,141	62,954	399	443	

FOOTNOTES

1. The random sample consists of approximately thirty farmers who cleared land of soil capability classes 3, 4, and 5 respectively, under the $4/acre policy in its first year of operation.

2. The first digit in the sample number indicates the soil capability class of the first parcel authorized and cleared in the first year of the Land Clearing Program.

3. The soil capability class of each authorization is listed in the same sequence as it was completed.

4. Farm location codes are as follows:

1. Armstrong L.G.D.	7. Grahamdale L.G.D.
2. Bifrost	8. Rockwood
3. Coldwell	9. Rosser
4. Eriksdale	10. St. Andrews
5. Fisher L.G.D.	11. St. Laurent
6. Gimli	12. Siglunes
	13. Woodlands

L.G.D. - Local Government District

5. Receipts - gross receipts from the sale of livestock, livestock products, grain (including wheat board payments) and cash crops, and custom work.

6. Total assets include estimated market value of farm machinery and equipment, buildings (including house), land owned and livestock and grain on hand as of December 31, 1970.

7. Farm type is designated according to major source of farm income i.e.
   1. from the sale of livestock,
   2. livestock products and
   3. grain.

Table 16

NUMBER AND SIZE OF LAND CLEARING AUTHORIZATIONS

FOR SOIL CAPABILITY CLASS 3 SAMPLE

Sample Number	1st authorization in acres	2nd authorization in acres	3rd authorization in acres	Total authorized Acres 1/
3 - 065	57			57
3 - 067	32			32
3 - 097	23			23
3 - 107	45	72		117
3 - 108	15			15
3 - 131	100			100
3 - 141	20			20
3 - 113	24			24
3 - 162	147	35		182
3 - 194	40	100	65	205
3 - 077	10	10		20
3 - 016	21	50		71
3 - 147	25			25
3 - 193	10	105		115
3 - 093	13			13
3 - 091	30			30
3 - 024	24	22		46
3 - 122	20			20
3 - 191	96	200		296
3 - 027	105	33		138
3 - 132	10			10
3 - 195	25			25
3 - 045	40	38		78
3 - 010	28			28
3 - 083	27			27
3 - 038	27			27
3 - 003	15			15
3 - 017	30			30
3 - 088	35			35
3 - 102	70			70
3 - 031	79			79
3 - 032	93			93
3 - 002	10	20		30
TOTAL ACRES	1,346	685	65	2,096
AVERAGE SIZE	41	62	65	47

1/ All acreage authorized for clearing under the Land Clearing Program between September 15, 1967 and March 31, 1970.

Table 16 - Cont'd

NUMBER AND SIZE OF LAND CLEARING AUTHORIZATIONS FOR SOIL CAPABILITY CLASS 4 SAMPLE

Sample Number	1st authorization in acres	2nd authorization in acres	3rd authorization in acres	Total authorized Acres 1/
4 - 284	13	30		43
4 - 087	30			30
4 - 188	15	26		41
4 - 183	10			10
4 - 154	12	15		27
4 - 211	17			17
4 - 308	37	21		58
4 - 005	33	71		104
4 - 110	24			24
4 - 116	24			24
4 - 258	48			48
4 - 185	30			30
4 - 134	321	208		529
4 - 031	71	25		96
4 - 270	33	40		73
4 - 086	47	32	34	113
4 - 180	30	60		90
4 - 112	80			80
4 - 261	105			105
4 - 332	20			20
4 - 316	12			12
4 - 195	15	15	30	60
4 - 035	40			40
4 - 204	34			34
4 - 019	20			20
4 - 285	79	50		129
4 - 229	47			47
TOTAL ACRES	1,247	593	64	1,904
AVERAGE SIZE	46	49	32	46

1/ All acreage authorized for clearing under the Land Clearing Program between September 15, 1967 and March 31, 1970.

TABLE 16 (Cont'd)

NUMBER AND SIZE OF LAND CLEARING AUTHORIZATIONS

FOR SOIL CAPABILITIES CLASS 5 SAMPLE

Sample Number	1st Authorization In Acres	2nd Authorization In Acres	3rd Authorization In Acres	4th Authorization In Acres	Total[1] Authorized Acres
5-049	22				22
5-041	38				38
5-054	20				20
5-053	13				13
5-028	70				70
5-004	20				20
5-005	30				30
5-050	230	28	38	25	321
5-059	30	28			58
5-019	50				50
5-043	178				178
5-060	46				46
5-006	31				31
5-042	40				40
5-016	150				150
5-048	50				50
5-003	20				20
5-040	310				310
5-029	55				55
5-055	37	43			80
5-061	31	100			131
5-018	58	205			263
5-036	126				126
5-051	65				65
5-012	48				48
5-009	12				12
5-052	18				18
5-047	16	15			31
5-057	18	13			31
5-033	19	15			34
TOTAL ACRES	1,851	447	38	25	2,361
AVERAGE SIZE	62	56	38	25	59
GRAND TOTAL	4,444	1,725	167	25	6,361
OVERALL AVERAGE SIZE	49	56	42	25	50

[1] All acreage authorized for clearing under the Land Clearing Program between Sept. 15, 19 and March 31, 1970

TABLE 17

Interlake Land Clearing Evaluation Study 1971
Distribution of Sample by Outcome of Contacts

Soil capability class	Completed surveys (includes transfers in)	Cannot establish contact	Incomplete	Invalid[1]	Inelligible[2]	Deceased	Refusal	Too busy at the time[3]	Did not keep appointment	Transfers out of group*	Total
3	33 (1 transferred in from 4, 1 in from 5)	6	1		3		2	1	1		47
4	27	6		1	2		1	6		2	43
5	30 (includes one transferred in from group 4)	7		2	1	1	1	1	2	1	45
Total	90	19	1	3	6	1	4	8		3	135

[1]Invalid - a. Wrong clearing acreages - farmer said acres cleared different than authorized.
b. More or less retired - son taken over

[2]Inelligible - a. not farming 1970.
b. clearing date outside defined dates of sample

[3]Too busy at the time - unable to arrange appointment because farmer involved in spring seeding. Not a refusal.

*Transfers out of group were not added into the totals to avoid double counting.

TABLE 18

Three-Year Average per Acre Land Clearing Costs, Production Costs, and Gross Returns on the First Authorizations by number of years in production, and according to Main Enterprise of Farms

o. of years thorized parcel Production	L	C	Livestock[a]	Crop[a]	Average/acre Land Clearing Costs[b]		Average/acre Production Costs[c]		Average/acre Gross Returns[d]	
					Main Enterprise[a]		Main Enterprise		Main Enterprise	
	No. Farms	No. Farms	No. acres in 1st. authoriz-ations	No. acres in 1st. authoriz-ations	Livestock	Crops	Livestock	Crops	Livestock	Crops
3 years	7	1	464	35	8.96	14.05	4.77	13.58	5.25	4.06
2 years	31	10	1493	546	16.17	12.83	9.81	6.67	15.82	10.81
1 year	16	6	898	267	9.06	9.90	3.30	3.69	4.49	4.02
0 years	13	6	440	301	9.98	14.84	.67	.81	-	-
All years	67	23	3295	1149	12.39	12.71	6.11	4.65	9.13	7.31

[a]Main Enterprise--if the 1970 gross receipts from the sale of crops exceeds those from either livestock or livestock products, the major type of enterprise ould be crop. If, however, either livestock or livestock products exceed crops in gross value of sales then the type would be designated as livestock.

[b]Land Clearing Costs--include costs of knockdown, piling, breaking or discing, repiling, stone-picking, root-removal, initial fence-building and any other osts considered as land development rather than crop, hay or pasture production.

[c]Production Costs--include costs associated with the actual production and harvesting of cash or hay crops and pasture. Examples could be seed-bed prepara-ion, seed and seeding, spraying, fertilizer and its application, harvesting, taxes, etc.

[d]Gross Returns--gross value of production of crops, livestock or livestock products from the authorized parcels in question.

TABLE 19

Characteristics Associated with Years of Production and Farm Type on Cleared Land--1970

No. of Years in Production	No. of Cases	Average Age of Operator	Average Academic Education	Average Farm Size[a] In Acres	No. of Farms by Main Enterprise[b] Livestock[g]	Crop[g]	Average Total Farm Receipts[c]	Average Selected Farm Expenses[d]	Average Net Farm Income[e]	Average Total Farm Assets[f]
0	19	51.2	6.7	799	13	6	6,965	3,204	3,761	56,139
1	22	49.7	7.1	934	16	6	7,107	4,323	2,784	67,364
2	41	50.1	7.3	727	31	10	8,665	3,962	4,703	64,460
3	8	43.5	8.5	1,264	7	1	11,090	2,990	8,100	59,294
All Farms	90	49.6	7.2	840	67	23	8,141	3,804	4,337	62,954
Farms with Main Enterprise:										
a) Livestock[g]	67	50.2	7.3	942	67	0	9,492	4,336	5,156	69,242
b) Crop[g]	23	47.7	7.0	545	0	23	4,204	2,254	1,950	44,636
All Farms	90	49.6	7.2	840	67	23	8,141	3,804	4,337	62,954

[a]Farm Size--the total acreage operated by the farmer in 1970; regardless of its use or type of tenure.

[b]Main Enterprise--if the 1970 gross receipts from the sale of crops exceeds those from either livestock or livestock products, the major type o enterprise would be crop. If, however, either livestock or livestock products exceeds crops in gross value of sales then the type would be designated as livestock.

[c]Farm Receipts--the 1970 gross receipts from the sale of livestock, livestock products, crops, as well as the gross receipts from farm custom w

[d]Farm Expenses--include fuel, oil and grease; livestock purchases; purchases of livestock feed; fertilizers and crop chemicals; cash rent for l and equipment; interest payments; and custom work expenses in 1970.

[e]Net Farm Income--the difference between total farm receipts and the selected farm expenses in 1970.

[f]Total farm assets include the estimated market value of all the owned farm machinery and equipment; buildings (including the farm house); all owned land; livestock; and grain, less the farm liabilities (farm loans and mortgages)

[g]In 17 out of the 23 crop farms the 1970 gross receipts from the sale of crops accounted for at least 50% of the total gross farm receipts.

SOURCE: Interlake Land Clearing Evaluation Study--1971