GOOD FARM MANAGEMENT IN CHIPPEWA AND MACKINAC COUNTIES (MICHIGAN)

Thesis for the Degree of M. S. MICHIGAN STATE COLLEGE William Edward Dickison 1946



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GOOD FARM MANAGEMENT IN CHIPPEWA AND MACKINAC COUNTIES (MICHIGAN)

by

WILLIAM EDWARD DICKISON

# A THESIS

Submitted to the School of Graduate Studies of Michigan State College of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Department of Farm Management

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# GOOD FARM MANAGEMENT IN CHIPPEWA AND MACKINAC COUNTIES (MICHIGAN)

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#### ACKNOWLEDGEMENT

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# GOOD FARM MANAGEMENT IN CHIPPENA AND MACKINAC COUNTIES (MICHIGAN)

William Edward Dickison

### INTRODUCTION

One purpose of this study on "Good Farm Management in Chippewa and Mackinac Counties (Michigan)"is to show the present situation and trends in factors affecting good farming in the eastern portion of the Upper Peninsula of Michigan. Some of the factors affecting farming in this area are: climate, type and location of soil, size of farm, amount of tillable land, amount and kind of livestock, amount and kinds of crops grown, machinery investment, building investment, markets and transportation costs. The second purpose of this study is to present suggestions for the improvement of farming in this region.

For many years Chippewa County was one of the greatest hay producing counties in the United States. The early agriculture of the county consisted mainly of raising hay, a few acres of small grain and a few potatoes. During the last few decades hay has decreased in importance due to loss of markets and higher transportation costs, although on the basis of acreage it is still the leading crop. Farming has become more diversified with an increase in dairying and livestock raising. Along with this, small grains and cash crops such as peas, flax, wheat, barley and oats have appeared.

Chippewa County lies in the extreme eastern part of the Upper Peninsula of Michigan. Sault Ste. Marie, the county seat, is the third oldest settlement in the United States. The first white man, Jean Nicolet, came in 1634, although it is possible that Etienne Brule may have preceded him here in 1618. At least five standards have flown over the area. Ojibway crane totem, Spanish, French, British and American. The fur trade was the main industry until about 1870 when lumbering began. With the establishment of the lumber camps in 1870 a small amount of land was brought under cultivation. By 1880 there were 117 farms in the county. The number of farms increased slowly until 1935 reaching a total of 1,779 farms. In 1940 the number of farms had dropped to 1,584. About 85 percent of the original farmers came from Canada and traced their ancestry back through Canada to England and Scotland. This ancestry has an important bearing on agriculture in Chippewa and Mackinac Counties.

Chippewa is the second largest county in Michigan and contains 1,573 square miles or 1,006,720 acres. Besides the mainland, it contains three fairly large islands, Neebish, Drummond, Sugar Island, and numerous small islands. A small amount of first class agricultural land is found on Neebish and Sugar Island.

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Directly south of Chippewa County is Mackinac County. Mackinac County contains 1,044 square miles or 668,160 acres. According to the Agricultural Land Classification Map of Michigan (1941) there is little farm land in Mackinac County. The areas of first and second class land are found in the clay plains south of Pickford, a small area north of Engadine, and a few other scattered areas in the central and western parts of the county.

The above counties comprise what is called, Type of Farming Area 15 by the Farm Management Department at Michigan State College. This is a cattle, hay and spring grain area.



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#### PHYSICAL FACTORS

## Climate

The overall climate of Chippewa and Mackinac Counties show the effect of the Great Lakes. The surrounding bodies of water tend to modify the climate and lengthen the growing season. In view of the above the summers are not as hot or the winters as cold as the interior of northern Michigan. Extreme ranges in temperature are not as prominent in the above area as in other inland areas having the same latitude.

The average growing season in Chippewa County varies from 142 days at Sault Ste. Marie to 148 days at Whitefish Point. The growing seasons are usually a few days shorter in the farming areas around Rudyard and Pickford than those along the lakeshore such as Bruce and Soo Township. Other local areas in the interior of the county may vary considerably from this. The average January temperature at Sault Ste. Marie is about 14<sup>°</sup> F. and the average July temperature about 64<sup>°</sup> F.

In Mackinac County the growing season averages 144 days on Mackinac Island and 141 days at St. Ignace. In general, the growing season is slightly shortened as one proceeds inland in Mackinac County. The average July temperature at St. Ignace is about 66<sup>°</sup> F. and the average January



Fig. 1. Length of growing season Chippewa County. Michigan.





temperature about 19° F.

The average annual precipitation in Chippewa and Mackinac Counties varies from 28 inches in the southern part to 32 inches in the northern part. These climatic factors: length of growing season, average annual precipitation and average annual temperature have a direct bearing on the type of farming practiced in this area. For further information see Appendix Table 1.

#### Land

Productive capacity of the land is one of the more important factors in determining the success or failure of a farm enterprise. Under present economic conditions it is estimated that 30 to 40 percent of the land in Chippewa County is suitable for farming and that the other 60 to 70 percent is suitable only for non-farm purposes such as forestry, game reserves, hunting grounds and recreation. At present about 15 percent of the land in Mackinac County is suitable for farming, the other 85 percent is non-farm land.

Soil classification maps for both Chippewa and Mackinac Counties have been drawn giving the location of farm land, forest land and other land not suitable for farming. Additional soil information is given on pages 2-13 inclusive in the Appendix.

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The greater part of the farm land is found in Bruce, Dafter, Pickford, Rudyard and Soo Townships in Chippewa County. Small areas of farm land are found in Kinross, Superior, Raber, Hulbert, Soo City and Sugar Island Townships. Bay Mills, Chippewa, Detour, Drummond, Trout Lake and Whitefish Townships have very little or no farm land.

Most of the farm land in Mackinac County is found in Marquette and Garfield Townships. Scattered areas of farm land are found in Portage, Newton, Moran, Brevoort, St. Ignace and Clark Townships. Bois Blanc, Hudson and Hendricks Townships have no farm land.

The productive capacity of the farms has a strong correlation with the quality of the soil in Chippewa County. In areas of good farm land there is a marked increase in the value of the farms as shown in Figure 3. Farms in the better land areas of Chippewa County are worth 3 to 4 times as much as those in the non-farming areas. Almost all the tillable land is found in the better farming areas. See Figures 5 and 6 for further information.

The close correlation found in Chippewa County between farm values, tillable acres and type of soil is not as marked in Mackinac County. The townships in Mackinac County have a mixture of farm land, non-farm land, and the land areas are not sharply defined. However, the two townships

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having the most farm land also have the highest valuation per farm and more tillable acres as shown in Figure 4. Figures 7-10 inclusive show the change in number of farms and land in farms by townships for both Chippewa and Mackinac Counties.

Even more marked is the correlation between the farm land and the location of farms of Farm Account Cooperators. All of the farms cooperating with the Michigan State College Farm Management Extension Department are located in areas of good farm land. In general, it may be said that these farms are better than the average and follow more of the approved practices.

Tables 1 and 2 show the size of farms, land value and tillable land in townships having Farm Account Cooperators.

acres
218
101
216
125
54
174
21 1( 21 12 17

TABLE 1 - Size of Farms, Land Value and Tillable Land of Farm Account Cooperators in Chippewa County.

Township	Size of farms	Land value	Tillable acres
Brevoort	156 acres	3 <b>,</b> 300	122
Clark	180 <b>"</b>	2,480	80
Marquette	<b>1</b> 04 "	2,905	92

TABLE 2 - Size of Farms, Land Value and Tillable Land of Farm Account Cooperators in Mackinac County

The trends in both counties is toward fewer and larger farms, with the expansion taking place in those areas having the best farm land. With few exceptions, those areas having land unsuited for farming purposes show a marked reduction in both tillable acres and number of farms. This seems to be a desirable trend that should be continued for the best economic use of the land.



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# CROPPING PROGRAM

#### General

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The early agriculture of Chippewa County centered around hay. The market for this hay almost disappeared with the passing of the lumber camps and the arrival of the truck and automobile. Increased transportation costs have also tended to make hay farming less profitable. For the most part this hay was number one timothy that made excellent horse feed but was of little use for other livestock feed due to its low protein content.

Despite all this there are still fields that have been in timothy sod for over 50 years. Certain economic conditions such as a feed shortage combined with drought may cause the price of hay to rise to \$20.00 a ton or higher. Under these conditions raising hay is perhaps the most profitable use for the land. This type of farming does not give a steady reliable income, and has all the disadvantages of one crop farming. The possibility that hay prices may rise tends to keep some farmers in the business where otherwise they would shift to some other type of farming. 1.1

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Figure 11 shows the importance of crops raised in Chippewa County on an acreage basis and Figure 12 shows the importance of crops raised in Mackinac County. Over 60 percent of the tillable land is in hay and pasture. Climatic conditions and type of soil limit the crops that may be grown in Chippewa-Mackinac Area. In general the clays and clay loams are well adapted to the production of hay and small grains. The lighter sandy loams are adapted to potatoes, root crops, small grains and hay. The area is too far north for the successful production of corn, therefore small grains form the bulk of the feed crop.

## Hay

<u>Red Clover</u> - Red clover is probably the most widely grown legume in Chippewa and Mackinac Counties. Two varieties, medium red and mammoth red are commonly found in the above area. Medium red is earlier and finer stemmed than mammoth red. Both of these clovers produce a high quality legume hay which make excellent livestock feed.

<u>Alsike Clover</u> - Alsike is another legume commonly found in the eastern portion of the Upper Peninsula. Alsike Clover will tolerate a more acid and wet soil than the red clovers. For this reason it is especially adapted to the heavy wet soils of Chippewa County.

<u>Alfalfa</u> - Alfalfa is not widely grown in Chippewa and Mackinac Counties although it is gaining in popularity in Mackinac County. Certain well-drained areas in Chippewa County produce good yields but in those areas that are not well drained it is more advantageous to grow clover. <u>Sweet Clover</u> - This legume is well adapted to the area but because of its coarseness in comparison to the other legumes it is very seldom used.

<u>Timothy</u> - This non-legume is the most widely grown hay in the area, but due to its low protein content it is not recommended for livestock feeding other than horses.

<u>Hay Mixture</u> - The most popular hay grown in Chippewa County is a mixture of timothy and red or alsike clover or both. When the mixture contains a high percentage of legumes it makes a valuable livestock feed.

Other Hays - Other non-legume hays grown in the area are Blue Grass, Brome Grass, Red Top and Reed's Canary Grass. Quite a bit of quack grass is found in some fields although it is an unwanted weed. Emergency hay crops grown are: Sudan Grass, Oats, Peas and Oats , and Vetch and Oats.

### Grains

<u>Oats</u> - More acres of oats are grown than any other of the small grains. One reason for the popularity of oats may be traced back to its value as a horse feed. Another and more important reason is its resistance to rust. Oats are the earliest planted spring grain. The most common varieties grown in Chippewa and Mackinac Counties are: Bond XD 69, Viclund and Iowa 444.

<u>Barley</u> - Barley ranks next to oats in importance in this area as a feed crop. In feeding value barley compares favorably to corn for most classes of livestock except swine, thus plays an important part in feed rations in this area. Barley is usually seeded immediately after oats on most farms. The two most popular varieties are Wisconsin 38 and Oderbruker.

<u>Flax</u> - Flax is the most important cash grain crop grown in the area. Almost the entire acreage of flax grown in Michigan is to be found in Chippewa County and Marquette Township of Mackinac County. The heavy soil, cool nights and long days are especially suited to the growth of flax. Mackinac County has about 5 percent as much flax as Chippewa County. There are few established varieties and most of the seed is grown locally.

<u>Field Peas</u> - Field peas are grown as both a cash crop and livestock feed. The most common varieties are Scotch Green, a small green pea used in soup, Marrowfat and O.A.C., large white peas used mostly for livestock feed.

<u>Miscellaneous Grains</u> - Small acreages of spring wheat, winter wheat, rye and emmer are grown in the area. Winter wheat is gaining in popularity over the spring wheat due to higher yields and earlier harvesting time. Considerable

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acreages of mixed grain, usually a mixture of oats and barley with some peas or flax are grown.

<u>Potatoes</u> - About three-fourths of the farms in Chippewa and Mackinac Counties grow some potatoes. Soil conditions are such, however, that the crop can be grown on only a limited acreage. Most of the commercial potato producers are located in areas of sandy loam. Important commercial areas are located south of the Sault along the St. Marys River in Bruce and Soo Townships, Raber Township and in the vicinity of Allenville. Irish Cobblers are the common early variety, while Sebago, Chippewa, Pontiac and Russet Rurals are the popular late varieties. Pontiac is a red skinned potato while the others are white.

<u>Root Crops</u> - A considerable acreage of Rutabagas are grown for livestock feed. These rutabagas make an excellent winter succulent feed for all classes of livestock.

Item	Barley	Oats	Wheat	Alfalfa	Mix 5 Clove Timot	0-50 r & hy Clov	Tim- er othy
Average yields	20	28	16	1.4	1.2	1.4	1.1
Productive ener	gy .						
Grain	. 714	644	795				
Roughage	184	<u>218</u>	226	1047	960	<u>1338</u>	706
TOTAL	898	862	1021	1047	960	<b>13</b> 38	706

TABLE 3 - Average Yields of Feed Crops in Chippewa and Mackinac Counties and Amount of Productive Energy per Acre<sup>1</sup>

TABLE 4 - Average Yields of Feed Crops in Chippewa and Mackinac Counties and Cash Value per Acre 2

Item	Barley	Oats	Wheat	Alfalfa	Mix 50-50 Clo- ver and Timothy
Average yields	20	28	16	1.4	1.2
Value per acre	\$ <b>11.</b> 00	9.24	12.00	14.90	10.92

Table 3 shows the amount of productive energy produced per acre with average yields in Chippewa and Mackinac Counties. Clover is the best legume hay with alfalfa next. The legumes show a definite advantage over non-legumes. Of the grains wheat yields the greatest amount of productive energy per acre, barley second, and oats the least.

1/ Farm Management Department, Michigan State College, Unpublished Mimeographed Material "What Crops Do Best On Your Farm" 2/ Average farm prices, 1930-39. Table 4 shows the cash value per acre of feed crops with average yields in Chippewa and Mackinac Counties. Alfalfa is worth more than mixed hay. Wheat is the most valuable grain and oats the least valuable. Barley is worth almost \$2.00 more per acre than oats.

More legume hay should be grown in Chippewa and Mackinac Counties. In order to increase the acreage of legumes all tillable land should be reseeded once every three years. More wheat and barley should be grown in view of the fact that they produce more productive energy per acre, and are a more valuable crop than oats.

# Soil Management Practices

Liming and Fertilizers - Many of the soils found in Chippewa and Mackinac Counties need lime. A good source of supply is the refuse lime available at the Carbide Plant in Sault Ste. Marie. The only charge is loading and hauling to the farm.

The prime need of most heavy soils in the area for fertilizer is phosphate. Some lighter soils may need other elements. In most cases barnyard manure and superphosphate will fulfill most requirements. In 1945 experiments showed 35 to 50 percent increase in hay yields due to use of phosphate fertilizer.

<u>Drainage</u> - In Chippewa and Mackinac Counties it is customary to use a system of furrowing where dead furrows are used for the surface drain. The value of the soil and crops grown will not warrant tile drainage under present economic conditions. In view of the above surface drainage must be used in this area.

A large percentage of the soils in Chippewa and Mackinac Counties need artificial drainage. The poor drainage limits the adaptability of crops that may be grown.

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# LIVESTOCK PROGRAM

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## General

Dairying is the most important livestock enterprise in Chippewa and Mackinac Counties. A few beef cattle are to be found in the area. and lately there has been a slight increase in their number and importance. Swine numbers have remained the same while sheep have been decreasing in numbers. Poultry ranks next to the dairy enterprise as a source of farm income in this area. Figures 13 and 14 show the numbers of the various classes of livestock found in this area.

# Dairy Cattle

Almost 80 percent of the farms in Chippewa and Mackinac Counties have a dairy enterprise. Most of the dairy cattle are of mixed breeding, although there are several highproducing herds of the major dairy breeds.

Table 5 shows the pounds of milk produced per cow in both counties and in the state.

	Mackinac Counties, Michigan, 193	54 and 1939.
Item	1934	1939
Chippewa	4,420	5,151
Mackinac	3,921	4,807
Michigan	4,308	5,177

TABLE 5 - Pounds of milk produced per cow in Chippewa and
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From this table we can see that progress has been made in increasing dairy production in both counties, but that they are still below the state average. There is also a strong correlation between type of land and production per cow as shown in Figures 15 and 16. With few exceptions the townships having the best farm land also have the highest production per cow.

A large part of the low dairy production is due to scrub dairy cattle and grade cattle of mixed breeding. Many farmers follow the practice of buying the cheapest bull available and use no definite breeding program. A well-planned breeding program based on proved sires of good breeding would greatly improve production in this area. The winter milk production is low. This is largely due to feeding poor quality roughage and insufficient amounts of grain.

## Beef Cattle

There may be a place in Chippewa and Mackinac Counties for beef cattle. Several successful breeding herds of the three major breeds Angus, Hereford and Shorthorn are to be found. Beef cattle may fit into the farming program in utilizing the large acreage of roughage and pasture that are available in both counties.

#### Dual Purpose Cattle

There are few if any strictly dual purpose cattle herds in the area. There seems to be a question about the advisability of a dual purpose herd as they produce less milk than the dairy breeds, and the quality of beef produced is slightly better than the grade beef now produced in the area.

The breeding program generally consists of using a beef type bull when beef prices are favorable, and switching to a dairy type bull when dairy prices become more favorable. The result is a mixture that produces poor quality beef giving low milk production.

#### Swine

About one-third of the farms in the area have swine. They are raised mostly for home use and are found chiefly on those farms having surplus milk available for feed. The lack of grain discourages any commercial swine breeders. Most of the pigs are grades of mixed Yorkshire or Chester White breeding.

## Sheep

Sheep have been declining steadily in numbers and importance. This decline may be due to the failure of sheep

to complement the dairy enterprise. From the standpoint of labor requirements dairy cattle are intensive while sheep are an extensive enterprise. Sheep and dairy cattle also demand different types of housing and buildings. In 1939 about one farm in ten had sheep. The predominate breeds are Oxford, Shropshire and Hampshire. There are still many successful farm flocks to be found in the area.

### Poultry

The poultry enterprise is second only to dairy in farm income. About 75 percent of the farms in Chippewa and Mackinac Counties raise chickens and over a third of these farms sell poultry products. Several commercial poultry flocks are to be found in the area. The more successful poultry farmers raise most of the grain fed thus cutting down on feed costs. The predominate breeds are White Leghorn and Plynouth Rock although many other breeds may be found.

#### Livestock Summary

Records show that at least 65 percent of the farm income in Chippewa and Mackinac Counties comes from livestock and livestock products. Most successful farmers in the area have one main livestock enterprise with one or more supplementary enterprises. Dairy and poultry are commonly found together. Swine are usually found on dairy farms. Beef, sheep, poultry and swine are sometimes found on a general farm. Sheep are usually found on a beef or general farm as the two enterprises are somewhat similar in feed, labor and building requirements.

Numerous farms in Chippewa and Mackinac Counties are understocked. The average for 1939 was 6 cows per farm. The number of livestock should be increased for the best utilization of feed.



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CHIPPEWA C	OUNTY	MACKINAC COUNTY
Chicken		Chicken
60,000		Numbers 60,000
55,000		55,000
50,000		50,000
45,000		45,000
40,000		40,000
35,000		35,000
30,000		30,000
25,000		25,000
20,000		20,000
15,000		15,000
10,000		10,000
5,000		5,000

Fig. 14. Chicken numbers in Chippewa and Mackinac Counties, Michigan Data from Agriculture Census of Michigan 1935, 1940 1939

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#### BUILDINGS, POWER AND MACHINERY

### General

Figures 17 and 18 show the value of building per farm in each township of both counties. While Figures 19 and 20 show the value of machinery per farm for each township. Here again one can see the strong correlation between type of soil and building and machinery investment per farm. In most cases farms with poor soil also have low building and machinery investment. Building and machinery investments per farm are considerably below the state average in this area as shown in Table 6.

TABLE 6 - Building investment per farm and machinery and equipment investment per farm, 1940

Item	Chippewa	Mackinac	State
Building investment	\$ 1,309	\$ 1,244	\$ 4,865
Machinery and equipment investment	522	473	648

#### Buildings

A good share of the farm buildings in this area were built from timber grown on the farms. In addition, the buildings were constructed mainly for hay storage and have few facilities for livestock. This may account for part of the lower building investment per farm.

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## Power and Machinery

Very few combines are found in Chippewa and Mackinac Counties. The nature of the soil and climate are such that combines are not too successful for fall harvesting of grain unless the grain is first cut and placed in a windrow. Combines may gain in popularity as more efficient methods of handling the grain are developed.

Tractors have been increasing in number and horses declining. Tractors have changed the general picture of farming in this region. It takes a lot of power to work the heavy wet soil which tractors can do more efficiently. In addition, moisture conditions are such that the soil must be worked in a short space of time for the best results. Horses are unable to do this in the required length of time.

Horses will probably always be an important source of power in this area. They are able to perform many tasks where it is impossible to use tractors such as winter manure hauling. This use of horsepower distributes farm work throughout the year and creates greater labor efficiency.

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Mackinac County, Michigan by townships 1939.



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#### MARKETS

Chippewa and Mackinac Counties are located a great distance from large terminal markets and consequently have had to depend on local markets to a large extent. Lack of competition has tended to keep prices down at most points in this area.

Figures 21 and 22 show the location of principle markets and processing plants in Chippewa and Mackinac Counties. All of these markets are located in the larger towns and on good roads.

Farm accounting records of this area show that farms selling whole milk are high in income. Table 7 shows the number of farms selling whole milk, butterfat and butter.

TABLE 7 - Products sold on dairy farms in Chippewa and Mackinac Counties

County	Number of farms prod- ucing milk	Number of farms sell- ing whole milk	Number of farms sell- ing butterfat	Number of farms sell- ing butter
Chippewa	1,225	131	852	151
Mackinac	420	129	189	37

In view of the fact that this market for whole milk is limited it is doubtful if many more producers could retail والاعتمام المتنا وتنشيات والمتلاكي

their own milk without creating a surplus. It seems desirable that more processing plants such as butter or cheese should come into the area for efficient marketing of dairy products.

The completion of the cheese factory at Pickford, which has a daily capacity of 100,000 pounds of milk, should improve the farm price of milk. It should also increase the winter milk production by furnishing a more desirable market which would encourage the producers to feed their cattle better. Processors have been importing milk from points 125 miles away, and paying substantially higher prices than those paid to local producers.

Figures 23 and 24 show the number of farms in each township selling whole milk, butterfat or butter. The townships having poor land also have the additional disadvantage of a lower market as there is little opportunity to sell milk and hauling charges to distant processing plants are higher. The main reason for this additional disadvantage is their location in extreme parts of the county.

The beef produced had to be shipped to terminal markets, namely Detroit, but with the starting of a local auction most of this beef never leaves the county. It is expected that more beef will be sold locally with completion of a packing plant at Pickford. There is a ready market for all locally grown beef as the demand is greater than the supply.

Sault Ste. Marie furnishes an excellent local market for all locally produced eggs and poultry products. This market for fresh eggs and poultry products is further increased by the summer tourist trade.

Hay produced in Chippewa and Mackinac Counties is sold in many states. The bulk of the hay has been going to Ohio, Tennessee, Virginia, Florida, Georgia and the Carolinas for use at race tracks. Hay is shipped to other areas whenever a shortage occurs. In 1944-45 about 1800 cars of hay were shipped which brought in approximately \$ 670,000. In 1945-46 over 2,000 cars were shipped which brought in approximately \$ 640,000. The average value of hay in 1945-46 was \$18.00 a ton.

The entire flax crop is marketed in Minneapolis and St. Paul, Minnesota.



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### CONCLUSION

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From this study we can see the effect of the various factors: climate, type and location of soil, size of farm, amount and kinds of crops grown, amount and kind of livestock grown, building investment, machinery investment, markets and transportation costs on farming in Chippewa and Mackinac Counties. Climate limits the type of crops grown thus indirectly determining the type of livestock that may be raised.

The most successful farms are located in areas of good farm land. A farm located in an area not suited for farming has little likelihood of succeeding. Those areas not suited to farming under present economic conditions should be removed from farming as soon as possible and other more profitable use made of the land such as forestry, hunting grounds, game reserves and recreation.

The size of the farm and amount of tillable land are factors in successful farming in Chippewa and Mackinac Counties. Farms under 160 acres in size with less than 120 tillable acres do not have sufficient size of business to support a family.

Most farms in Chippewa and Mackinac Counties are understocked. One reason for this is that the farmers came from a country where small herds were the rule and find it hard to change their way of farming and adjust themselves to large herds. Other reasons are the poor markets, small amount of grain raised and poor quality of roughage.

Improvement in quality and yields of crops could be obtained through the use of more legumes, better drainage, more fertilizers, additional organic matter and better prepared seed beds. The solution to the disposal of the surplus hay raised in this area would be to market it through livestock. ST and a fitting fit with the second second second

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Since over 60 percent of the farm income is derived from livestock and livestock products, increasing the quality and quantity of livestock should increase farm income. This improvement in livestock should come through the use of proved herd sires of good breeding and better feeding methods. Emphasis should be placed on cattle, poultry and sheep. Hogs should be raised for home use and not as a commercial enterprise.

Lack of machinery and buildings causes inefficient operation of many farms. A method of correcting this would be to increase livestock production which would in turn increase farm income, thereby enabling the farmers to make the necessary building and machinery improvements.

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With the arrival of improved market outlets fermers in Chippewa and Mackinac Counties may be furnished the incentive that is necessary for the adoption of better farming practices and methods thereby strengthening the general agriculture economy of the area. APPENDIX

Concentration Solid State

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Station	Tempera January Average	ature July Average	Growing season Days	Average an- nual precip- itation. (Inches)
CHIPPEWA				
Sault Ste. Marie	14.2° F	64.1 <sup>0</sup>	F 142	£8 <b>.</b> 85
Whitefish Point	17.6 <sup>0</sup> F	59 <b>.4<sup>°</sup></b>	F 148	32.88
MACKINAC				
Mackinac Island	18.3 <sup>0</sup> F	65 <b>.4<sup>0</sup></b>	F 144	30.59
St. Ignace	18.8 <sup>0</sup> F	66 <b>.5<sup>0</sup></b>	F 141	£4 <b>.</b> 98

TABLE 1 - SUMMARY OF CLIMATIC FACTORS<sup>1</sup>

1/ Climate and Man, Yearbook of Agriculture 1941, pp. 914-915.

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# CHIPPEWA COUNTY SOILS<sup>2</sup>

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The most important agriculture soils in the county are the Ontonagon series, which comprise about 11 percent of the area; Bergland series, about 8 percent of the area and Bruce series about 2 percent of the area. Mineral soils comprise about 80 percent of the total area of the county, organic soils about 18 percent, hardrock about 1 percent and inland lakes and streams about 1 percent. About 65 percent of the total area of mineral soils in the county contain the normal amount of moisture for the region, while the other 35 percent hold water until saturated or waterlogged.

The mineral soils having fair or good natural drainage in Chippewa County are the following: Ontonagon, Blue Lake, Strongs, Rubicon, Alpena, Waiska, Shelldrake, Eastport, Emmet, Munising, Bohemian, Longrie, Onaway, Johnswood and Wallace series.

The mineral soils existing under conditions of poor drainage in Chippewa County are as follows: Saugatuck, Ogemaw, Brimley, Trout Lake, Bruce, Bergland, Munuscong, Detour, Newton and Granby.

The alluvial soils are the Ewen series. The organic soils, mucks and peats, are: Carbondale, Kerston, Greenwood, Spalding, Houghton, Rifle and Tahquamenon.

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2/ Taken largely from Soil Survey of Chippewa County, Michigan 1927, pp. 9-44.

### Ontonagon Soils

Ontonagon Silty Clay Loam - Ontonagon silty clay loam is one of the red clay soils extensively used for farming, occupying level plains in the eastern part of the county. The soil is acid and requires artificial drainage. The slope phase of this soil type occurs on short, steep slopes that are more profitably used as pasture land than for cultivated crops.

Ontonagon Silt Loam - Ontonagon silt loam is the lightest textured soil of the Ontonagon series. It is not high in humus, but is moderately productive and durable under cultivation. The soil is strongly acid, and is distributed throughout the lake bed clay plains in the eastern part of the county.

Ontonagon Clay - Ontonagon clay is the heaviest of the red clay soils on the lake bed plains of the eastern part of the county. The soil is fertile and is less acid in the plow soil than other soils of the Ontonagon series. The land is nearly level and drainage is slow because of the heavy texture of the soil. Effective drainage is the chief need for improvement.

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# Bergland Soils

Bergland Clay - Bergland clay is a dark colored, heavy soil closely associated with and closely related to the Ontonagon soils. It differs from the Ontonagon soil primarily because of poorer drainage. The soil is neutral or alkaline in reaction and is very fertile. At present the agricultural value of the land is low because of poor drainage and high cost of reclamation.

Bergland Silty Clay Loam - Bergland silty clay loam is characterized by a covering of black mucky organic matter as much as six inches thick overlying mottled grey and yellow silty clay loam. It is slightly acid or alkaline in reaction and is fairly fertile. Under natural conditions the soil is waterlogged. The chief obstacles to the extensive use of this land for agriculture are the costs of clearing the land and maintaining effective drainage.

Bergland Silt Loam - Bergland silt loam is a little more loamy and friable than others of the Bergland series. It has about the same agricultural possibilities as others in the Bergland series.

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## Bruce Soils

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Bruce Fine Sandy Loam - Bruce fine sandy loam is a dark colored, fertile but poorly drained soil which occurs in fairly large bodies on the low-lying flat plain southeast and south of Sault Ste. Marie. The soil is loamy, has good tilth and fair yields have been obtained. The principal need is artificial drainage.

<u>Bruce Silt Loam</u> - Bruce silt loam is very similar to Bruce fine sandy loam but contains more silt and is productive if drained.

## Other Soils

<u>Munuscong Fine Sandy Loam</u> - Munuscong fine sandy loam has a dark grey or almost organic surface covering similar to that of the Bergland soils. The soil is fertile, not highly acid, and has little agricultural value at present because of cost of clearing and draining.

<u>Munising Stony Loam</u> - Munising stony loam has an excessively stony surface soil characterized by boulders and very large blocks of rock at the surface, underlain by a pale red bouldery sand and clay mixture. The soil is strongly acid and too stony for farming.

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<u>Munising Stony Sandy Loam</u> - Munising stony sandy loam is similar to Munising stony loam. The soil is acid.

<u>Onaway Stony Loam</u> - Onaway stony loam comprises well drained, excessively bouldery land underlain by pale red stony sandy clay. Since most of the land is excessively stony very little of it has been cleared for agriculture.

<u>Strongs Loamy Sand</u> - Strongs loamy sand comprises most of the well-drained gently rolling sandy hardwood lands of the county. Due to its low moisture supply it is better suited to the production of trees.

<u>Blue Lake Sandy Loam</u> - Blue lake sandy loam is similar to Strongs loam sand, but it contains a higher percentage of clay, is strongly acid and moderately fertile. The stony phase is similar to Blue Lake sandy loam but contains a greater quantity of stones and gravel and is not well suited to agriculture.

<u>Ogemaw Sandy Loam</u> - Ogemaw sandy loam is a wet sandy soil underlain by a red clay substratum at a depth of three feet or less. This land produces fair yields except where it is excessively wet. Rubicon Sand - Rubicon sand comprises the deep yellow sands of level dry areas such as the pine plains in the western part of the county. The soil is dry to a depth of three feet or more, highly acid, low in lime and other elements of fertility. The land is not used for cultivated crops and it ranks very low in agricultural value because of its moisture deficiency and low fertility.

Rubicon Fine Sand - Rubicon fine sand is similar to Rubicon sand but it contains a higher proportion of fine sand and very fine sand. None of the land has been utilized for farming due to low fertility, high acidity, moisture deficiency and low content of organic matter.

Bohemian Very Fine Sandy Loam - Bohemian very fine sandy loam is composed mainly of pale red or salmon colored very fine sand and silt to a slight depth. The soil is acid, fairly fertile, but low in humus and nitrogen.

<u>Emmet Stony Loamy Sand</u> - Emmet stony loamy sand consists of dry or well-drained loose sand to a depth of three feet or more. The soil is low in fertility, low in moisture and generally acid. It is of little agricultural value.

Longrie Stony Loam - Longrie stony loam consists of brown sandy material from one to three feet thick resting on

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limestone bedrock. It occurs in small isolated bodies in the southern part of the county. Because of its unfavorable situation, thinness and excessive stoniness it has little agricultural value.

Detour Stony Loam - Detour stony loam comprises excessively stony, but nearly level land in the southeastern part of the county. The soil is moderately wet and fertile but because of stoniness is little used for agriculture. The shallow phase differs from the stony loam in having only a very shallow covering of soil material over the limestone bedrock.

Johnswood Stony Loam - Johnswood stony loam is very similar to Detour stony loam. It is moderately fertile and fairly moist, but too stony for profitable agriculture use.

<u>Kalkaska Sandy Loam</u> - Kalkaska sandy loam comprises brown light sandy loam underlain by comparatively dry loose sand and gravel. This soil occurs in small bodies in the southeastern part of the county and has only slight agricultural value under present conditions because of low moisture content. The gravelly phase is similar to the sandy loam and has little agricultural value.

Kalkaska Loamy Sand - Kalkaska loamy sand is less loamy with a reduced moisture holding capacity than Kalkaska sandy

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loam. The soil is acid and has only fair natural fertility.

Brimley Very Fine Sandy Loam - Brimley very fine sandy loam occurs chiefly in small bodies in the eastern part of the county on the old lake-bed plains. The top soil is light brown or variegated ash grey and yellow brown. It is strongly acid and the moisture content is sufficient. Where the soil is utilized for cultivated crops it has produced fair yields when properly handled.

<u>Trout Lake Stony Fine Sandy Loam</u> - Trout Lake stony fine sandy loam is a poorly drained or semi-swampy sandy soil resting on bedrock of limestone at a depth ranging from twentyfour to forty inches. The soil is not excessively acid and is probably fairly fertile. It occupies only a small aggregate area in the vicinity of Trout Lake.

<u>Granby Sand</u> - Granby sand is a wet swampy sand soil slightly better drained than the muck and peat swamps. It has a higher lime content than Newton sand which it closely resembles. Granby sand has practically no agricultural value because of poor drainage, small size of bodies, and its association with other poor soils and location.

<u>Newton Sand</u> - Newton sand is a wet swampy sand soil characterized by a thin mucky covering. Areas of this soil are widely distributed occuring mainly in narrow strips

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bordering swamps or lakes. The soil is strongly acid and under present economic conditions has no agricultural value.

<u>Wallace Fine Sand</u> - Wallace fine sand is composed of dry fine and medium sands characterized by a hardpan subsoil. This soil is entirely free from stones and gravel and is strongly acid. It has little agricultural value because of unfavorable relief, low fertility, location within swamps and small area.

<u>Eastport Sand</u> - Eastport sand is the low-lying strips of sand directly along the lake shore in the southeastern part of the county. Most of this soil is alkaline and has no agricultural value.

Shelldrake Sand - Shelldrake sand comprises the low ridges and level strips of beach and lake-bed sands lying directly along Lake Superior and White Fish Bay. The sand is grey or pink salmon in color and acid. At present it has no agricultural value.

<u>Saugatuck Sand</u> - Saugatuck sand comprises the wet sand soils of low fertility occuring on flat sandy plains and on the border of swamps. It has a rust colored hardpan subsoil. This type of soil is low in fertility, strongly acid and is widely distributed throughout the county, but it has practically no value for cultivated crops and only fair value

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for pasture.

<u>Alpena Cobbly Loam</u> - Alpena cobbly loam is a coarse dry limestone soil which occurs on low narrow ridges marking the position of old shorelines of former glacial lakes. It occurs in small bodies and has very little agricultural value.

<u>Waiska Cobbly Loam</u> - Waiska cobbly loam is a poor dry soil, strongly acid, occurring in small low ridges in the northern part of the county indicating the benchlines of old glacial lakes. The acreage of this soil is small and the land has no agricultural value.

<u>Ewen Silt Loam</u> - Ewen silt loam comprises the heavier alluvial soil of the county which occupies low semi-swampy bodies. The soils occur in narrow strips, are excessively wet, and have been used only as pasture.

<u>Ewen Sandy Loam</u> - Ewen sandy loam is the sandier alluvial soil which is fertile, but because of poor drainage and small area has little agricultural value.

<u>Coastal Beach</u> - Coastal beach comprises the narrow strip of beach along the shores of the lake sand, mud flats, shingle or limestone bedrock that is bare of vegetation. It has no agricultural value. <u>Rock Outcrop</u> - Rock outcrop is the limestone bedrock exposed at the surface occurring chiefly in the southern part of the county and on Drummond Island. Total area is five and five-tenths square miles.

## Organic Soils

<u>Carbondale Muck</u> - Carbondale muck is a nearly black or dark brown loamy or granular muck high in organic matter and alkaline neutral or very slightly acid in reaction. This soil comprises about 1/4 of the total of organic soils in the county. At present it has practically no agricultural utilization other than a limited use as pasture.

<u>Rifle Peat</u> - Rifle peat is a dark brown coarsely granular or woody peat nearly neutral or acid in reaction. It is very high in organic matter and is the most extensive organic soil in the county. It has little or no agricultural value.

<u>Kerston Muck</u> - Kerston muck lies along stream courses and consists of organic matter and alluvial mineral matter. It has no agricultural value at present.

<u>Spalding Peat</u> - Spalding peat is a strongly acid brown or yellow organic soil. It occurs mainly in the northwestern part of the county and has no value at present. <u>Greenwood Peat</u> - Greenwood peat consists of brown or yellowish fibrous coarse textured nearly pure organic matter showing very little decomposition. The soil is strongly acid and has no value at present.

<u>Houghton Muck</u> - Houghton muck is derived from brown spongy or feltlike finely fibrous peat. It ranges from acid to alkaline and has no agricultural value at present.

<u>Tahquamenon Peat</u> - Tahquamenon peat occurs in wet marshlands. It comprises a surface mat of living roots and very slightly decomposed dead plant matter derived from the present vegetation and has no present value. STATISTICS STATES AND THE PARTY OF

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