

INVESTMENT OPPORTUNITIES ON MECOSTA
COUNTY FARMS

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INVESTMENT OPPORTUNITIES ON MECOSTA COUNTY FARMS

by

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AN ABSTRACT

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R. G. Wheeler

ABSTRACT

The lack of resources and the lack of means to acquire more resources plague many farmers in the country today. The need for more adequate resources has been greatly accentuated by rapid technological development. Although new technologies may save labor, reduce costs, and increase output, many of them require investments that would be prohibitive for low income farmers. If farmers in low income areas are to increase their productivity enough to be financially independent of government subsidies, and if they are to use the country's agricultural resources effectively, they will need investment funds for the major adjustments necessitated by changing technologies and market situations.

The guiding hypothesis followed in this thesis was that farmers with low incomes do have remunerative opportunities to invest capital in additional resources and to improve their management practices. The effects that would result from three levels of investment--\$5,000, \$7,500 and \$12,500 per man--were estimated; then the investment plans were evaluated by comparing differences in net incomes.

The eight farms were selected from a 1955 survey of 133 Economic Class I to IV farms in Mecosta County. The results of the survey indicated that about half of the farm operators were in a position to make forward looking plans. Similar results would probably have been found for the 3,880 Economic Class I to IV farms in six nearby counties. Altogether, 2,200 farm operators in Mecosta County and the nearby counties may be ready to plan aggressively for the future.

Additional investments at levels of \$5,000, \$7,500 or \$12,500 per operator on the eight Mecosta County farms can in general be expected to increase the net incomes of the operators after paying normal

interest and replacement charges. An investment of \$5,000 on each of the five, one-man farms will increase the average net income of the farm operators by \$1,770. The increases range from \$1,200 to \$2,280.

Two of these five operators are part-time farmers. At the medium and high levels of investment, they would give up their off-farm jobs. With investment of \$7,500 on each farm, the two operators could expect an average increase of \$2,350 in net farm income. With investments of \$12,500 on each farm, the two operators could expect an average increase of \$3,390 in net farm income. Neither of these investment levels would increase net farm income more than enough to offset the loss of off-farm income.

The full-time operators of the other three, one-man farms could expect increases in net income of \$2,330, \$2,620 and \$2,260, respectively, with a \$7,500 investment per farm. With investment of \$12,500 per farm, these operators could expect increases of \$4,200, \$3,720 and \$3,260, in net income, respectively.

With the same three levels of investment per operator on the three, two-man farms, the operators could expect average increases in net farm income per man of \$1,960, \$2,790 and \$3,890, respectively.

The dairy enterprise on the case farms presented the most promising investment opportunities. Two factors making expansion of the dairy enterprise attractive were the farmers' familiarity with dairying and their present ownership of dairy resources. Three areas for additional investment in dairy farming were buildings, machinery and equipment and livestock.

A potato enterprise and a poultry laying flock were examined for several of the case farms. However, these enterprises did not appear as rewarding as equal investments in dairy.

Total production would probably increase on six of the case farms if their operators had ready access to funds for taking advantage of the plans outlined in this thesis. In terms of total milk production, this would mean doubling or tripling their present output. Corresponding increases might be expected on similar farms in the area. However, one or two of the sample farms and other small dairy units would be likely to discontinue milk production altogether. In Census Economic Area 4a, which includes Mecosta County, the farmers in Economic Classes IV to VI produce over 60 percent of the milk output. The decrease in milk production resulting from the disappearance of some of these farm operating units will go a long way to offset the increased production on other farms adopting the investment plans outlined in this thesis.

As a result, milk production for the county as a whole would probably increase only a quarter to a half even if the investment plans were followed. This increase would not be large in terms of the expanding demands for fluid milk from this area.

Changes in the present credit structure that would make available larger quantities of capital to farmers would help to make possible the development of more successful farm businesses. To make sound changes in the credit structure, both farmers and credit agencies need to seek out and develop wise investment programs for farms. Then with this information as a guide, they could formulate changes that would make available larger quantities of capital.

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CHAPTER I

THE PROBLEM

A combination of added investment and management changes is a powerful tool for more successful farming. This thesis will endeavor to point out some of the opportunities for additional investment coupled with management changes on farms in Mecosta County, Michigan, a low farm income area. The 1954 Census reported 78 percent of Mecosta County's commercial farms had a gross income less than \$5,000, a fairly common net income for factory workers.

These low farm incomes follow partially because new agricultural technologies are being adopted rapidly in the county as a whole, whereas Mecosta County farmers are making changes only slowly. As a result, farmers in Mecosta County face difficult choices. Many of the adjustments which might lead to more successful farming would require substantial additional investments. This poses the questions, "What are the opportunities for additional investment on Mecosta County farms?" "Will additional investment in these opportunities contribute importantly to more successful farming in Mecosta County?" "What management changes are needed to permit effective use of additional physical resources?"

Rapid Technological Developments

Since World War II, agriculture in the United States has experienced a technological revolution of a greater magnitude than at any other time in its history.

At the start of the period, Black noted that

the productivity of many farms in this country could be increased a fourth or more by some of the following methods: draining portions of the farms, developing small scale pump and other irrigation, pasture and range improvement, land clearing, terracing and other forms of erosion control and construction of needed farm buildings.¹

These are but a few of the methods responsible for increasing productivity per man from an index of 86 in 1945 to 123 in 1954. This is twice the magnitude of the corresponding increase during the 1936 to 1945 period.

The rapid adoption of new practices in recent years has by no means exhausted the possibilities of still further technological development. DeGraff paints a bright picture of the dynamic possibilities of new technologies in even the most developed regions.

There is no such thing as a fully developed country or area nor can there be while science and technology remain dynamic. On the one hand, there are few if any wholly underdeveloped areas. The capacity of any area to produce is always a function of the science, technology, and corresponding capital applied to the resources to which it has access. Even the resources are not a constant, but rather they expand and stretch as a basis for production in relation to the science and technology applied to them. Consequently, even the presently most developed regions have in store potentially greater development from the further application of existing scientific knowledge and from new scientific discoveries yet to be made.²

More livestock, buildings, machinery and land are often needed to permit effective use of the new methods. As a result, the trend is towards larger sized farms in nearly every section of the country. The Census supports this observation by showing a 300 percent increase in

¹John D. Black, "Agricultural Credit Policy in the United States," Journal of Farm Economics, 1945, p. 601.

²Herrell DeGraff, "Some Problems Involved in Transferring Technology to Underdeveloped Areas," Journal of Farm Economics, 1951, p. 697.

value of the labor-saving, cost-reducing machinery and equipment inventories of farms from 1945 to 1954. In addition it shows a corresponding 60 percent increase in total value of United States farms for the same period.

Moreover, the new complex techniques and machines require, in addition to larger farm size, a high degree of skill and a lot of attention for effective use. Consequently, many farmers tend to specialize in fewer enterprises.

Uneven Rates of New Investment

Farms in the more prosperous areas have readily adopted new technologies and seem to have a high rate of new investment. For three reasons, on the other hand, the farms in low income areas like Mecosta County have not invested capital or adopted new technologies at a corresponding rate.

One reason is that low incomes make substantial capital accumulation very difficult and do not provide the net worth basis for borrowing more capital. A second reason is that investors vary the quantity of funds and also interest rates directly with the amount of risk involved in any investment opportunity. Consequently, the high risk associated with farms in the low income areas has reduced the quantity of new investment capital available to these farmers.

Thirdly, opportunities for profitable investment are easier to visualize on the prosperous area farms than on farms in the low income areas where substantial changes in methods are often needed to achieve satisfactory incomes. In fact, added capital frequently appears to have a low productivity on low income farms because of the following characteristics. Typically, these farms are small in size and located

on "poor" or unproductive land. Their operators usually have acquired only a minimum of education; they lack knowledge of adjustment opportunities; and they typically do not manage their present resources effectively. Hence, farmers and investors alike have not invested capital in the farms in the low income areas at the same rate as in the prosperous areas.

In 1945, Black pointed out factors which contributed to a slow rate of additional investment on low income farms; now, even a dozen years later, these factors still exist on many low income farms such as those in Mecosta County.

The ones who really need it [financing] are those who already have mortgages on small farms and are having difficulty carrying even the mortgages which they have because their farms yield such small returns; or they are not mortgaged but their earning power is so low on their present farms that lending agencies do not consider them safe risks. Farmers in either of these situations are in a vicious circle. They are not able to borrow because they have so little resources; and only with great difficulty can they increase their resources without borrowing in order to get command of more resources.³

Significance of Investment Opportunities on Farms in Low Income Areas

Hendrix noted the prominence of the low income farm problem.

Chronic low incomes still persist as the typical situation in large parts of American agriculture. This is so now after several years of rapid growth in the general economy and after more than two decades of large-scale federal programs directed to farm price and income problems. Increasing public awareness of, and interest in, the persistence of these low incomes has now culminated in the official recognition of them at the national policy level as an important public action problem.⁴

Many of the present public programs aimed at low income area farms completely overlook or do not fully exploit potential investment

³John D. Black, "Agricultural Credit Policy in the U. S.," Journal of Farm Economics, 1945, p. 596.

⁴W. Elbert Hendrix, "What To Do About Low Incomes In Agriculture," Journal of Farm Economics, 1956, p. 1385.

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opportunities. Black urges the nation to decide what adjustments are needed in its agricultural sector. He argues that full exploitation of investment opportunities will help to solve the low farm income problem.⁵ If farmers in low income areas are to increase their productivity enough to be financially independent of government hand-outs, to use the country's agricultural resources effectively and to provide an ample supply of agricultural products, they will need investment funds for the major adjustments necessitated by changing technologies and market situations. The needed adjustments present opportunities to invest varying quantities of capital in many different enterprise combinations. Also, a wide diversity of new management practices will need to accompany the new investments. A thorough understanding by the public of investment opportunities will provide a base for wise planning of public programs affecting farms in low income areas.

On the other hand, if the low income farmer knew his investment opportunities, he could invest his limited supply of capital more effectively to increase his productivity. Furthermore, if the investment opportunities were more clearly defined for his farm, he could present a strong argument for borrowing the large amounts of capital he needs to adopt new technologies necessary for more successful farming.

The guiding hypothesis followed in this study was that Mecosta County farmers do have opportunities for investing capital in additional resources which will permit more effective use of their labor and

⁵J. D. Black, "Extremities of Current Agricultural Policy Proposals" (paper given before Economics Seminar, Michigan State University), February, 1958.

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management resources. Such investments, when coupled with improved management, will make for more successful farming in Mecosta County. Moreover, a clearer understanding of investment opportunities, will make investment in Mecosta County farms more attractive to investors.

The Study Area

Most of Mecosta County's farmers operate dairy and general type farms. According to the 1954 Census, 63 percent of Mecosta County's 1,575 farms received more than \$1,200 gross farm income. About three-fourths of these, however, received less than \$5,000 from the sale of farm products. Livestock and livestock products contributed two dollars of every three that Mecosta County farmers received for farm income. Dairy products alone accounted for nearly half of the total farm receipts. Crop sales returned one dollar of every three that Mecosta County farmers received from sale of farm products. The Census goes on to report that off-farm employment of farm operators in Economic Class I to V increased from 1950 to 1954. In addition, the 1954 Census reports an average milk production of 5,500 pounds per cow; crop yields averaged 27 bushels for wheat, 30 bushels for oats and 1.5 tons for hay.

A typical Mecosta County farm has had a combination of livestock and crop enterprises on its 80 acres of land. Its barn was constructed to house 6 to 12 dairy cows and a team or two of horses. The dairy herd produced farm-separated cream for sale and skim milk to feed either veal calves or hogs. Furthermore, three or four dairy steers were raised for beef. The cropping system was designed to provide feed for the livestock, although a few acres of wheat and potatoes were grown as cash crops.

Soils of Mecosta County are predominately Rubicon-Montcalm-Grayling sands (47%) and McBride sandy loam (23%).⁶ The central and western part of the county has areas where wind erosion is a problem at times. However, the south and eastern parts, comprising the larger part of the county's agriculture, contains some of the heavier types of the above associations. Even so, these soils tend to be droughty, keeping long run average yields low. The Soil Conservation Service recommends that the farmers adopt organic matter building practices on much of the county's soil.

⁶Statement by Ivan Schneider, Soil Science Department, Michigan State University, based on Soil Survey of Mecosta County, Michigan, Number 18, Bureau of Chemistry and Soil, U.S.D.A., 1927.

CHAPTER II

METHODS AND PROCEDURE

The farm management worker could adopt one of several research methods to study investment opportunities on farms in low income areas. The research worker's decision to adopt a particular method will be influenced by the purpose of the study, the availability of data and his personal preference.

The case study and comparative budgeting method was selected to study the opportunities for various levels of additional investment on Mecosta County farms. In the case method, the researcher endeavors to understand why each farm is as it is, operates as it does, and obtains the results that it does, and what influence each particular element has on all of these factors.¹ Comparative budgeting of alternative plans of action on the case farms will then help the researcher to understand their investment opportunities.

By budgeting alternatives and comparing the results among a number of case farms typical of an area, some of the common problems of investing additional capital will be exposed and promising possibilities can be identified. On the other hand, if only one case farm is studied, the wide diversity of farm situations in any one area will limit the application of results from this method.

¹John D. Black, et. al., Farm Management (New York: Macmillan Co., 1947), p. 515.

In his article in the 1950 Journal of Farm Economics, Wheeler explains some of the advantages of the case study and comparative budgeting method employed in his operating unit approach.

The farm management worker cannot hope to provide a ready made solution for even the most important problems on each individual farm. But extensive analysis in terms of representative operating units will demonstrate appropriate ways of attacking particular problems; moreover, the solution can be adjusted slightly to fit many situations similar to the ones actually analyzed. There is no need to stop at this point. Extending the number of case studies to include an appropriate sample of a particular group of operating units illustrates a technique for moving from micro-economics toward macro-economics, or from partial equilibrium analysis toward general equilibrium analysis.²

For the results of this method to be most meaningful to an area, the farms must be chosen to represent typical farm situations within the area. However, bias can be introduced because not all the typical farm situations will lend to detailed study; the small number of farms used in the case method may not represent all types of farms found in a large or heterogeneous farming area. If the case farms are well chosen, the results of the case studies may offer specific solutions to many farm problems in the area. However, the number of cases is usually so small that in relation to the entire universe, even the results of a well chosen sample will only provide hypotheses and indicate possible adjustments for a farming area.

After planning promising management alternatives on a particular farm, a convenient method of comparing these alternatives is to subtract the summation of all items used in production times their respective prices

²Richard G. Wheeler, "Operating Unit Approach to Farm Management," Journal of Farm Economics, 1950, p. 215.

from the summation of all expected products (or increases in inventories) times their respective prices for a given period.³ This budgeting procedure will give the estimated net income resulting from promising alternative plans of action. Then, the plans can be evaluated by comparing their net incomes.

Wheeler pointed out the three types of information needed as a basis for budgeting.

1. The present situation, including physical and financial resources available, the cropping programs, the livestock program, rates of fertilization, rates of feeding, and other management practices;
2. The range of technical possibilities for varying the management of present enterprises on the farm, or for adding new enterprises;
3. The expected price relationships for the period of time covered by the analysis.⁴

If this information is available on a farm for several years, a normal year can be synthesized. The research worker needs to adjust or "normalize" the abnormal situations to establish a clear picture of the typical physical and value relationships between the farm inputs and outputs, expenses and receipts. However, on some farms, incomplete data or erratic situations will hinder the establishment of a normal pattern.

Comparative budgeting is a useful guide in adjusting management techniques and physical and financial resources for an optimum farm organization. Plans for future financial transactions affecting the

³Lawrence A. Bradford and Glenn L. Johnson, Farm Management Analysis (New York:Wiley & Sons, Inc., 1953), p. 329.

⁴Richard G. Wheeler and John D. Black, Planning For Successful Dairying in New England (Cambridge:Harvard University Press, 1955), p.299.

farm business can be easily evaluated by making appropriate budgets to show the financial impact of the proposals. When budgeting alternatives, the farm management worker will draw on knowledge of the various technical fields as well as of the field of economics. In addition, his budget will have to reflect the management capacity of the farm operator.

Budgeting is limited to situations where a small number of promising alternatives are to be analyzed. The researcher will find budgeting a large number of alternatives time consuming. However, a preliminary evaluation will usually narrow the number down to a few of the more promising alternatives which warrant further analysis by budgeting.

Selection of Case Study Farms

Eight Mecosta County farms were selected for analyzing various levels of additional investment. All were operated by men who expressed an interest in making long range adjustments for more successful farming. Table 1 gives a brief description of these five, one-man farms and three, two-man farms. With the exception of two men who were the senior partners on two father-son combinations, all eleven of the operators were under 50 years of age. Two of the farm operators worked off the farm for a hundred days or more in 1954 as did about 40 percent of all Economic Class I to IV farm operators in Mecosta County. Table 1 shows that four of the eight case farms would be classified in Economic Class IV. The Census reports that 57 percent of all of Mecosta County's Economic Class I to IV farms would fall in a similar category.

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TABLE 1
A DESCRIPTION OF THE EIGHT CASE FARMS IN MECOSTA COUNTY

Farm	Men per farm	Farm size	Type of farming	Cows	Milk Market	Product sales
	(number)	(tillable acres)		(number)		(dollars)
B	One	68	Dairy	12	Manuf.	4,700
D	"	130	Dairy	12	Manuf.	4,100
E	"	98	Dairy	11	Manuf.	3,400
F	"	160	Dairy	17	Fluid	6,000
G	"	138	General	10	Cream	4,900
A	Two	167	Dairy	25	Manuf.	8,500
C	"	126	General	15	Cream	8,300
H	"	160	General	12	Cream	13,700

The eight farms used in this thesis were among twelve that were selected for an earlier study of farming adjustments.⁵ The earlier selection was based on a preliminary survey taken in 1955 of 133 farms in Mecosta County. In this preliminary survey, information was obtained by personal interviews with nearly all of the farm operators in Economic Classes I to IV in a quarter of Mecosta's land sections. The questionnaire was designed to obtain general information about the farm business, such as the number of acres, number and kinds of live-stock, recent changes on the farm and attitude and age of the farm operator. Table 2 shows how the eight case farms used in this thesis fit into the group of 133 farms.

About half of the 133 farms appeared to have enough gross income to correspond to the Census definition of Economic Class IV farms. The other half corresponded to Economic Classes I-III farms. About 40 of the 133 farm operators were under 40 years of age; another 44 were 40 to 50 years of age; the remaining 49 operators were 50 years of age or older.

⁵E. F. Lord and R. G. Wheeler, "Opportunities For Higher Incomes On Mecosta County Farms," Mich. Agri. Expt. Sta. Quart. Bul., Vol. 39, No. 1, pp. 125-138.

TABLE 2

A CLASSIFICATION OF THE 133 PRELIMINARY
SURVEY FARMS AND THE EIGHT CASE FARMS

Men per farm (number)	Farm size (tillable acres)	Type of farming	Typical size of herd (cows)	Operators by age		Total farms (number)	Case farms selected (number)
				Under 50 years (number)	Over 50 years (number)		
One	30 to 140	Dairy	6 to 12	28	24	52	3
"	30 to 140	General	6 to 12	7	5	12	1
"	150 to 400	Dairy	12 to 17	12	2	14	1
"	150 to 400	General	6 to 11	7	3	10	
"	30 to 400	Other	None	4	2	6	
Two	80 to 140	Dairy	6 to 17	6	1	7	
"	150 to 240	Dairy	18 or more	4	6	10	1
"	80 to 240	General	18 or more	8	3	11	2
"	250 to 500	Dairy	18 or more	2	2	4	
More than two	250 to 500	General	18 or more	2	1	3	
More than two	150 to 240	Other	None	4		4	
Totals				84	49	133	8

The operators of the eight case farms expressed interest in improving their farm business and appeared to be in a position to make long range plans for more successful farming. These case farms were selected from 61 farms, nearly half of the 133 farms, that were in a similar situation. A frequency distribution of these 61 general and dairy farms shows that they have about the same proportional distribution among the categories listed in Table 2 as the 133 farms. Also, nearly half of the 61 farms sold farm-separated cream. Thirty-four percent of the 61 farms grew a small acreage of cash crops, with wheat and dry beans being the most popular.

The operators on the other half of the 133 farms lacked interest or were not in a position to develop more successful farm businesses because of age or for other reasons. Consequently, no case study farms were selected from this half of the total sample population. However, knowledge of the number and kind of these farm situations will help in discussing how the results found on the case farms apply to the area as a whole.

Information Needed for Budgeting

The information necessary for budgeting was obtained by a personal interview with each cooperating farmer. These data formed the basis for synthesizing a "benchmark" or "normalized" plan for each farm. This "benchmark" plan represented what might reasonably happen if a case study farm were operated for the next five to ten years about the same as it has been operated in the past few years.

Agricultural researchers and extension workers helped in estimating the technical and economic possibilities on Mecosta County farms. In addition, various types of literature provided helpful information. Price data were based on expected price relationships in Mecosta County over the next five to ten years.⁶

A particular set of resources coupled with a particular type of management resulted in the "normal" yields, practices and financial statements of the "benchmark" plan for a case farm. The "benchmark" plan then served as a point of departure for estimating on paper what might happen if additional investments were assumed to alter the present combination of physical resources. Management practices, yields and

⁶

See Appendix A for a list of the prices used.

financial results were assumed to vary in response to additional investment. By examining the effects of the changes in net farm income, opportunities for additional investment were evaluated for each case study farm.

Forms Used

A crop and livestock form⁷ was useful in planning changes for comparative budgeting of crop and livestock inputs, production and sales on a case study farm. When additional investment opportunities were explored, the changes from the "benchmark" plan were noted on one of the forms. Qualitative changes in production methods were proposed and then quantitative estimations were made about inputs and outputs. Acres in each crop were noted along with the yields, total production, crop receipts and fertilization application. For convenience, crops fed on the farm were converted to a corn equivalent or a hay equivalent basis. The livestock part of the form was designed to record livestock numbers, feed inputs, production and sales. The remaining part of the form was used for recording those purchases directly relating to crop or livestock production, namely fertilizer, stock, seeds, plants and feed.

A second useful form for comparative budgeting on the case farms contained the financial summary⁸ for the "benchmark" and any adjustment plans. The top half was used to record annual farm receipts (crops sales, livestock sales, and other) which add up to gross farm income. The bottom half was used to record annual farm operating expenses as well as

⁷ See Appendix B for crop and livestock form.

⁸ See Appendix C for financial summary form.

charges for interest and for replacement. A total of this expense column subtracted from the gross income yields net farm income for a year.

Alternative Levels of Investment

In this study, budgets were prepared to show the opportunities for additional investment at three levels--\$5,000, \$7,500 and \$12,500 on the one-man farms, and \$10,000, \$15,000 and \$25,000 on the two-man farms. At each level, alternative dispositions of funds in various combinations of stock, improvements, machinery and equipment were explored. In addition, promising management alternatives were investigated within each combination of additional physical resources.

The levels of investment set for this study were not high enough to provide capital for stock, machinery, buildings, improvements and also land purchases. Therefore, few opportunities involving land purchases were analyzed. In those cases where additional land was proposed, leasing was usually assumed. If a farmer can hold land by leasing, the limited amount investment funds can be used to acquire other resources.

CHAPTER III

RESULTS OF ANALYSIS

Net Farm Income Can Be Increased by Additional Investment

Farms in Mecosta County, a low income area, do offer remunerative opportunities for additional investment. As shown by Census data, many of Mecosta County's farmers now have gross incomes barely equal to the net incomes of many industrial workers. After deducting farm expenses from these gross incomes, many Mecosta County farmers have net incomes so low that their farms are typically not considered to offer attractive investment opportunities. However, if additional investments were made on these farms, the net income of their operators could be substantially increased.

Farm A

The analysis of Farm A points out the opportunities for additional investment on a 25-cow dairy farm in Mecosta County. Additional investment in this father and son partnership will increase the operators' net income after normal interest and replacement charges on the added investment have been deducted.

Since the younger partner returned from military service ten years ago, the operators have added 130 acres, bringing the total acreage to 300. Of this, about 167 acres are tillable. Forty acres of the tillable land are Isabella loam. The remaining 127 acres are sandy loams and loamy sands of the McBride and Montcalm series. A few of the fields have rather steep side hills.

The present cropping system for Farm A was designed to provide feed for the livestock. A rotation of corn, oats, hay, hay and hay has been followed on most of tillable acreage. However, the fields with the heavier textured soils sometimes have had a shorter rotation with fewer years of sod. On the other hand, the side hills with erosion problems have had longer rotations with no row crops. Twenty-five acres of corn produce 100 tons of silage and 600 bushels of grain annually. Thirty acres of oats, used as a nurse crop, add 425 bushels of corn equivalent to the feed supply. Sixty-five acres of alfalfa-brome yield 1.8 tons of hay equivalent per acre and 40 acres of rotational pasture yield about one ton of hay equivalent per acre. In addition 70 acres of permanent pasture provide about 14 tons of hay equivalent annually. Total plant nutrients from commercial fertilizer and manure applied on the 167 tillable acres have averaged 20 pounds of nitrogen, 25 pounds of phosphorus and 33 pounds of potassium per acre.

Milk from the 25 Guernsey cows comprises the largest single item of gross farm income. Production per cow has averaged 7,500 pounds of 4.4 percent butter-fat milk. The herd has been fed an average 2,400 pounds of grain and 5 tons of hay equivalent. Farm-separated cream was sold until recently, when a change was made to manufacturing milk. Most of the calves have been raised either for dairy replacements or for beef; seven steers and five heifers have been raised for sale annually.

The machinery inventory includes two tractors, a pickup truck, the usual tillage equipment, milking machine and a hay loader. Silage harvesting, corn picking and grain combining are custom hired.

The operators of this farm have kept a large percentage of the tillable acreage in sod for extended periods of time. Therefore,

roughage consuming livestock fit well with the present cropping system. However, possible expansion of the dairy enterprise is hindered because each of the three 40 by 60 foot barns is located a distance from the others. The present milking herd nearly fills the barn at the home place. A second barn, located about a mile away, houses the dry cows, the beef animals and some of the young stock. The third barn houses the rest of the young stock. None of three barns offers much opportunity for housing a larger milking herd without substantial remodeling.

Improving the roughage program appears to have promise for Farm A. Probably more total digestible nutrients could be grown per acre if improved roughage management practices were adopted. Annual applications of potassium and phosphorus on the alfalfa-brome sod would help to increase yields and improve the quality of roughage. Careful planning of rotational and strip grazing would help to provide ample quantities of roughage throughout the pasture season. Sudan grass or oats could be grown to supplement midsummer pasture. The operators could focus attention on better methods of roughage preservation. The present method of haying using a hay loader does not result in as high quality roughage as a grass silage program does. Grass silage can be cut and stored in one day but hay needs to be dried for several days before it is stored. Therefore, there is a greater probability that hay will be rained on and some of its digestible nutrients lost through leaching.

Increased milk production also appears to have promising possibilities for Farm A. Milk production per cow might be increased economically by feeding more grain and higher quality roughage. Remodeling the buildings and increasing the size of the milking herd might also prove economical. In addition, the productive capacity of the herd could be

improved if artificial breeding replaced the beef bull which is presently used and if replacement heifers were carefully selected for milk producing characteristics.

On the other hand, some of the more productive soils on Farm A might support an intensified cash-crop type of farming which would provide another source of income. For example, a few acres of potatoes or pickling cucumbers might add more income and still allow keeping the dairy enterprise intact if some improved dairy management practices were adopted.

Farm A was a two-man dairy farm as were 28 of the 133 farms in the preliminary survey. Farm A with 167 tillable acres was placed in a category with ten other two-man dairy farms ranging in size from 150 to 240 acres (Table 2). These ten dairy farms had herds averaging 25 cows. Four of the dairy farms, including Farm A, sold manufacturing milk.

The following seven plans explain the investment possibilities explored on Farm A. A summary of these seven plans is presented in Table 3. The important variations among the plans are the amount of investment, size of herd, production per cow, rates of feeding and quality and quantity of roughage.

Plan 1

In Plan 1, the operators will expand the dairy herd to 35 cows. The beef herd will be sold and the proceeds reinvested. A net investment of \$2,300 is proposed.

The basement of the barn where the beef herd is now housed will be remodeled and a loose housing system will be adopted. The operators will construct a milk parlor and a milkroom in one corner of this barn.

TABLE 3

SUMMARY OF INVESTMENT OPPORTUNITIES EXPLORED FOR FARM A

Item	Unit	Benchmark Plan	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6	Plan 7
Added investments in									
Buildings	(dollars)		1,500	2,000	3,900	2,000	5,700	10,200	9,600
Equipment	(dollars)			2,500	4,500	8,500	5,100	8,500	9,100
Livestock	(dollars)		2,000	1,000	2,800		5,400	7,500	7,500
Other	(dollars)					700			
Total Investment	(dollars)		3,500	5,500	11,200	11,200	16,200	26,200	26,200
Less: Sale of beef herd	(dollars)		1,200	1,200	1,200	1,200	1,200	1,200	1,200
Net Added Investment	(dollars)		2,300	4,300	10,000	10,000	15,000	25,000	25,000
Building Changes									
Pen barn			yes	yes	yes		yes	yes	yes
Milk parlor			yes		yes		yes	yes	yes
Milk room				yes	yes		yes	yes	yes
Bunker silo				yes	yes		yes	yes	yes
Paved yard					yes		yes	yes	yes
Potato storage						yes			
Milk Cows									
Milk per cow	(number)		35	30	37	25	43	50	60
Replacement heifers	(pounds)		8,000	8,000	9,000	8,000	11,000	11,000	9,000
Hogs raised yearly	(number)		9	12	15	5	15	20	22
Beef animals	(number)		2						
Feed crops	(number)		12	125	140		140	140	140
Wheat	(acres)		145	15		90			
Potatoes	(acres)		7			15			
Pickles	(acres)					20			
Net Income	(dollars)		4,365	5,610	7,990	7,030	9,830	11,220	11,410

An estimated \$1,500 would make these changes if the operators did most of the remodeling work themselves. Some changes in the management of the herd will be necessary. In the winter months, traveling to and from the pen barn for two milking operations per day might be burdensome. The proposals in this plan will overcome such a difficulty because most of the herd will freshen in the spring. As a result, all 35 cows would be milked during the summer and fall months. Then, for the winter months, the herd will be moved to the barn on the home place and the number of milking cows will correspond to the capacity of that barn. The young stock and the dry cows will continue to be housed at the third barn.

A few changes in the rest of the farm operation are proposed in Plan 1. Although the operators will continue producing manufacturing milk, changes will be necessary in the crop and livestock program; additional fertilizer, applied in accordance with soil test recommendations is expected to increase crop yields to 50 bushels for corn, 35 bushels for oats, 30 bushels for wheat and 2 tons for hay; fifteen tillable acres will be seeded for permanent pastures. An increase in milk production of 500 pounds per cow over the benchmark plan will result from higher quality feeds, better care, and the addition of ten "good" cows.¹

¹"Reference is made to average, good and very good Holstein cows having the inherent capability to produce 7,000, 10,000 and 13,000 pounds respectively, of 3.5 test milk when fed medium quality roughage and grain at the rate of one pound to each four pounds of milk produced." C. R. Hoglund, A Budgeting Guide In Estimated Feed Inputs and Milk Production When 1,200 Pound Holstein Cows Are Fed Variable Quantities of Grain and Three Qualities of Roughage, Agricultural Economics Department Mimeograph No. 670, (East Lansing, Michigan: Michigan State University, 1957), p. 1.

The \$2,300 net additional investment and the accompanying management changes will increase net income \$900 over the benchmark plan after paying normal interest and replacement charges (Table 4). The investment can be amortized in about three years.

Plan 2

In Plan 2, a shift to producing fluid milk is explored. A net additional investment of \$4,300 will provide five cows, a milkhouse, a 400-gallon bulk milk tank and a bunker silo. Purchase of six or seven bred heifers from proven stock will provide five good cows. The beef herd will be sold. Crop yields and fertilizer recommendations will be the same as in Plan 1. Twenty-seven tillable acres will be seeded to permanent pasture. The hay loader will still be used for haying; corn picking, silo filling and grain combining will be custom hired.

When contemplating a change to fluid milk, farmers often raise the question of bulk handling. Dairies in the Mecosta area prefer their new producers to have bulk handling rather than can facilities. Also, lending institutions, such as the Farmers Home Administration, are strongly in favor of bulk tanks on dairy farms when they make loans. Many of the recent Farmers Home Administration loans to fluid milk producers either included funds for a bulk tank or left enough credit to enable the farmer to purchase a tank if his dairy requests one later. On the other hand, one of the large dairies serving Mecosta County started a new can route which will operate for at least five years. A limited amount of investment will go further if a can market is available.

The farm operators should carefully consider several sizes of bulk tanks if a decision is made to adopt bulk handling of milk. Some farm

TABLE 4

COMPARATIVE FINANCIAL SUMMARY, FARM A

Item	Benchmark Plan	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6	Plan 7
	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)	(dollars)
Receipts								
Milk	5,610	9,000	10,070	14,080	6,800	20,150	23,500	23,070
Cattle and Calves	2,240	960	1,300	1,750	575	2,150	2,200	2,540
Eggs and Poultry	480	480						
Wheat	180	210	800		775			
Pickles					2,600			
Potatoes					5,910			
Total	8,510	10,650	12,170	15,830	16,660	22,300	25,700	25,610
Expenses								
Labor	200	200	100	200	200	900	1,000	1,000
Feed	700	800	530	650	260	2,900	4,180	3,640
Straw and seed	220	250	300	300	1,600	1,200	1,000	1,000
Machine hire	200	300	400	200	200	130	100	100
Lime	120	240	240	240	200	240	240	240
Fertilizer	600	910	1,010	1,230	2,340	1,330	1,230	1,330
Breeding and vet.	220	300	330	420	270	570	650	670
Misc. supplies	150	350	300	380	200	450	500	600
Gas and oil	500	600	700	700	700	700	700	700
Building upkeep	150	175	150	300	150	300	300	300
Machine upkeep	800	800	800	800	800	800	800	800
Replacement of equipment	500	500	660	900	1,320	1,000	1,200	1,300
Replacement of buildings		50	50	200	130	300	430	370
Property taxes and ins.	285	285	315	330	330	400	400	400
Electricity and telephone	400	400	450	450	400	500	500	500
Interest on debt		125	225	540	530	750	1,250	1,250
Total	5,045	6,285	6,560	7,840	9,630	12,470	14,480	14,200
Net Income	3,465	4,365	5,610	7,990	7,030	9,830	11,220	11,410

management men see a bulk tank as just the beginning step towards much larger herds and higher quality cows. If this is true, the operators of Farm A may be wise to set their goals higher than suggested in this plan and to consider a bulk tank larger than specified. A bulk tank is an expensive item and it will last for many years. The holding capacity of the tank can be under-used but the maximum capacity cannot be expanded as more milk is produced. Therefore, the farm operators should carefully evaluate the alternatives: (1) investing funds in presently unused capacity of a bulk tank with possible long run savings and (2) shorter useful life of a small bulk tank with the opportunity of investing funds elsewhere in the interim.

The stable has 18 stanchions which would not accommodate the proposed 30 cow herd if most of the herd is freshened in one season. However, if six more stanchions were added under the center of the barn, it would have 24 stanchions. Then, by following a careful breeding program, a uniform freshening pattern could be established so that no more than 24 cows would need to be milked at any one time. The six dry cows and 12 young-stock would be housed in the other barn.

The proposals of Plan 2 will increase the net income \$2,200 over the benchmark plan after paying interest and replacement charges (Table 4).

Plan 3

In Plan 3, an estimated net investment of \$10,000 will provide 12 more cows, a 400-gallon bulk tank, a remodeled barn and more silage facilities. The beef herd will be sold.

The typical rotation will be corn, oats, hay and hay. However, the hilly and lighter texture soils will have three years or more of sod; the heavier textured soils will have a more intensified corn

rotation. Fertilization recommendations and crop yields will be the same as presented for Plan 1 except for the alfalfa-brome.

A pole-type lean-to will be constructed along the east side of the barn at the home place. Further remodeling of the barn basement will provide a feeding area, an inexpensive four-stall milking parlor and a milk room. Fluid milk will be sold. A bunker silo will be constructed either on the east or south side of the barn. An addition to the cement barnyard will complete the \$3,900 building investment.

Large quantities of high quality roughages will help to increase milk production per cow. Grass silage will form the nucleus of the high quality roughage program although 15 acres of corn silage will also help. The first cutting of alfalfa-brome will be harvested for silage in the early summer. If the pasture did not provide adequate quantities of roughage in midsummer, grass silage could be fed until the pasture improved. The second crop of alfalfa-brome will be used for pasture, hay or silage. Two hundred pounds of 0-20-20 per acre applied to the alfalfa-brome ground after the first cutting will help to boost hay yields to 2.5 tons.

The grass silage will be stored in the new bunker silo at the home place. The silo will have a 20 by 60 foot cement floor and earthen sides which might be lined with cement or timbers at a later date. This latter proposal would decrease spoilage, increase self-feeding possibilities and reduce maintenance requirements.

Either a small new or large used forage harvester and a forage wagon will be purchased. These implements will play an important role in the high quality roughage program because both grass silage and chopped hay will be harvested.

The purchase of 12 "good" cows together with an artificial breeding program will help to increase the productive capacity of the herd. Then by feeding each cow an average of 5.5 tons of high quality roughage and 37 bushels of corn equivalent, a 9,000 pound milk production per cow is estimated.

A net investment of \$10,000 in this plan will produce a \$4,400 increase in net income over the benchmark plan after paying interest and replacement charges (Table 4).

Plan 4

In Plan 4, a 20-acre potato enterprise and a 15-acre pickling cucumber enterprise in addition to the present dairy herd are considered as a possible alternative at the \$10,000 net investment level.

Several years ago potatoes were raised on this farm. However, low potato prices and yields induced the operators to discontinue this enterprise. Inadequate summer rainfall, low fertilization and poor seed were factors partially responsible for the low yields. In Plan 4, ways of overcoming these difficulties are suggested.

Farm A has a wet swampy section which will probably yield an adequate supply of water for irrigation. An estimated \$700 will pay for digging a pond and an estimated \$4,000 will purchase the pump, motor, pipe and sprinklers to complete the system.

Three rotations are suggested. A potato, oats and alfalfa-brome (green manure) rotation will be followed on 60 acres of the heavier soils; a cucumber, wheat, hay and hay rotation will be followed on the lighter soils; and the remaining 32 acres will be in a four year rotation consisting of corn, oats, hay and hay.

Twelve hundred pounds of 5-20-20, 200 pounds of ammonium nitrate and 30 bushels of certified seed per acre, in combination with an ample supply of water will help to produce the estimated 400 bushel yield of potatoes. About 80 percent of the 8,000 bushels will grade US # 1 and will bring an average price of 90 cents per bushel. Two-thirds of the US # 1's will be sold at harvest time or shortly thereafter. The remaining one-third of the crop will be stored on the farm in a new potato storage building. Approximately 1,000 bushels of cull potatoes will provide a substitute for some of the grain normally fed to the dairy herd. In addition a few cull potatoes will be sold to neighbors for cattle feed.

The irrigation system will also be used on the 15 acres of pickling cucumbers which are expected to produce 350 bushels per acre. However, the harvesting laborers will receive 50 percent of the crop for picking and an additional 3 percent of the crop will be retained by the pickle company for recruiting the harvest laborers. Consequently, the operators of Farm A will only receive about \$175 per acre for their pickling cucumbers.

The operators will keep the 25-cow dairy enterprise and will continue to produce manufacturing milk. A 500 pound increase in milk production per cow above the benchmark plan will result from substituting 1,000 bushels of cull potatoes for 250 bushels of corn in the dairy feeding program.

The net investment of \$10,000, as proposed in Plan 4, will increase net income over the benchmark plan by \$3,600 after paying interest and replacement charges (Table 4).

Plan 5

Plan 5 is similar to Plan 3 except that Plan 5 is at the \$15,000 net investment level. Most of the investment over Plan 3 will be spent for 18 "very good" cows and the larger facilities needed to house and to care for a 43-cow dairy herd in a building layout similar to Plan 3. The forage harvester, pen barn, bunker silo and paved yard will be larger than those proposed for Plan 3. The same size milkroom and milk parlor will handle both herds. However, a larger bulk tank will be needed for Plan 5 because 25 percent more milk will be produced than in Plan 3. The operators will shift to a fluid milk market.

The high quality roughage program will be similar to the one proposed for Plan 3. However, the cows in Plan 5 will have a higher inherent productive capacity and the operators will feed an average of eight more bushels of corn per cow. As a result the herd is estimated to produce 2,000 pounds of milk more per cow than in Plan 3. About 75 percent of the corn will be purchased.

In addition to a higher level of investment, Plan 5 also includes more management changes than Plan 3 does. An 11,000 pound milk production might be more appropriate to propose after the operators have attained the 9,000 pound level of Plan 3. Therefore, Plan 5 might evolve after the operators gained proficiency at the level suggested in Plan 3.

In Plan 5 net income prospects are estimated to improve \$6,360 over the benchmark plan after interest and replacement charges are deducted (Table 4).

When farmers are contemplating adjustments in their farm businesses, a wise move is to determine if these adjustments are "once and for all"

changes or whether more changes will come in the future. Many of the adjustments made on farms today will give way to further changes in the future. Therefore, farmers will be wise to consider making adjustments on their farms in such a way that further adjustments can be made as the agricultural situation changes from year to year.

Plan 6

Can Farm A profitably increase cow numbers to the point where only roughage is produced on the farm and all of the concentrates are purchased? Many farmers are faced with this question as the trend continues towards larger dairy farms.

To exploit this plan will call for a \$25,000 net investment and major adjustments in the present farming system. Cow numbers will be increased to 50; the milking herd and 20 replacements will be the only livestock kept; the operators will cull the present herd severely to eliminate the low producers. Then, by adding 25 "very good" cows and adopting an artificial breeding program, the inherent productivity of the herd will be increased. Furthermore, careful attention to the roughage program, as suggested in Plan 3, will result in improved roughage harvesting methods and in the production of high quality roughages. Then feeding 45 bushels of corn plus 200 pounds of protein supplement along with 5.5 tons of high quality roughage, a herd average of 11,000 pounds of milk per cow will be expected. A shift will be made to a fluid milk market.

The building layout will also be similar to the one explained in Plan 3. The barn on the home place will be used as a hay storage and feeding structure; a new pole barn will have a resting and a loafing area; the silage will be stored in two new bunker silos lined with

concrete; and a milkroom equipped with a bulk tank and a milking parlor equipped with a pipeline milker will be located in the basement of the old barn.

A large forage harvester, a used tractor, two forage wagons and a bulk tank will be included in the machinery investment.

Even with the purchase of 4,180 bushels of ear corn, the plan is estimated to add \$7,760 net income over the benchmark plan (Table 4). One disadvantage in this plan is that the high producing cows and the larger herd will warrant having two men on hand for each milking. However, the senior operator is approaching the age where he will want to do less work on the farm. Therefore, the junior operator might be faced with the possibility of hiring a man on a year-round basis rather than just during the summer months as proposed. Even so, this plan will provide income for the junior partner's labor, retirement income for the senior partner and, if necessary, income for a full time hired man.

Plan 7

A net investment of \$25,000 is proposed in Plan 7. Like Plan 6, Plan 7 will also have a larger dairy herd. Thirty-five "good" cows will be added to bring the total for the herd to 60. However, the same amount of milk will be produced as in Plan 6 because of the lower average milk production per cow (9,000 pounds). The operators will sell fluid milk.

With some small adjustments both buildings and machinery as outline in Plan 6 will handle the ten added cows. Both the pen barn and the milk parlor are quite flexible in their cow carrying capacity. The milk parlor in Plan 7 does not include a pipeline milker at this time but probably one will be installed later. In terms of operating hours, this

plan proposes using the forage harvester much more than in Plan 6 because, during the summer, a daily supply of roughage will be cut and hauled to the barn so that no pasture is required. This latter proposal will increase hay equivalent yields 0.5 tons per acre. The same amount of labor as proposed in Plan 6 will be able to care for the 60-cow herd.

Feed requirements per cow will be less for Plan 7 than for Plan 6. By feeding an average of 35 bushels of corn equivalent together with 5.5 tons of high quality roughage the operators can expect an average of 9,000 pounds of milk per cow. All of the feed grains will be purchased as in Plan 6.

Increases in net income prospects are about the same, \$7,945, as for Plan 6 (Table 4). Both Plans 6 and 7 might have higher returns if the operators raised all of their grain themselves. On the other hand, by purchasing grain, the operators can spend more time with the milking herd and can keep more cows.

Low, medium and high levels of added investment on the eight case farms.

Analyses similar to the one presented for Farm A were made for the seven other case farms. Opportunities for additional investments at the low, medium and high levels were explored for all of the case farms. In addition several different combinations of new resources and management changes were suggested at each level of investment. A summary of possibilities at the three levels for each farm is presented in Table 5.

As shown in Table 5 all of the case farms had remunerative opportunities at the three levels of investment. The farm operators can expect an average of \$1,840, \$2,540 and \$3,700 added net income from investments at the low, medium and high levels, respectively. The

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range in net income prospects can be partially explained by two factors. One is that the case farms were chosen to represent a diversity of farm situations. A second factor is that even within a group of farms similar in many characteristics, a wide difference can occur in the type of resources at hand and the capacity of the farm operator.

TABLE 5

ADDED NET INCOME FROM THREE LEVELS OF ADDED NET
INVESTMENT ON EIGHT MECOSTA COUNTY FARMS^a

Farm	Level of added investment		
	Low (\$5,000)	Medium (\$7,500)	High (\$12,500)
	(dollars)	(dollars)	(dollars)
One-man			
Farm B	2,280	2,330	4,200
D	1,200	1,600	3,080
E	1,800	3,100	3,700
F	2,160	2,620	3,720
G	1,400	2,260	3,260
Two-man ^b			
Farm A	2,260	3,180	3,980
C	2,040	2,610	4,500
H	1,600	2,600	3,200

^aThe benchmark plan was the base to which income and investment were added.

^bAdditional investment and income on the two-man farms were divided by two to convert the figures to a comparable basis with the one-man farms.

One should not draw the hasty conclusion that all investments on Mecosta County farms will be rewarding. Careful planning and comparative budgeting were necessary to identify the promising opportunities present here. Many different possibilities were investigated. However, not all were feasible or attractive.

The Most Attractive Opportunities for Additional
Investment are in the Dairy Enterprise

Of the enterprises competing for additional investment on Mecosta County farms, dairying seems to offer the most attractive opportunities.

Generally, the additional investments helped to intensify or to expand the present dairy enterprise. Often, some of the livestock and crop enterprises were discontinued to make way for the additional investment in the dairy enterprise.

Dairying appears to be attractive for additional investment for several reasons. One reason is that several of the large dairies supplying Detroit, Lansing and Grand Rapids with fluid milk are expanding the fringe of their milk shed to include parts of Mecosta County. Moreover, these increased demands for drinking milk will probably continue during the next 10 to 20 years.

Many Mecosta County farmers are familiar with dairying. The 1954 Census shows 73 percent of the farms in Mecosta County had milk cows. In the past, farm-separated cream and manufacturing milk were the main dairy products of Mecosta dairy farms. However, education and judgement will show advantages of producing a higher valued dairy product to people familiar with dairy farming. Usually one can visualize changes within an enterprise easier than changes necessary to establish a new enterprise.

Mecosta County's communities have been built around dairy farming needs. Farmers will deal with the local businessmen for supplies and probably will look to the local lending agencies for credit. The townspeople and businessmen know and understand how dairy farming is important to their communities; therefore, they will be willing to help farmers acquire the additional dairy facilities. In addition many of the productive resources essential for dairying are already available on Mecosta County farms.

Equal Investments in a Dairy Enterprise
and in a Poultry Laying Flock

Some of the problems affecting additional investment in a new enterprise as well some of the problems facing small farmers producing manufacturing milk in Mecosta County are investigated for Farm B. The following analysis of investment opportunities on Farm B compares equal investments in a dairy enterprise and in a poultry laying flock enterprise at both the low and high levels. A summary of the investment opportunities described here is presented in Table 6.

Farm B

In 1955, Farm B had a gross income between \$2,500 and \$5,000 as did half of the farms in the preliminary survey. Furthermore, Farm B was placed in the largest group in Table 2. This group was composed of 52 one-man dairy farms with 30 to 140 acres of tillable land. The operator of Farm B sold manufacturing milk as did 40 percent of the farm operators.

Farm B has two 40 acre tracts of land of which 63 acres are tillable. Five additional tillable acres are rented from a sister. Crops grown on these 68 acres provide all of the feed, except protein supplement, for a 12-cow Holstein herd, replacement young stock and a bull. The dairy herd averages 9,000 pounds of milk per cow. The usual practice has been to feed 1,800 pounds of grain and 5.2 tons of hay per cow.

The operator provides most of the labor for the farm operation. However, he does participate in a labor exchange agreement with the neighbors during the feed harvesting season; he contracts labor to pick seven acres of pickling cucumbers; and his wife takes care of 120 layers.

The 68 tillable acres are level and predominately McBride sandy loam. No typical rotation appears to have been followed. However, the operator has grown wheat, cucumbers, oats, hay and hay in one sequence

and corn, wheat, hay and hay in another sequence. Usually the operator has applied 200 pounds of 3-12-12 to the wheat, oats and pickling cucumbers to produce 25 bushels, 35 bushels and 200 bushels per acre, respectively. The corn has produced 35 bushels per acre with applications of only stable manure. The alfalfa-brome sod does not receive any fertilizer. The operator applies lime when soil test results warrant.

The machinery inventory includes two tractors, a half-ton pickup truck, a combine, a two-unit milking machine, the usual tillage equipment and a few small tools.

The operator feels the continual cost-price squeeze and is looking for ways to improve his income prospects over the next few years. One of the more pressing problems at the present time is that total crop production is limited by the small number of tillable acres. The operator has tried to increase the present feed supply by renting cropland from neighbors on a yearly basis. However, uncertainty of yearly cash renting hinders long range planning. Higher rates of fertilization and improved management practices will help to increase yields. Even so, only a limited increase in total crop production can be realized on the small acreage of Farm B.

The buildings are another limiting factor. Nineteen stanchions and two box stalls fill the basement of the barn. The tie-up is crowded and has caused many teat injuries. The 10 by 24 foot silo will not store enough silage for the present 12-cow herd. The milkroom facilities will not meet requirements for selling fluid milk so a new milkroom will probably need to accompany any major changes in the dairy enterprise.

The operator might solve these problems in several ways. He could apply more intensive management practices to the present resources; he could continue renting, when possible, with hopes of obtaining a long term lease; or he might enlarge the buildings by adding a bunker silo, a pen type stable or a young stock shed. Most of these ideas will probably be more attractive if a shift is made to fluid milk.

Another possibility would involve shifting to an enterprise such as poultry and buying the extra feed that is needed. Some of these investment and management possibilities are explained below. A brief summary of the four plans is presented in Table 6.

Plan 1

Most of the changes resulting from the \$5,000 investment in Plan 1 will occur in the dairy enterprise. A milkhouse meeting requirements for selling fluid milk will be constructed. As the possibilities of selling fluid milk seem to depend rather heavily on the operator's willingness to adopt bulk handling facilities, this plan will include a 300-gallon tank. The present small upright silo will be replaced with an unlined bunker silo. Four cows will be added and an artificial breeding program will be adopted; any further increase in cow numbers above the 16 proposed in this plan will require more stanchions or a larger barn.

Some changes in the rotations are proposed. Twenty acres will be in a cucumbers, wheat, hay, hay and hay rotation, 20 acres will be in a corn, cucumbers, oats, hay and hay rotation and 27 acres will be in a corn, hay and hay rotation. A late fall or early spring seeding of oats (1/2 bushel per acre) will establish the alfalfa-brome sod. Fertilizer applications of 150 pounds of 5-20-20 on corn, 300 pounds on oats, 300 pounds on wheat and 200 pounds on pickling cucumbers will help to boost yields to 45, 40, 35 and 200 bushels, per acre,

TABLE 6

SUMMARY OF INVESTMENT OPPORTUNITIES EXPLORED FOR FARM B

Item	Unit	Benchmark Plan	Plan 1	Plan 2	Plan 3	Plan 4
Added investments in						
Buildings	(dollars)		1,500	2,500	5,300	6,500
Equipment	(dollars)		2,700	1,200	4,200	5,000
Livestock	(dollars)		900	1,300	3,000	3,500
Total Investment	(dollars)		5,000	5,000	12,500	15,000
Less: Sale of dairy herd	(dollars)					2,500
Net added investment	(dollars)		5,000	5,000	12,500	12,500
Building changes			Milk house Bunker silo	Poultry house & equipment	Pen barn Milk room Milk parlor Paved yard	Poultry house & equipment
Equipment changes						
Milk cows	(number)	12	16	12	Bulk tank Chopper	Corn picker Feed mill
Milk per cow	(pounds)	9,000	9,500	9,000	27	
Replacement heifers	(number)	3	4	3	10,500	
Layers	(number)	120		900	6	2,700
Replacement chicks	(number)	80		1,000		3,100
All crops	(acres)	68	68	68	98	68
Wheat	(acres)	5	5			
Pickles	(acres)	7	9	7	10	
Total receipts	(dollars)	4,740	7,480	10,640	12,710	23,600
Total expenses ^a	(dollars)	2,820	3,755	7,900	6,530	18,170
Net income	(dollars)	1,920	3,725	2,740	6,180	5,430

^aCharges for interest and replacement are included.

respectively. An application of 200 pounds of 0-20-20 on the alfalfa-brome sod after the first cutting will increase quality and quantity of roughage. Five and a quarter tons of hay equivalent together with 30 bushels of corn equivalent fed per cow will result in a herd average of 9,500 pounds of milk per cow.

An investment of \$5,000 as indicated in Plan 1 will add \$1,800 net income over the benchmark plan after deducting interest and replacement charges.

Plan 2

During the preliminary visits, the operator and his wife expressed an interest in adding a poultry enterprise as opposed to investing additional funds in the dairy enterprise. One of the possibilities for adding a poultry laying flock to Farm B is explored in Plan 2. The 12-cow enterprise will be continued as in the benchmark plan.

The proposed \$5,000 investment will provide equipment, buildings and stock for the new poultry enterprise. A single story insulated poultry building will be constructed to house a 900 bird laying flock. The house will also have facilities for brooding 1,100 late-winter-hatched replacement chicks. Annual replacement and careful feeding are estimated to help to attain an average of 18 dozen eggs per bird annually.

Two rotations will be followed--35 acres in a cucumbers, corn, oats, hay and hay rotation and 32 acres in a corn, oats, hay and hay rotation. As a result, all of the feed for the dairy herd will be raised and a large part of the poultry feed will be purchased. The fertilization rates are somewhat lower in this plan due to a liberal use of hen manure, although yields remain about the same as in Plan 1.

The ration for the laying flock will consist of an average of 30 pounds of supplement and 60 pounds of corn and oats per bird. Twenty pounds of corn and oats plus ten pounds of supplement will be fed to each replacement chick. Innoculations and antibiotics will be used as necessary.

The operator's wife will do much of the work for the larger poultry enterprise. Even so the changes in Plan 2 will only increase net income by \$800 after paying interest and replacement charges.

Plan 3

The proposals in the previous plans stayed within the limits of the present acreage and explored possibilities for intensifying production. In recent years, the operator has rented 30 acres on a yearly basis. This has helped the feed situation in the short run. However, the uncertainty of the year-to-year lease does not encourage him to adopt good soil management practices or to expand his operation as much as he desires. He has tried to buy land in the neighborhood but he feels that land prices are high in relation to the added feed that the land will produce. Expansion to a 25 to 30-cow dairy herd will be easier to visualize if more land is available.

In Plan 3, the assumption is made that the operator can obtain a long-term lease, on 30 acres of land with the same productivity as his own 63. This long term lease, will encourage the operator to improve his soil management practices which will lead to higher crop yields. He will raise enough roughage on the 98 acres to feed 27 cows and 6 replacements. However, the cucumbers, corn, oats, hay and hay rotation and the corn, oats, hay and hay rotation, will only furnish about 60 percent of the grain requirement. The remaining 30 percent will be purchased, along with three tons of supplement.

Careful selection and purchase of 15 cows of proven ability and the wise use of artificial breeding will increase the productive capacity of the herd. Then a high quality roughage program including grass silage, and the good management that the operator has demonstrated will form a basis for a 1,500 pound increase in milk production per cow over the benchmark plan.

About \$9,500 will be invested in new buildings and machinery. A new self-feeding bunker silo will replace the small upright silo; the present barn will be used primarily for hay and straw storage; part of the present stable will be converted to a milkroom and milk parlor; some of the remaining space will be used as a feeding area for the dairy herd; and a pole frame addition to the barn will provide additional space for a loose housing system. These accommodations will comfortably house 27 milking cows. The calves and yearlings will be housed separately in a part of the old barn. A small forage harvester and a bulk tank are the items of machinery to be purchased for Plan 3.

The adoption of the proposals presented in the plan will increase net income \$4,260 after interest and replacement charges are deducted.

Plan 4

A flock of 2,700 layers and an investment of \$15,000 is proposed in Plan 4. Of this investment, \$2,500 will come from the sale of the dairy herd. A more intensified cropping system is suggested for Plan 4. The pickling cucumbers, oats and wheat will be replaced by a second year of corn to form a corn, corn, hay and hay rotation. The home grown corn will supply about half of the total feed requirement for the poultry flock; the other half will be purchased. The operator will feed about 20 pounds more of corn and oats per hen than in Plan 2. Egg production

is estimated to average 21 dozen eggs per bird, three dozen more than in Plan 2. In Plan 4, the operator will spend fulltime tending the flock. Furthermore, with some automatic equipment, the present family labor and about four months of hired help are expected to meet the labor needs.

The investment program in Plan 4 includes remodeling the present barn to house the pullets on the ground floor. Part of the second floor will provide additional pen space for any overflow of pullets. The proposed two-story laying house will have community nesting and automatic waters. The laying house plans do not include an automatic feeder but probably one will be installed in the future. The house will have a grain storage and an equipped egg room.

A corn picker will also be purchased partly because of the larger corn acreage and partly to take advantage of any opportunities to rent additional corn ground or to purchase standing corn. A feed mill and mixer will be purchased. The hay will be baled and sold.

Adoption of the proposals for Plan 4 will increase net income \$3,410 after interest and replacement charges are deducted.

A laying flock is one way to intensify a Mecosta County farm with a limited acreage. However, as illustrated by Farm B, a sum invested in a laying flock does not appear to provide as remunerative a combination of resources as an equal sum invested in the dairy enterprise. The soil and its relation to feed production for livestock appears significant here. Mecosta's soils will produce fair yields of corn, wheat and oats. However, a rotation that will maintain the soil productivity will require about half or more of the rotation to be in sod crops. The dairy cow requires large quantities of easily produced roughages and only small amounts of supplemental grain. In contrast, a laying flock requires all grain and no roughage.

Equal Investments in a Dairy Enterprise and in a Potato Enterprise

The farmers of Mecosta County have grown a few acres of cash crops to diversify their cropping systems and their sources of income. Wheat, pickling cucumbers, potatoes and dry beans are some of the typical cash crops. Wheat is probably grown as much for the straw as for the grain. The other crops are usually produced for sale. The opportunities for added investment in a specialized potato and a specialized dairy enterprise are compared for Farm C.

Farm C

Farm C was one of a group of 11, two-man farms that were classified in Table 2. The group included general type farms which had 80 to 240 acres of tillable land. All of the farms had a few acres of wheat; most of the farms including Farm C, also had other cash crops such as dry beans and potatoes. The 11 farms had dairy herds ranging from 3 to 26 cows; seven of the farms sold cream as did Farm C.

Farm C has 106 tillable acres that are located in one tract at the home farm. The soils in this tract are classified as Isabella loam or loamy sand. Two additional tracts, located about a mile away from the home farm, contain 20 acres of lighter textured cropland. Occasionally, 35 acres or so have been share-rented from neighbors.

A father and his 30-year old son operate this general type farm which had 15 Holstein cows, 50 hogs, 10 veal calves, 12 acres of cranberry beans and 7 acres of potatoes. The feeding rates have averaged 40 bushels of corn equivalent and 5.5 tons of hay equivalent per cow. These rates have resulted in an average of 10,000 pounds of milk per cow, a record well above the county average of 5,500 pounds. The practice on Farm C has been to sell the cream and to feed the skim milk to hogs and

and veal calves. In addition, the hogs have received about 12 bushels of corn equivalent each before reaching the market weight of 220 pounds.

A rotation that has been followed on 40 acres is potatoes, corn, oats, hay, hay and hay; a second rotation that has been followed on 30 acres is wheat, corn, beans, oats, hay, hay and hay. Ten acres have been in permanent pasture. Moderate fertilizer applications have helped to produce 45, 50, 55, and 250 bushels of wheat, corn, oats and potatoes per acre, respectively. Hay yields have been 1.5 tons per acre. In recent years, harvest labor problems have caused the operators to reduce the potato acreage and to substitute dry beans as the main cash crop.

The buildings and machinery have been kept in good repair. A 30 by 40 foot machinery barn, built within the last few years, houses two Farmall H tractors, a baler, a combine, a two-row potato planter, a six-row potato duster and some small tools. Seventeen stanchions arranged in two rows facing in are located across the west half of the 40 by 60 foot barn. Part of the east half is used as a farrowing shed for the spring and fall litters and part as a stable for four to eight head of young stock.

Farm C has several problems which may affect investment possibilities. Inadequate water drainage often delays cropping operations in several fields. Droughts in midsummer, a shortage of harvest labor and a limited number of marketing channels affect potato expansion possibilities. Low hay yield and a corresponding shortage of roughage have meant that occasionally the operators have increased the rate of concentrate feeding in an effort to maintain milk production. The present milking herd and replacements fill the 17 stanchions. The small milkroom which

is attached to the west side of the stable, does not meet fluid milk standards. Consequently, dairy expansion possibilities are limited, without remodeling the dairy buildings.

Farm C has several promising possibilities as indicated in Table 7. By draining the wet spots and by adopting improved soil management practices, a specialized potato enterprise could be developed. During summers with good growing conditions, the operators have reported 450 bushels of potatoes per acre. However, because of the frequency of midsummer droughts, the long-term average yields will fall below this figure. Some of the severe drought conditions could be lessened by irrigating the potatoes during the dry periods. Either a pond dug in one of the several wet spots or a deep well will furnish sufficient water.

On the other hand, more liberal use of lime and fertilizer would increase roughage yields. Then by reducing the acreage of cash crops, roughage production would be further increased, paving the way for a larger dairy herd. Furthermore, the operators could explore either remodeling the present barn and adding more stanchions, or constructing a pen barn addition and a milking parlor; adoption of fluid milk would involve changing the present milkroom and adding a milk cooler.

Plan 1

A \$10,000 investment in a specialized potato enterprise is suggested in Plan 1. By using 100 acres at the home farm and renting an additional 50 acres from neighbors, 76 acres of potatoes will be raised on Farm C. The operators will spend fulltime on potato production and will also use all of the land in a potato rotation. The cows, dairy equipment and the other livestock will be sold and the proceeds reinvested in the potato enterprise.

TABLE 7

SUMMARY OF THE INVESTMENT OPPORTUNITIES EXPLORED FOR FARM C

Item	Unit	Benchmark Plan	Plan 1	Plan 2	Plan 3	Plan 4
Added investment in						
Buildings	(dollars)		4,800	3,100	7,000	8,400
Equipment	(dollars)		7,200	3,500	17,400	6,900
Livestock	(dollars)			2,600		9,000
Other	(dollars)		1,300	1,000	3,400	1,300
Total investment	(dollars)		13,300	10,200	28,300	25,600
Less: sale of cows	(dollars)		3,300		3,300	
Net added investment	(dollars)		10,200		25,000	25,600
Building changes						
			Potato storage	Milk house	Potato storage	Pen barn
				Remodel barn		Milk house
				Bunker silo		Milk parlor
				Young stock shed		Bunker silo
						60
						10,500
						21
						102 + 50 rented 126 + 40 rented
Milk cows	(number)	15		30		
Milk per cow	(pounds)	380 ^a		10,000		
Replacement heifers	(number)	4		9		
Hogs raised yearly	(number)	46		27		
All crops	(acres)	126	102 + 50 rented	126		
Wheat	(acres)	11		15		
Potatoes	(acres)	7	76		76	
Beans	(acres)	12			25	
Rented to others	(acres)		25			
Total receipts	(dollars)	8,375	21,650	14,170	34,320	27,000
Total expenses^b	(dollars)	6,335	17,510	8,090	24,930	15,890
Net income	(dollars)	2,040	4,140	6,110	9,390	11,110

^apounds of butter fat.^bIncludes charges for interest and replacement.

Specialized potato equipment including a two-row planter, a roto-beater, a two-row digger, a six-row sprayer and additional field crates will need to be purchased. Other changes will involve remodeling the present dairy barn into a potato storage and draining several of the wet spots.

Thirty-eight acres of early potatoes and 38 acres of late potatoes will spread the harvesting over a two month period. As irrigation is not proposed, a 300 bushel yield per acre is expected. A three year rotation (late potatoes, oats and clover, and early potatoes followed by a rye cover crop) will permit growing two potato crops and two green manure crops in three years. The oats and hay will be sold. Thus, a cash crop occurs in each year of the rotation.

Seven hundred pounds of 5-20-20 per acre will be applied to both the early and late potatoes. The rye cover crop will receive 150 pounds of ammonium nitrate; this fertilizer will supply nitrogen to the cover crop and also provide some nitrogen to supplement the regular spring fertilizer application on the late potatoes.

Potato prices are very uncertain from season to season. Although \$1.00 per bushel was used in this analysis, fluctuation of over 100 percent can be observed in the potato price cycles. Therefore, some potato specialists generalize that a potato farmer makes a good profit one year out of five. In the other four years, the farmer makes little profit or loses money. This statement may not be entirely true. However, a prospective grower will need sufficient operating capital to sustain a few unprofitable years until he is rewarded with favorable prices and/or yields.

If the operators adopt Plan 1, they will have to overcome harvest labor problems and also they will have to develop a market for their

potatoes. In the last 12 years the potato acreage in Mecosta County has been reduced drastically from 4,490 acres in 1945 to less than 500 acres in 1957. Therefore, neither potato buyers nor potato harvest laborers visit the county in any appreciable number. A large quantity of potatoes as suggested for Plan 1 will help to overcome these problems. A long potato harvesting season and a large quantity of potatoes will insure several weeks of work which should help to attract harvest laborers. In addition, the large quantity of potatoes produced will help to solve the marketing problem because the operators can offer large lots of uniform quality potatoes for sale, thereby attracting buyers and enabling the operators to bargain effectively.

This \$10,000 net investment in a specialized potato enterprise will increase net income by \$2,000 over the benchmark plan after deducting interest and replacement charges.

Plan 2

Expanding the dairy herd to 30 cows is suggested in Plan 2. The operators will invest \$10,000 and make several changes before they complete the transition to Plan 2. A shift will be made to a fluid milk market. The dairy barn will be remodeled to accommodate the larger herd. A new pole frame building located near the present barn will house the young stock. Enlarging the present milkroom and adding a bulk tank will meet requirements for selling fluid milk. The swine enterprise will be reduced to 27 hogs and two sows.

A wheat, corn, hay and hay rotation and corn, oats, hay, hay and hay rotation will be followed in Plan 2. Two hundred pounds of 0-20-20 applied per acre after the first cutting will increase alfalfa-brome yields to 2.5 tons per acre. Fertilizer expense for the other crops will be

twice the amount in the benchmark plan. Tile drains will be laid to several of the troublesome wet spots.

A forage harvester and horizontal silo will form an integral part of the improved roughage program. Alfalfa-brome will be harvested at the optimum maturity and the oats will be either pastured or ensiled depending on roughage requirements at harvest time.

Artificial breeding, a 30 percent rate of culling, better care and improved management will increase milk production 1,000 pounds per cow. Moreover, as excellent quality roughage will be preserved in this plan, the herd will consume about 0.5 tons more per cow.

The \$10,000 investment as outlined for Plan 2 will increase the net income by \$4,100 over the benchmark plan after deducting interest and replacement charges.

Plan 3

A specialized potato enterprise similar to the one proposed in Plan 1 is explored in Plan 3. However, Plan 3 calls for \$25,000 net investment. The dairy herd will be sold. The home farm and 50 acres of rented land will be used in a three year potato rotation similar to the one described in Plan 1.

Rather than turn to a larger acreage for increased production, more intensified potato production practices are proposed for Plan 3. For example, irrigation together with an application of a ton of 5-20-20 per acre will help to increase potato yields 175 bushels over Plan 1.

The growing of both early and late potatoes will spread the harvesting season over six to eight weeks. All of the early crop and part of the late crop will be sold directly from the field or will be stored for only a short period of time before being sold. About half of the late crop will be stored for several months if necessary.

Plan 3 requires a much larger investment in machinery and equipment than Plan 1. Most of the investment over Plan 1 will be needed for the irrigation system. The pump, motor, pipe, sprinklers, deep well and well screen are estimated to cost \$12,600.

If the operators adopted Plan 3, they could expect net income prospects to improve by \$7,560 over the benchmark plan after deducting replacement and interest charges.

Plan 4

For Plan 4, the operators will invest \$25,600 in a 60-cow dairy enterprise. The 166 acres, including 40 acres of rented land, will be in a corn, oats, hay, hay and hay rotation. In this plan, all of the crops will be used for roughage; the oats will be pastured or ensiled; the corn and a large part of the grass will also be ensiled; and ear corn will be purchased.

The roughage program, including two horizontal silos, a new forage harvester and optimum fertilization, will help to supply an adequate quantity of high quality roughage. The roughage production practices will correspond to those outlined in Plan 2. Early cut grass silage and roughage harvested daily will be fed to the herd at the barn as a substitute for pasture.

The dairy herd will consume an average of six tons of high quality roughage and 35 bushels of corn, and will produce 10,500 pounds of milk per cow. The adoption of an artificial breeding program, the culling of 21 cows annually and the demonstrated dairy husbandary of the operators will help to realize the adjustment presented for the dairy enterprise.

The construction of a loafing shed is suggested to provide facilities for a loose housing system. A milkroom will be equipped with a bulk tank and a milk parlor will be constructed in part of the old barn. The operators will shift to a fluid milk market.

Two men will be needed to milk the 60-cow herd. This higher labor requirement may become burdensome because the older operator will probably want to do less farming in the future. However, his five grandsons are beginning to help with the chores now and are expected to be more helpful in the future. On the other hand, this plan offers enough net income so outside help can be hired if necessary.

A \$25,000 investment, as outlined Plan 4, is estimated to add \$9,080 net income to the benchmark plan after paying interest and replacement charges.

Three Promising Areas in Dairy for Additional Investment

As shown in the foregoing analysis, Mecosta County farms have opportunities for remunerative investment in livestock, buildings and equipment and machinery for the dairy enterprise. These areas are not necessarily listed in the order of importance. However, the optimum combination of productive factors for any particular Mecosta County dairy farm will require a wise apportioning of investment funds among the three areas. The magnitude of investment in any one area will vary with the management capacity of the farm operator, the production practices followed and the resources presently owned. Table 8 shows the average investment in these three areas for the most promising dairy plans that were proposed for the eight case farms.

Wilcox and Cochran's 1951 statement explaining that additional investments are necessary to increase productivity is applicable to

Mecosta County farms seven years later. They said that the national average of 5,200 pounds of milk per cow does not compare with the 8,000 to 10,000 pound average many dairymen get.

All these methods [better feeding,] housing, and care of cows and better selection and breeding of increasing milk production per cow, except the better care, involve using additional capital applied in combination with the existing dairy herd and operator's labor. A similar analysis holds for rates of crop production; on most farms heavier application of fertilizer, more use of insecticides, and better seed bed preparation would increase both yields and profits. Only the best farmers use the right forms of capital in sufficient quantities with their land, breeding stock, and labor. The adoption of the most efficient combination of factors in farm production would increase output per farm and per farmer 25 to 50 percent above current levels in most American communities.²

TABLE 8

AVERAGE ADDED INVESTMENT PER FARM IN LIVESTOCK, MACHINERY
AND BUILDINGS UNDER VARIOUS DAIRY INVESTMENT PLANS
PROPOSED FOR EIGHT MECOSTA COUNTY FARMS

Item	Level of Investment		
	Low	Medium	High
	(dollars)	(dollars)	(dollars)
One-Man Farms			
Livestock	1,200	2,860	4,800
Machinery	1,700	2,100	3,420
Buildings	1,920	2,040	4,340
Two-Man Farms			
Livestock	3,460	5,160	7,600
Machinery	2,800	5,130	9,000
Buildings	3,530	5,160	8,460

Adjustments towards larger sized dairy herds were relatively attractive for most of the case farms. Table 8 shows the average investment in livestock at the three levels for the case farms. Not only

²Willard W. Cochran and Walter W. Wilcox, "Economics of American Agriculture" (New York:Prentice-Hall, Inc., 1951), p. 42.

more cows but also cows of a high inherent productive capacity were proposed in the investment plans. This meant "good" or "very good" cows and improved practices such as Cochran and Wilcox describe.

Machinery was a second important area of investment on Mecosta County farms (Table 8). In the analyses of the case farms, machinery and equipment were estimated to provide the increased labor productivity needed to keep more and better quality cows. Such items as forage harvesters, bulk tanks, forage wagons, and tractors were proposed in many of the investment plans.

The third area of remunerative investment was in dairy buildings (Table 8). As explained previously typical Mecosta County barns have a few stanchions, few milkroom facilities, and small silos. These factors tend to limit present milk production and milk production practices to standards of many years ago. Therefore, many opportunities exist for remodeling and constructing dairy buildings.

Low cost buildings constructed to minimize labor requirements for chores were included in most of the dairy plans. Because of the larger demands for high quality roughages, silage storages were proposed in many of the investment plans.

Remunerative opportunities exist for shifting to the production of fluid milk. Usually the price for fluid milk is about a dollar higher than the price of manufacturing milk. The additional dollar per 100 pounds received for fluid milk will amortize the additional investment in a milkroom, a cooler and other fluid milk facilities in a relatively short period of time.

Improved management practices were proposed to accompany the additional investments. An attempt was made to balance additional

investment with those practices that seemed feasible for the particular farm. Investment in the dairy enterprise by itself will not be remunerative unless the investment is also accompanied by the type of management which will effectively use the new physical resources.

Limited Opportunities for Additional Investment

Most of the case farms had several rather promising opportunities for additional investment. However, the analysis of the investment opportunities on Farm D indicates that not all of Mecosta County farms are as fortunate.

Farm D

Farm D was drawn from a group which contained about a third of the 133 farms in the preliminary survey. This group was composed of one-man dairy farms with 30 to 140 acres of tillable land.

Although two men live on Farm D, neither of them is considered to be a full-time operator. The father is at an age where he does little farming and the 30-year-old son has worked full time off-the-farm during the winters. Of the 240 acres owned, 130 acres are tillable. The soil types range from loamy sands to sand. Farm D probably has a larger amount of light sandy soil types making up its total cropland than the other case farms.

Annual applications of 14 pounds of nitrogen, 21 pounds of phosphorus and 26 pounds of potassium have helped to produce 15 bushels of wheat, 30 bushels of oats, 10 bushels of kidney beans and 25 bushels of corn per acre, respectively. Pickling cucumbers and sugar beets have been grown in recent years but both produced disappointing results because of a combination of droughts and light soils.

The 12-cow dairy herd is about the typical size for many of Mecosta County farms. The operators have produced manufacturing milk as did about a third of the 133 farms. Four replacement heifers, four beef steers, two bulls, three work horses, ten hogs and one sow are included in the livestock inventory. On a per-cow basis, the dairy herd averaged 3,500 pounds of 4.0 percent butterfat milk and consumed 20 bushels of corn equivalent and four tons of hay equivalent.

The livestock and crops yields, as presented above, were lower than usually found on the other case farms. Probably a substantial improvement in practices will be necessary before investments will increase the net income.

The barn 40 by 30 foot has a watering trough in the center, five stanchions on the west side, three stanchions on the north side and three stanchions on the east side. Such an arrangement makes chores burdensome. However, remodeling may be as costly as constructing a new pole barn addition and adopting a loose housing system.

Crop yields on the light soils have been low. The operators of Farm D could overcome droughty conditions by irrigation, although it has not been used in the neighborhood. If the operators have to rely on their demonstrated cropping practices and yields as a basis for credit, they may encounter considerable difficulty in borrowing additional funds for a new irrigation venture. Table 9 outlines the opportunities for additional investment that are described below.

Plan 1

Plan 1 includes a \$5,000 investment in an irrigation system. The younger operator will continue working off-the-farm as he does at present.

TABLE 9

SUMMARY OF INVESTMENT OPPORTUNITIES EXPLORED FOR FARM D

Item	Unit	Benchmark Plan	Plan 1	Plan 2	Plan 3	Plan 4
Added investment in						
Buildings	(dollars)		600	2,000	4,100	4,600
Equipment	(dollars)		3,800	1,500	5,500	4,700
Livestock	(dollars)			1,500	3,000	3,800
Other	(dollars)		1,200		500	
Total investment	(dollars)		5,600	5,000	13,100	13,100
Less: sale of stock	(dollars)		600		600	600
Net added investment	(dollars)		5,000	5,000	12,500	12,500
Building changes						
			Bunker silo	Remodel Barn	Pen barn	Pen barn
				Milk house	Milk house	Milk house
					Milk parlor	Milk parlor
					Bunker silo	Bunker silo
Milk cows	(number)	12	10	15	25	30
Milk per cow	(pounds)	3,500	7,000	7,000	8,000	8,500
Replacement heifers	(number)	10	3	7	5	5
Hogs raised yearly	(number)	10		10		
Steers and bulls	(number)	6				
Feed crops	(acres)	85	66	80	86	95
Wheat	(acres)	10	7	15	12	15
Potatoes	(acres)		15			
Pickles	(acres)	7	15		12	
Dry beans	(acres)	20	7	15		
Total receipts ^a	(dollars)	4,095	8,920	6,780	10,370	10,890
Total expenses ^a	(dollars)	2,245	6,140	3,765	6,140	6,455
Net income	(dollars)	1,850	2,780	3,015	4,230	4,435

^aCharges for interest and replacement are included.

Fifteen acres of potatoes, proposed in this plan, will be irrigated. As Farm D already has a potato planter and a digger, a sprayer will be the only specialized potato equipment purchased in this plan. Yields of 375 bushels per acre are expected to materialize from irrigation, 600 pounds of 5-20-20, 200 pounds of ammonium nitrate and the use of certified seed. The crop is estimated to grade about 80 percent US # 1. These potatoes will bring an estimated 90 cents a bushel when sold directly from the field. No winter potato storage is proposed in this plan.

Irrigation together with three tons of 5-20-20 applied to 15 acres of pickling cucumbers will result in a 3,600 bushel cucumber crop.

Other cash crops included in the rotation are seven acres of cranberry beans producing seven bushels per acre and seven acres of wheat producing 14 bushels per acre. The corn, oats and hay will provide enough feed for the livestock. Twenty acres of Rubicon sand in the northwest corner of the farm will be reforested under this plan thereby reducing the number of tillable acres to 110.

Although none of the new investment is proposed for the dairy enterprise, the sale of all of the livestock except the cows and replacement heifers will yield some funds to reinvest in better quality dairy cows. The operators will cull out the low producing cows and raise only the better heifers. The two bulls will be replaced by artificial breeding. Feeding practices to be adopted will require improving the quality of roughages and feeding five more bushels of corn equivalent per cow. Feeding cull potatoes will also contribute to increased milk production. The better management practices will help to increase milk yields of the ten-cow herd to the 7,000 pound mark.

Income prospects from this \$5,000 investment in irrigation equipment are increased about \$1,000 over the benchmark plan after deducting interest and replacement charges.

Plan 2

Plan 2, another possibility at the \$5,000 investment level, places more emphasis on the dairy enterprise. The operators will shift to fluid milk production. The dairy herd will be expanded to 15 cows. The other livestock enterprises will be continued as in the benchmark plan. The 110 acres will be in a corn, oats, hay, hay and hay rotation, or wheat, beans, hay, hay and hay rotation. Twenty acres of Rubicon sand in the northwest corner will be reforested. Crop yields and fertilizer recommendations will be the same as in Plan 1. Silo filling and grain harvesting will be custom hired.

A new cement tie-up with 15 stanchions will be built in the barn. A milkhouse, located on the east side of the barn will meet requirements for producing fluid milk and will be equipped with a 200-gallon bulk tank.

Careful selection and purchase of ten heifers from dams of proven ability will increase the productive potential of the herd. Then, through improved dairy management practices as outlined in Plan 1, and more attention to individual cows the herd will average 8,000 pounds of milk per cow. The feeding rates for the herd will average five tons of high quality roughage (including pasture, hay, and grass silage) 30 bushels of corn equivalent and 250 pounds of protein supplement.

The operators may experience difficulty getting on a fluid milk route with the small herd proposed here. However, the bulk tank will be in their favor.

The older partner can probably carry on the chores during the winter months while the younger operator continues his off-farm work. The proposals in Plan 2 will add about \$1,150 to net income over the benchmark plan after deducting interest and replacement charges.

Plan 3

The suggestions for Plan 3, at the \$12,500 net investment level, include both an expanded dairy enterprise and a larger cash cropping program. All of the livestock but the cows will be sold. A small irrigation system will be purchased to irrigate 12 acres of pickling cucumbers and 32 acres of midsummer pasture. The largest part of the investment will provide facilities for a 25-cow dairy herd averaging 8,000 pounds of milk per cow.

A loose housing system will be adopted. The present barn will serve as a feeding, maturity and young stock barn; a new pole barn will be constructed to provide a resting and loafing area; a new milkhouse will be equipped with a bulk tank; a two-stall milk parlor located in the old barn will enable one man to milk the 25 cows. Improved management practices as outlined in Plan 2 and the addition of 15 "good" cows will help to attain the estimated 8,000 pounds of milk per cow.

The grain required for the larger herd cannot be produced on the 110 acres. About 580 bushels of corn and three tons of protein supplement will be purchased annually. Roughage quality will be improved by adopting a better silage program; a used forage harvester and bunker silo will be instrumental in this program. Some first cutting alfalfa-brome will be ensiled to supplement summer pasture. In addition to the grass silage, ten acres of corn will be harvested for silage.

This plan would require the full-time attention of the younger operator. Therefore, he would have to give up his off-farm job. The adoption of Plan 3 would increase net farm income by \$2,380 after deducting interest and replacement charges. This increase in farm income would probably not offset the loss of off-farm income.

Plan 4

If the operators demonstrated an ability to substantially increase milk production per cow, a \$12,500 net investment in a 30-cow dairy herd may have possibilities on Farm D. The proposals of Plan 4 will require \$12,500 to provide facilities similar to but larger than those described in Plan 3. In addition, 20 "good" cows will be purchased and the other livestock except ten cows will be sold. All of the concentrate feed will be purchased, thereby freeing the 110 tillable acres for roughage production. A used forage harvester and a bunker silo are proposed to aid in preserving high quality silage.

Because of the proposal to feed high quality roughages and the assumptions of better management and better cows, the milk production per cow is estimated to be 8,500 pounds. The herd will consume an average of 5.5 tons of roughage, 30 bushels of corn equivalent and 150 pounds of protein supplement.

Sixty acres will be in a wheat, oats, hay and hay rotation; 50 acres will be in a corn, oats, hay and hay rotation; and 20 acres of Rubicon sand will be reforested. All of the forage during the summer months will be chopped daily and hauled green to the dairy herd to substitute for a pasture program.

If the younger operator gives up his off-farm job and invests \$12,500 in a 30-cow dairy operation he could expect, under Plan 4, a

\$2,550 increase in net farm income after deducting interest and replacement charges. However, the increase in income would probably be offset by the loss of the off-farm income.

If funds were readily available to the operators of most of the case farms, they could farm more successfully than they do at present. However, the analysis indicates that even if funds were more readily available to the operators of Farm D, they would probably not achieve much success in farming.

Investment in Part-Time Farming

About ten percent of the farm operators in Economic Classes I to IV in the 133 farm survey reported full-time off-farm jobs. With this number of farm operators engaged in off-farm employment, a question of investment opportunities on these farms arises. The part-time farmer is faced with at least four alternatives. He could continue off-farm employment and the farm as presently done; he could invest additional funds in a full-time farm business; he could invest additional funds in part-time farming and continue to work off-the-farm; or he could turn to full-time employment off-the-farm and give up farming. Some of these alternatives are explored for Farm E, a part-time farm.

Farm E

Farm E was one of a group of 52, one-man farms that were classified in Table 2. These farms had 30 to 140 acres of tillable land and 6 to 12 cows. The operator of Farm E sold manufacturing milk as did the operators of 40 percent of the farms in this group; he was under 50 years of age as were half of the farm operators in this group.

The operator and his family are trying to build this part-time farm into a full-time farm unit. The 98 tillable acres of land are

mostly Mancelona loamy sand, Montcalm sandy loam and Rubicon sand; part of the Rubicon sand is being reforested.

A typical rotation has been corn, oats, hay, hay, hay and hay. A few acres of pickling cucumbers and corn have been grown in the past few years as cash crops but this is not the usual practice. Commercial fertilizer has been applied to all of the cropland except the pasture at rates averaging 4 pounds of nitrogen, 15 pounds of phosphorus and 15 pounds of potassium per acre. Most of the cropland has also received manure. The livestock enterprises have varied from time to time. Eleven cows produce 6,800 pounds of milk per cow. By both natural and artificial breeding, the Durham herd of a few years ago has been converted to the present predominately Holstein herd. A few veal calves, hogs and layers are usually raised on the farm. Several years ago, 8,000 broilers a year were raised.

The operator and his wife have been investing their off-farm income in the farm. The 15 year old son shows an interest in the farm and is participating in Vocational Agriculture. The family plans to have a 20-cow dairy herd producing fluid milk. When the operator turns to full-time farming, he will increase production and yields because he will be able to give more careful attention to the farm operation. Higher fertilizer rates will be expected to improve yields of roughages and grain. The family has made enough progress in improving the farm to date so the operator is considering the merit of remodeling the dairy barn and building a new milkhouse. Some of the opportunities for additional investment are summarized in Table 10.

Plan 1

In Plan 1, the operator will continue to work full time off-the-farm; the family will provide a large share of the labor demands for the 20-cow

TABLE 10

SUMMARY OF INVESTMENT OPPORTUNITIES EXPLORED FOR FARM E

Item	Unit	Benchmark Plan	Plan 1	Plan 2	Plan 3
Added investments in					
Buildings	(dollars)		3,100	2,500	4,000
Equipment	(dollars)		300	2,500	5,500
Livestock	(dollars)		1,600	2,500	3,000
Total investment					
Building changes	(dollars)		5,000	7,500	12,500
			Milk house	Pen barn	Pen barn
			Remodel barn	Milk parlor	Milk parlor
			Young stock shed	Milk house	Milk house
					Bunker silo
Equipment changes					
			Can cooler	Bulk tank	Bulk tank
Milk cows	(number)	11	20	25	30
Milk per cow	(pounds)	6,600	7,500	8,000	8,700
Replacement heifers	(number)	3	5	6	8
Hogs raised yearly	(number)	8	8	10	2
Feed crops	(acres)	93	98	98 + 20 rented	98
Wheat	(acres)	5	5	5	
					Chopper W/wagon
Total receipts					
Total expenses^a					
	(dollars)	3,440	7,030	9,080	11,395
	(dollars)	2,880	4,650	5,400	7,140
Net income					
	(dollars)	560	2,380	3,680	4,255

^aCharges for interest and replacement are included in expenses.

dairy herd. The barn will be remodeled and 20 stanchions will be added. A young stock shed will be constructed and attached to the barn. Other additions will include a milkhouse and can cooler; a shift to a fluid milk market is proposed. A total investment of \$5,000 is needed for this plan.

Milk production of 7,500 pounds per cow will result from a combination of improved management practices, artificial breeding and nine additional "good" cows. More attention will be focused on producing high quality roughages. This will involve harvesting hay at the proper stage of maturity and planning the pasture program carefully so that sufficient roughage will be available throughout the year. Hay baling and grain combining will be custom hired.

All of the necessary roughage can be produced with a corn, oats, hay, hay and hay rotation and with a wheat, hay, hay, and hay rotation. Then, by doubling the application of fertilizer, 45 bushels of corn, 40 bushels of oats and 2.1 tons of hay per acre will be expected.

The adoption of these proposals will increase net income \$1,800 over the benchmark plan after deducting interest and replacement charges. However, this plan will make large labor demands on the operator who will have a full-time farm job as well as a 40 hour-a-week off-farm job.

The operator may have difficulty being accepted for a fluid milk market because of the small 20-cow herd and the can cooler that are proposed in Plan 1. If his plans are to change to fluid milk, a possible alternative to this plan would be to consider a bulk tank along with more cows and no off-farm work.

Plan 2

In Plan 2 the operator will give up his off-farm job. The \$7,500 investment plan adds 14 "good" cows and a bulk tank. The larger herd

can probably be housed more economically in a loafing shed than in the stanchion barn used under Plan 1. Therefore, a pen stable will be constructed. Then the present barn will be used as a hay and straw storage and as a young stock barn. A four-stall milk parlor will be constructed in the basement of the old barn. The proposed milkhouse will have a bulk tank. Fluid milk will be sold.

Milk production of 8,000 pounds per cow is expected from feeding 5.5 tons of hay equivalent and 35 bushels of corn equivalent. Leasing 20 acres will increase the area of cropland enough so that all of the feed can be produced for the larger herd.

A \$7,500 investment in the 25 cow, fluid milk enterprise, as outlined in this plan, will increase the net income of the operator \$3,000. Even so, the increased net farm income will not offset the loss of off-farm income.

Plan 3

In Plan 3 the operator will enlarge the dairy herd to 30 cows. The transition from the benchmark plan to Plan 3 will call for a \$12,500 investment. A pen barn will be constructed to house the larger herd; the old barn will provide feeding and hay storage space; and a milk parlor and a milkroom will be similar to the one proposed for Plan 2.

The cows will consume an average of 35 bushels of corn equivalent and 5.5 tons of hay equivalent. A large portion of the roughage will come from high quality pasture, grass silage and hay. The corn will be ensiled and the oats either pastured or ensiled. A forage harvester and a 100-ton bunker silo will be the largest investments in the improved roughage program. Milk production per cow is estimated to increase 2,200 pounds over the benchmark plan.

Rather than rent land as in Plan 2, the operator in Plan 3 will use all of the crops grown for roughage, and will purchase ear corn.

The proposals presented for Plan 3 will increase net farm income of the operator by \$3,700 after deducting interest and replacement charges. The increase in net farm income will nearly offset the loss of off-farm income.

Other Farm Situations

The following analyses of the remaining three farms briefly describe their more promising possibilities for additional investment.

Farm F

Farm F was one of the 21 farms in the preliminary survey on which fluid milk was produced. This farm was further classified in a group with 14, one-man dairy farms which had 150 to 400 tillable acres (Table 2); the typical size herd ranged from 12 to 17 cows.

Farm F had 17 cows and 160 acres of tillable land including 38 acres of rented land. A large part of the land at the home farm is kept in permanent pasture. Grass silage and ear corn are typically produced on rented ground or purchased "in the field" if possible.

The dairy herd has averaged 7,800 pounds of milk per cow from feeding rates of one ton of grain and five tons of hay equivalent. In addition to the 17 cows, four replacement heifers have been raised and added to the herd each year. Occasionally, a few hogs have been fed surplus corn.

Silage harvesting is the only important operation that cannot be accomplished with the presently owned machinery. A sharing agreement with a neighbor who has a forage harvester appears to solve this problem

satisfactorily. The barn basement has a stable with the 20 stanchions for the milking herd and a tie-up for the young stock. An 18 by 120 foot cement lined horizontal silo is located at the back of the barn; this silo holds much of the roughage for the barn feeding period.

The added incomes and investments are listed in Table 5 and briefly described below. The plan at the low level of investment will include ten additional cows, remodeling the barn and adding a forage harvester. An investment in these proposals will increase net income \$2,160 after interest and replacement charges are deducted. The medium investment plan will include about the same adjustments as proposed at the low level plan. The herd will be enlarged to 29 cows. Most of the added investment over the low level plan will be for a bulk tank. As a result, an increase in net income of only \$2,620 will be realized from the medium investment plan. In the high investment plan, a 30-cow herd is proposed. Milk production will be increased 2,200 pounds per cow over the benchmark plan. The increase will be attributable to better quality cows, to better management and to better feeding practices as outlined for Plan 3 of Farm A. An additional five bushels of grain will also help to exploit the higher inherent productivity of the herd. The high investment plan will improve net income \$3,720 over the benchmark plan after deducting interest and replacement charges.

Farm G

Farm G, a general type farm, was classified with 11 other general farms which had 30 to 140 acres of tillable land (Table 2). Most of the farms in this group had 6 to 12 cows. Six farms had a few beef cattle and a few hogs. All 11 of the farms grew cash crops. However, there was no one crop grown on all the farms. Six of the farms produced farm-separated cream as did Farm G.

The operator of Farm G acquired management of the 138 tillable acre farm from his father a few years ago. About 60 percent of the operator's gross income came from various livestock enterprises. The remaining 40 percent was derived from the sale of wheat and dry beans. By following conservative practices the operator has received two dollars of net income for each dollar of expenses.

The livestock inventory includes 10 dairy cows, 5 beef animals, 25 hogs, 60 layers and a bull. Hay is the only roughage that has been stored for winter feeding; the farm has no silos. The barn has 17 stanchions plus maternity pens and a young stock tie-up. The stock are watered in the barnyard. The operator milks the dairy herd by hand and separates the whole milk on the farm. He sells cream to one of the local creameries and feeds the skim milk to veal calves and hogs.

The three levels of investment presented in Table 5 show how much this operator can increase his net income through added investment. Several changes are proposed in the low investment plan. Ten "good" cows will be added and artificial breeding will be adopted. A milking machine and a change to a manufacturing milk market are proposed. Higher rates of fertilizer will increase roughage quantity and quality. Then by feeding good quality hay and pasture, and five bushels more of grain, the operator will increase milk production 2,500 pounds per cow. Such changes will increase net income \$1,400 after deducting interest and replacement charges.

In the plan at the medium investment level, the operator will shift to a fluid milk market. A bulk tank and fluid milk facilities will require most of the added investment over the low level. This investment opportunity is expected to increase net income prospects \$2,260 after paying interest and replacement charges.

The high level includes another step towards developing a larger dairy farm. Here, about the same production and management practices are proposed as in the low and medium investment plans. The operator will increase the herd to 30 "good" cows and will adopt a silage program. A forage harvester, horizontal silo and forage wagons will help in harvesting and preserving high quality grass and corn silage. Then, the high quality roughage and five more bushels of corn equivalent fed per cow will increase milk production 3,500 pounds over the benchmark plan. The proposals included in the high investment will increase net income \$3,260 after deducting interest and replacement charges.

Farm H

Farm H, a two-man general type farm with 160 tillable acres was placed in a group with ten other two-man general farms which had 80 to 240 tillable acres (Table 2). Wheat was grown on all of the farms; most of the farm operators raised dry beans; and a few operators raised pickling cucumbers and string beans.

During the past few years, the two young brothers who operate Farm H have concentrated on building up the soil productivity. By growing green manure crops and by applying heavy rates of fertilizer, they have increased the crop yield substantially. The operators are now focusing their attention on expanding the 12-cow dairy herd and on changing to a fluid milk market. During the period of transition, the operators have produced 8,000 broilers and 25 hogs annually. The 160 acres of tillable land operated includes 35 which are rented on a crop share agreement.

Investments in both the broiler enterprise and the dairy enterprise were budgeted. The opportunities in the broiler enterprise were not

as rewarding as investments in the dairy which are listed in Table 5 and described below.

Proposed at the low level of investment is a 30-cow dairy herd. The operators will continue to rent the 35 acres but on a cash basis. They will continue the 8,000 broiler enterprise. Remodeling the present barn into a hay storage, constructing a pen barn and building a horizontal silo are proposed to provide housing and feed storages for the 30-cow herd. Furthermore, the investment funds will provide a bulk tank, 25 bred heifers and a small forage harvester. This low level of investment plan is estimated to return \$3,100 over the benchmark plan after paying interest and replacement charges.

The medium investment plan includes increasing the herd to 40 cows. Thirty-five acres of land will be rented on a cash basis. Most of the added facilities will be similar to the low investment plan but larger to accommodate the larger herd. The operators will devote full time to caring for the milking herd and will discontinue the broiler enterprise. At the medium investment level, net income would be increased \$5,200 over the benchmark plan after deducting interest and replacement charges.

At the high investment level, a 50-cow dairy herd composed of "very good" cows is proposed. The building and machinery additions will be similar to Plans 1 and 2 but larger to accommodate the larger herd. The broiler enterprise will be discontinued and 65 acres of land will be cash rented. This plan is estimated to yield an increase of \$6,400 net income after paying interest and replacement charges.

By selecting only the farms that were in a position to make forward looking plans, about half of the farms in the preliminary survey of

Mecosta County were not considered for analysis of possible investment opportunities. One of the typical characteristics of the farms not considered was that the operator was over 55 years of age with no prospective replacement. The question arises, "What significance do the investment opportunities on the case study farms have for farm situations not included in the study?"

Those farm operators who have retired or are approaching retirement age usually think of less farming rather than more farming in the future. However, the investment opportunities on these farms do have significance to their operators. Traditionally, older farmers have expected a retirement income from renting their farms, doing less farming, selling the farm, or receiving non-farm income. The income from rent or sale of the farm will be determined in part by the productive potential of the farm unit. A prospective operator will probably make some adjustments if he assumes operation of the farm. If the retiring farm operator has an accurate picture of additional investment opportunities and adjustment possibilities, he could better evaluate his farm. Furthermore, the promising opportunities will be a selling point when he is negotiating with prospective leasees or buyers. Therefore, by keeping additional investment opportunities in mind the farmer approaching retirement age can obtain a clearer picture of his retirement income possibilities.

Some of the miscellaneous type farms that were not included in the study might have quite different investment opportunities than presented here for the case farms. However, these farms were few in number and rather unique in organization when compared to the general and dairy type farms typical of the area. For example, a few orchard farms were found and a few farms seemed to have success growing string beans or

strawberries. Processing plants located several miles from the county might purchase string beans, cherries, apples, strawberries, and other fruit and vegetables. However, these processors offer only limited opportunities at the present time for large scale expansion of Mecosta County farm businesses.

CHAPTER IV

SUMMARY AND IMPLICATIONS

Additional investments in combination with changes in farm organization and practices would provide the basis for substantially higher incomes for Mecosta County farmers. This conclusion is based on comparative budgeting analysis of investment opportunities on eight farms in this low income area.

A 1955 survey of 133 Economic Class I to IV farms in Mecosta County indicates that about half of the farm operators were in a position to make forward looking plans. Similar results would probably have been found for the 3,830 Economic Class I to IV farms in six nearby counties. Altogether 2,200 farm operators in Mecosta County and the nearby counties may be ready to plan aggressively for the future.

Operators of the eight case study farms were selected from those of the original survey group who were ready to make forward looking plans. Although eight farms cannot represent all of the actual farm situations in the area, the cases chosen do represent a variety of typical farm situations. Therefore, the analysis for these farms will shed light on investment opportunities for many similar units in the Mecosta County area.

Additional investments at levels of \$5,000, \$7,500 or \$12,500 per operator on the eight Mecosta County farms can in general be expected to increase the net incomes of the operators after paying normal interest and replacement charges. An investment of \$5,000 on each of the five,

one-man farms will increase the average net income of these farm operators by \$1,770. The estimated increases range from \$1,200 to \$2,280.

At the medium and high levels of investment, the two part-time operators would give up their off-farm jobs. With investment of \$7,500 on each farm, the operators could expect an average increase of \$2,350 in net farm income. This would not be large enough to offset the loss of off-farm income. With investments of \$12,500 on each farm, the operators could expect an average increase of \$3,390 in net farm income. This would barely offset the loss of off-farm income.

The full-time operators on the other three, one-man farms could expect increases in net income of \$2,330, \$2,620 and \$2,260 respectively, with a \$7,500 investment per farm. With investment of \$12,500 per farm these three farm operators could expect increases of \$4,200, \$3,720 and \$3,260 in net income.

With the same three levels of investment per operator on the three two-man farms, their operators could expect average increases in net farm income per man of \$1,960, \$2,790 and \$3,890, respectively.

The dairy enterprise on the case farms presented the most promising opportunities. Two factors making expansion of the dairy enterprise attractive were the farmers' familiarity with dairying and their present ownership of dairy resources.

Three areas for additional investment in dairy farming were buildings, machinery and equipment, and livestock. A wise apportioning of additional investment funds among the three areas is needed for successful dairy farming. Nearly all of the dairy investment plans proposed additional cows. Investments in the other two areas varied with

the proposals presented for each plan. However, substantial adjustments in the three areas were proposed for all the case farms. By adopting the suggested adjustments, the operators could substantially increase their net incomes.

For five of the eight case farms, the most attractive opportunities at the low level of investment included a combination of about 25 percent more cows, increase milk production per cow, and the addition of fluid milk handling facilities. For a variety of reasons, the above adjustments did not apply to the three other case farms. Farm F already had a milkroom and was producing fluid milk. Extensive barn remodeling and 50-percent larger milking herds were proposed for Farms C and G. On four of the eight case farms, the low level of investment included a forage harvester.

At the high level of investment on seven of the case farms, the most promising possibilities would include at least doubling the size of the herd, producing more milk per cow, adding milkrooms, milking parlors, bulk tanks, forage harvesters, silage storages, and loose housing barns. The exception Farm F, already had a horizontal silo and a 17-cow herd; a 70 percent increase in herd size was proposed. On all eight farms, the plans at the high level of investment proposed selling fluid milk and expanding the herds to approximately 30 cows per man.

At the low level of investment on Farm B, a poultry laying flock would return about \$1,000 less net income than an equal investment in a dairy enterprise. At the high investment level, a poultry plan would return about \$700 less. On Farm H, investment in a broiler enterprise did not appear as attractive as an equal investment in a dairy enterprise.

Investments in a specialized potato enterprise on Farm C were estimated to increase net income only 60 percent as much as equal

investment in dairy. On Farms A and D small acreages of potatoes were considered. However, investment in these proposals did not appear to increase net income prospects as much as investment in dairy would.

Farm D had the least promising opportunities for additional investment. The investment possibilities were limited because most of the cropland was of a light sandy type and the operator had demonstrated very little ability to achieve satisfactory results from the dairy herd. Production averaged only 3,500 pounds of milk per cow. A low level investment in part-time farming on Farm E would increase the operator's net farm income, but the expanded farming operation would compete strongly with the off-farm job for the operator's time. At the medium investment level, the operator would give up his off-farm job but he could not expect the increased net farm income to offset the loss of off-farm income. A high level of investment in fulltime farming would nearly offset the loss of off-farm income.

Most of the larger demands for feed and crops could be met on the land presently held if higher fertilization rates, better seed, and improved drainage or irrigation were adopted. Because of this, no additional land was proposed for six of the eight case farms at the low and medium levels of investment. At the high level, additional land was proposed for three farms. By leasing rather than purchasing, additional land could be farmed and investment funds could be used to acquire other resources.

Investors and farmers need to appraise the opportunities for additional investment on Mecosta County farms. The extensive type of cropping system required for dairy farming is better adapted to the soils of Mecosta County than the intensified cropping system required for

other types of farming investigated in this study. Therefore, farmers and investors may find many attractive opportunities for enlarging dairy herds, constructing more buildings, and adding machinery and equipment. Improved management and production practices such as better feeding, better care and better breeding should accompany the added investment in the dairy enterprise. More fertilizer, grass silage and better pastures together with proper timing of the cropping operations will improve the quality and the quantity of roughage. Then, a better feeding program consisting of high quality roughages and more grain will help to increase milk production. The profitability of added investment in the dairy enterprise will depend to a large extent on increasing milk production per cow as well as on increasing milk production per farm.

Several of the case farms had attractive opportunities for expanding the dairy herd to the point where only roughages were produced on the farm and all of the grain was purchased. If the income from the additional cows that could be kept is considered, Mecosta County dairy farmers can probably purchase corn as economically as they can raise corn in most years.

Total production would probably increase on six of the case farms if their operators had ready access to funds for taking advantage of the plans outlined above. In terms of total milk production, this would mean doubling or tripling the output of the benchmark plans. Corresponding increases might be expected on similar farms in the area. However, Farm E, possibly Farm D, and other small dairy units would be likely to discontinue milk production altogether.

Recently, the operator of Farm E decided to turn to full-time non-farm employment. He plans to occupy the farmstead and will probably rent

some of the more productive fields to neighbors, leaving other fields to lie idle and some fields to be reforested. As a result, the farm will virtually disappear as an operating unit in a short period of time. Indications are that other farm businesses will end in a similar way as their present operators retire or turn to full-time non-farm employment.

On the national scene, many farms have disappeared. The U. S. Census shows a decrease from 3.6 million commercial farms in 1950 to 3.3 million farms in 1954 for the U. S. as a whole. During the same period, the amount of cropland harvested decreased 23 million acres. Some of the decline can be accounted for by the disappearance of farms similar to Farm E. Such farms only produce a small amount of product by themselves but, collectively, they produce a fairly large amount. In Census Economic Area 4a, which includes Mecosta County, the farmers in Economic Classes IV to VI produce over 60 percent of the milk output. The decrease in milk production resulting from the disappearance of some of these farm operating units will go a long way to offset the increased production on other farms adopting the investment plans outlined in this study.

As a result, milk production for the county as a whole would increase only a quarter to a half even if the investment plans were followed. This increase would not be large in terms of the expanding demand for fluid milk from this area.

Changes in the present credit structure that would make available larger quantities of capital to farmers, would help to make possible the development of more successful farm businesses. To make sound changes in the credit structure, both farmers and credit agencies need to seek out

and develop wise investment programs for farms. Then with this information as a guide, they could formulate changes that would make available larger quantities of capital.

APPENDICES

APPENDIX A

LIST OF PRICES USED IN BUDGETING^a

Item	Unit	Price
Prices Paid		(dollars)
Machinery^b		
Tractor		
2-plow		1,500.00
3-plow		2,200.00
Forage harvester		
Small - power-take-off		1,500.00
Large - motor-mounted		2,500.00
Wagon		
Forage		600.00
Flatbed		300.00
Corn picker - 2-row		900.00
Potato equipment		
Sprayer 8-row		500.00
Digger 2-row		1,100.00
Planter 2-row		800.00
Planter 1-row		450.00
Roto-beater		800.00
Irrigation equipment		
Pipe - 4 inch	(foot)	.70
Pipe - 5 inch	(foot)	1.10
Pump and motor - small		1,500.00
Pump and motor - large		3,000.00
Baler		
Small - power-take-off		1,000.00
Large - motor mounted		2,000.00
Bulk milk cooler		
150-gallon		1,500.00
200-gallon		2,000.00
300-gallon		2,200.00
400-gallon		2,600.00
600-gallon		3,600.00
Livestock		
"Good" dairy cows	(head)	200.00
"Very good" dairy cows	(head)	275.00
Baby chicks	(dozen)	.30
Feed		
Dairy supplement	(ton)	100.00
Poultry supplement	(ton)	110.00
Shelled corn	(bushel)	1.40

APPENDIX A

Item	Unit	Price
Prices paid		(dollars)
Fertilizer		
5-20-20	(ton)	75.00
0-20-20	(ton)	65.00
33-0-0	(ton)	85.00
Lime	(ton)	6.00
Prices received		
Oats	(bushel)	.60
Wheat	(bushel)	1.80
Potatoes	(bushel)	1.00
Cucumbers	(bushel)	1.00
Fluid milk at farm. 3.5% B.F.	(100 pounds)	4.00
Manufacturing milk at farm. 3.5% B.F.	(100 pounds)	3.00
Butterfat	(pound)	.63
Cull cows	(head)	100.00
Deacon calves	(head)	6.00
Hogs	(100 pounds)	15.00
Eggs	(dozen)	.35
Cull layers	(head)	.90

Farm

CROP AND LIVESTOCK PLAN

Plan

CROP	Acres	Yield	Production	Share	Used on farm		Sales		Fertilizer		Total applications		
					Seed	Grain Roughage (C.E.) (H.E.)	Quantity	Price Value	Kind	Rate	N	P ₂ O ₅	K ₂ O
Total cropland													
Perm. pasture													
Woodland													
Other land													
Total land													

Nutr. in fert.
" " manure
From a.u.
Tot. nutr. appl
Rate on A.

APPENDIX B

Livestock	No.	Yield	Production	Farm use	Grain fed (C.E.)		Rough. fed (H.E.)		Sales		SELECTED PURCHASES	
					Per hd.	Total	Per hd.	Total	Quan.	Pr. Val.	Item	Quant. Price Amt.
Milk cows											Fert.	
Heifers raised yearly											Seed	
											Stock	
											Feed	

Breed of cows

B.F. test

Av. wt. of cows

Litters per sow

Comparative Financial Summary, Farm _____

Item	Benchmark Plan	Altern- ative <u>1</u>	Altern- ative <u>2</u>	Altern- ative <u>3</u>	Altern- ative <u>4</u>	Altern- ative <u>5</u>
Receipts						
Milk						
Cattle & calves						
Poultry						
Eggs						
Hogs						
Wheat						
Corn						
Custom Work						
Total						
Expenses						
Labor-regular						
-seasonal						
Feed						
Seed						
Machine hire						
Lime						
Fertilizer						
Breeding, vet. & med.						
Misc. supplies						
Gas & oil						
Repairs & maint.-total						
-bldg.						
-equip.						
Replacement of equip.						
Replacement of bldg.						
Property taxes						
Property insurance						
Electricity & telephone						
Cash Rent						
Interest on debt						
Total						
NET INCOME						

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