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By-Ferris, John N.

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Project '80 is designed to answer three questions: (1) What will rural Michigan be like in 1980? (2) What can be done to change the course of events in directing Michigan's rural economy? and (3) What do rural people want it to be like in 1980? Faculty members prepared 50 discussion papers which were reviewed by leaders in rural areas and businesses directly concerned with the rural economy. Factors affecting rural Michigan's environment were (1) social economic climate, (2) political climate, (3) supply and demand for rural products and services, (4) US. demand for food, (5) US. export-import prospects for food, (6) organization of agricultural markets, and (7) demand for United States timber products. Necessary agriculture and agribusiness adjustments in farms, dairy, livestock, eggs and poultry, field crops, grain marketing, fruits and vegetables, farm labor, farm machinery and equipment, farm financing, food wholesaling and retailing, nursery industry, and floriculture were discussed. Natural resource problems were in use of land and water, recreation and tourism, timber production and industry, commercial fisheries, and fur bearing animals. Projection was made of adjustments as they affect rural people and rural living. The appendix contains data concerning rural Michigan and a listing of available Project '80 publications. (DM)

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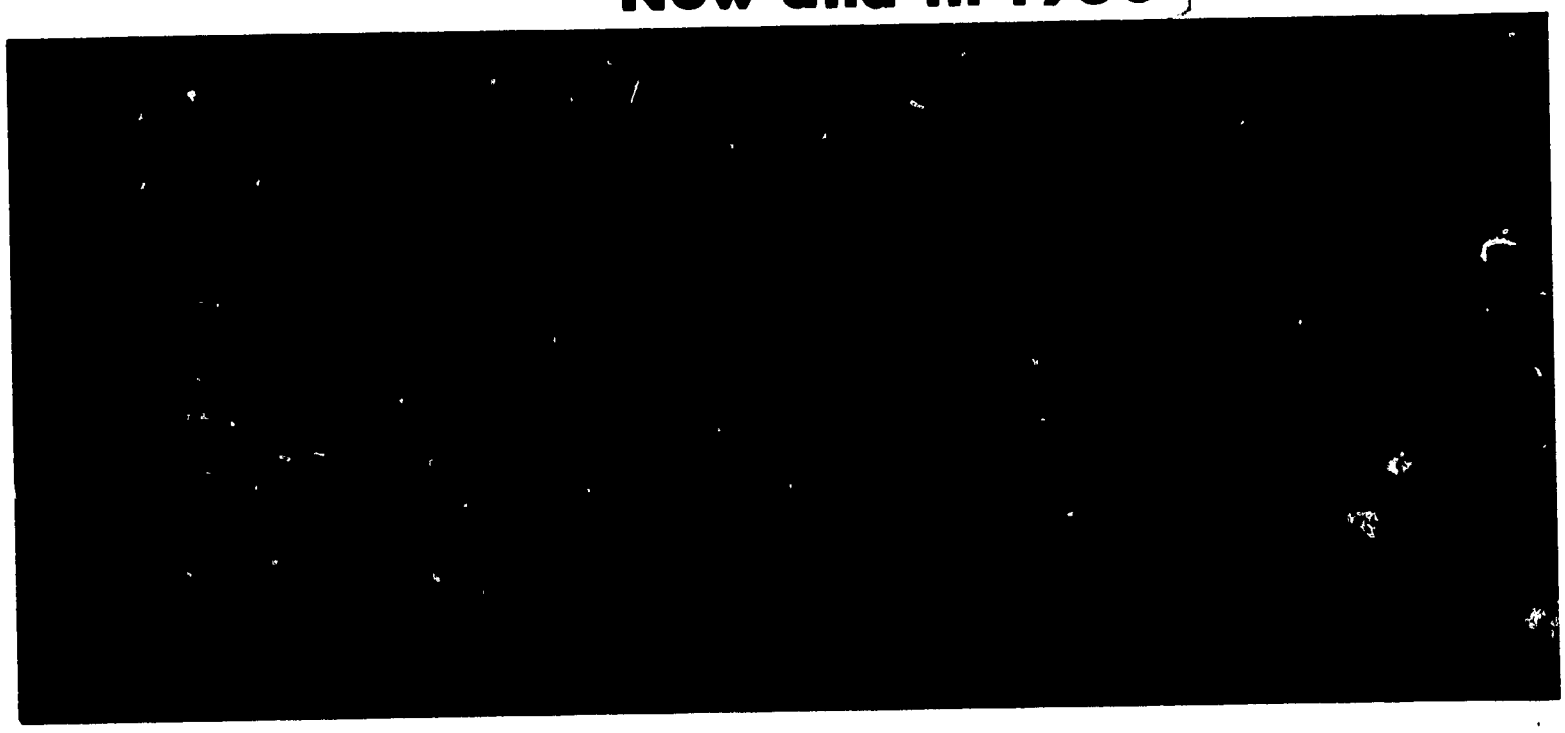
RESEARCH REPORT

FROM THE MICHIGAN STATE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION AND COOPERATIVE EXTENSION SERVICE, EAST LANSING

PROJECT '80

RURAL MICHIGAN
Now and in 1980



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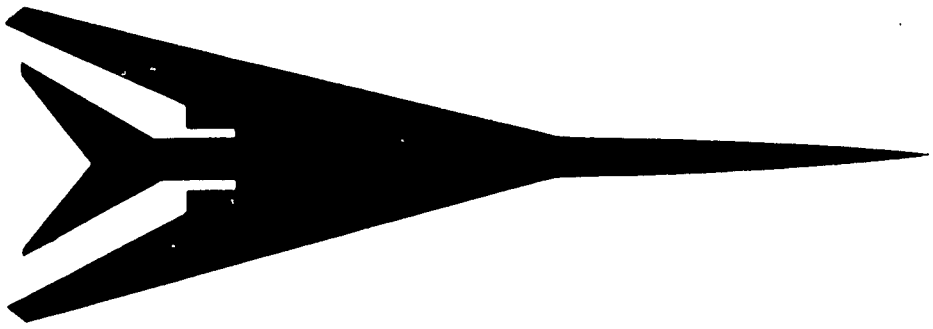

FOREWORD

THE RURAL SCENE in Michigan is changing very rapidly. Many decisions are being made that require commitments for several years ahead. Long range planning is a must. In order to encourage long range planning and assist the people of rural Michigan in this effort, the College of Agriculture of Michigan State University launched PROJECT '80 in early 1964. PROJECT '80 is a study of the prospects and potential for rural Michigan by 1980.

PROJECT '80 is designed to seek answers to three important questions: (1) What will rural Michigan be like in 1980, *in the natural course of events?* (2) What do rural people and others concerned want it to be like in 1980? (3) What can be done to capitalize on the opportunities, avoid impending problems, or change the natural course of events and redirect Michigan's rural economy toward the goals?

A task of this magnitude has required the time and effort of many individuals. Dean T. K. Cowden, the College of Agriculture, appointed a steering committee composed of the chairman, Dr. L. L. Boger, chairman of the department of agricultural economics; Dr. Raleigh Barlowe, chairman of the department of resource development; Dr. John Carew, chairman of the department of horticulture; Dr. Charles Lassiter, chairman of the department of dairy; Dr. Alexis Panshin, chairman of the department of forest products; and Richard Bell, assistant director of the Cooperative Extension Service. Dr. John Ferris of the Department of Agricultural Economics has been the project director and Mark Allen of the department of information services has been the editor.

The steering committee delegated to selected faculty members the responsibility of preparing some 50 discussion papers covering the many facets of the rural economy – agriculture, agribusiness, forestry, fisheries and wildlife, nursery crops, floriculture, recreation, service industries, and people. Many rural leaders and representatives of businesses directly concerned with the rural economy participated in the project by reviewing these papers, offering suggestions, and submitting ideas for needed programs.

About 200 of these individuals joined 100 campus-based faculty members in a two-day seminar at Michigan State University's Kellogg Center on March 31-April 1, 1965, for such a review. Other meetings have been held for this purpose, including a two-day workshop for the entire faculty of the College of Agriculture and the Extension Service.

It is possible to make use of analytical techniques in the development of long range – a decade or more – projections. However, there are numerous forces impinging upon the future that defy analysis. For this reason, PROJECT '80 researchers have sought the wise counsel and judgment of persons within and outside of the College of Agriculture.

A series of 16 reports has been published on PROJECT '80 as listed on page 81. This report both summarizes 15 individual reports and presents the background information used in their preparation. The emphasis in all of these reports is on answering the first question posed by the project, "What will rural Michigan be like in 1980, *in the natural course of events?*" These are the projections. They are based on certain assumptions, research, and a great deal of judgment. They should not be regarded as inevitable. True, many of the developments projected will occur regardless of or in spite of what is done in Michigan. But at the same time there are forces over which we do have some control. Here people can do something to change the course of events if they act soon enough and if they really want to accept the challenge. In a sense, PROJECT '80 is an early warning device designed to spark action to change some of the projections before it is too late.

A study such as PROJECT '80 can focus on making projections, but the question of goals and actions must be answered by individuals and organizations. PROJECT '80 reaches a transition with the publication of these reports as rural Michigan considers the implications of the projections. The success of PROJECT '80 depends on how effective it is in bringing the best information available to the attention of rural Michigan and in stimulating people to discuss the future and to plan accordingly.

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Project '80 Reports
Unpublished (In order of citation)

Title	Author(s)	Department
Assumptions on International Conflicts	Lawrence Witt	Agricultural Economics
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Assumptions about Weather and its Control	Ernest Kidder	Agricultural Engineering
	James B. Harrington, Jr.	Agricultural Engineering
	William Kost	Graduate Student, Agricultural Economics
What's Ahead in Agricultural Research	Lloyd Turk	Agricultural Experiment Station
Adopting Agricultural Technology During the Next 15 Years	Richard Bell	Cooperative Extension Service
International Trade and Agreements	Lawrence Witt	Agricultural Economics
Population Projections for the United States and Michigan	John F. Thaden	Institute for Community Development
Trends in Leisure Affecting Michigan's Rural Potential by 1980	David N. Milstein	Resource Development
Government Programs in 1980	Dale Hathaway	Agricultural Economics
Prospective Rural Resource Development Programs	William J. Kimball	Resource Development
Developments in State-Local Tax Systems and their Implications for Agriculture	Garland P. Wood	Agricultural Economics
Trend Factors Affecting Consumer Demand	J. D. Shaffer	Agricultural Economics
Trends in Recommended Nutritional Allowances, and Projections	Mary Zehner	Agricultural Economics
Effects of Changes in Food Processing Technology	W. Smith Greig	Agricultural Economics
Demand for Farm Products	L. V. Manderscheid	Agricultural Economics
Assumptions Regarding Market Structures	Linley Juers	Agricultural Economics

Published Reports
(In order of citation)

Report	Title of Section	Committee	Department
Michigan Timber Production and Industry Mich. Agr. Expt. Sta. Res. Rep. 38	Timber Production	Lee James	Forestry
	Timber Industry	Aubrey Wylie	Forest Products
Economic Prospects of Farmers Mich. Agr. Expt. Sta. Res. Rep. 47		K. T. Wright	Agricultural Economics
The Dairy Enterprise Mich. Agr. Expt. Sta. Res. Rep. 45	The Dairy Farm Enterprise	D. L. Murray, Chm.	Dairy
		C. R. Hoglund	Agricultural Economics
		A. L. Rippen	Food Science
	Processing Plants and Milk Utilization	A. L. Rippen, Chm.	Food Science
		D. L. Murray	Dairy
		L. E. Juers	Agricultural Economics
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		Hugh Henderson	Animal Husbandry
		E. C. Miller, Jr.	Animal Husbandry
		W. L. Finley	Animal Husbandry
		J. A. Hoefer	Animal Husbandry
		Leonard Kyle	Agricultural Economics
		Charles Spillman	Agricultural Engineering

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		Carl Hoyt	District Marketing Agent
		Myron Kelsey	Agricultural Economics
		John Wolford	Poultry Science
Field Crops, Market Firms and Farm Supply Mich. Agr. Expt. Sta. Res. Rep. 44	Field Crops	Leyton Nelson, Chm.	Crop Science
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		Robert Lucas	Soil Science
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		George Hogaboam	U.S.D.A.
		Perc Reeve	Farmers and Manufacturers Beet Sugar Association
		Lynn Robertson	Soil Science
	Market Firms: Grain, Beans, and Farm Supply	George K. Dike, Chm.	Agricultural Economics
		Harold Ecker	Short Course
		Richard Heifner	Agricultural Economics
		Robert E. Lucas	Soil Science
The Fruit and Vegetable Industries; Bees and Pollination Mich. Agr. Expt. Sta. Res. Rep. 49	Fruit Industries of Michigan	R. P. Larsen, Chm.	Horticulture
		Myron Kelsey	Agricultural Economics
		Paul Wooley	Entomology
		George McManus, Jr.	District Horticultural Agent
	Michigan's Vegetable Industry	Clark Nicklow, Chm.	Horticulture
		John Downes	Horticulture
		Stan Ries	Horticulture
		Shigemi Honma	Horticulture
		Robert Lucas	Soil Science
	Fruit Industries of Potatoes — Marketing, Processing and Consumption	W. Smith Greig, Chm.	Agricultural Economics
		Don Ricks	Agricultural Economics
		Paul Larsen	Horticulture
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		Clifford Bedford	Food Science
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Farm Machinery and Farm Labor Mich. Agr. Expt. Sta. Res. Rep. 48	Farm Machinery and Equipment	R. G. White, Chm.	Agricultural Engineering
		H. F. McColly	Agricultural Engineering
		R. H. Bittner	Agricultural Engineering
		C. W. Hall	Agricultural Engineering
		C. M. Hansen	Agricultural Engineering
		E. H. Kidder	Agricultural Engineering
		C. J. Mackson	Agricultural Engineering

Published Reports (continued)

Report	Title of Section	Committee	Department
		R. L. Maddex	Agricultural Engineering
		L. E. Ahti	Michigan Farm and Power Equipment Association
		M. E. Heft	Extension Agricultural Agent
		A. U. Khan	Graduate Assistant, Agricultural Engineering
		J. H. Levin	U.S.D.A.
	Farm Labor in 1980	Daniel W. Sturt	Agricultural Economics
Financing Michigan Farms Mich. Agr. Expt. Sta. Res. Rep. 46		John R. Brake	Agricultural Economics
Food Wholesaling and Retailing Mich. Agr. Expt. Sta. Res. Rep. 40		George Stachwick, Chm.	Agricultural Marketing and Utilization Center
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		Richard Lindstorm	Horticulture
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		Judith Prochnow	Information Services
	Changing Roles of Family Members	Harold T. Christensen	Sociology, Purdue University
	Rural Youth	Gordon Beckstrand	4-H Youth
		Wilbur B. Brookover	Education-Sociology
		James McKee	Sociology
		Delwyn Dyer	4-H Youth

RURAL MICHIGAN — NOW AND IN 1980
HIGHLIGHTS AND SUMMARY

By John N. Ferris, Department of Agricultural Economics, Director, Project '80

A condensation of 19 unpublished Project '80 papers and 15 published Project '80 reports as listed in the Bibliography and the Appendix.

INTRODUCTION

Rural Michigan will be an integral part of a dynamic economy between now and 1980. Agriculture and the other industries related to rural Michigan are subject to the same forces as those impinging upon nonrural industries. The demarcation between rural and urban living is rapidly disappearing. And the entire state of Michigan is looking more and more beyond its own boundaries. Therefore, prospects for rural Michigan must be considered in the context of trends under way for the entire state, the United States, and even the world.

Chapter I focuses on the underlying technical, economic, social and political forces that will shape the general environment for rural Michigan in 1980. It is important to know and understand these environmental forces even though they are subject to only limited control by rural Michigan itself. They provide guidelines for projecting the demands for the products and services of rural Michigan as well as the resources available for meeting these demands. Chapters II and III deal with these inputs and outputs and the new technologies expected for 1980. Here action by the people of rural Michigan can have a major impact on the actual developments between now and 1980. In Chapter IV, the emphasis is on rural people – how they will live, how their attitudes will change and how their roles will shift as an integral part of the larger evolving society.

Chapter I.
The Environment for Rural Michigan — Now and in 1980

To be sure, projecting developments between now and 1980 is a difficult task. Many imponderables cloud the picture. No individual or group of individuals can accurately foresee all the future developments. Some analytical tools are available for making long range forecasts, but many of the very vital forces cannot be subjected to rigorous analysis. Here reasonable assumptions must be made. Following are some of the assumptions upon which subsequent projections are based:

BASIC ASSUMPTIONS

1. *No major war* (81). Peace has been described as the period between two wars. While perhaps relevant in 1940, such a definition has no place in a world of "overkill." For purposes of analyzing the problems of the Michigan economy in 1980, one must assume the absence of major war for the entire intervening period. To assume a major war would change the entire analysis. A major war could leave few people, no economy, and only subsistence production problems.

The absence of a major war, however, does not imply peace. There can be conflicts, deliberately held within limits by each party. "Brush fire wars," internal revolution and occasional bloody riots are possible, even likely to be characteristic of the next 15 years. Peace in the idyllic sense of no resort to arms has seldom persisted on this globe for more than a few months; the future is likely to resemble the past.

2. *No major depression* (47). Many "built in" stabilizing mechanisms in the U.S. economy coupled with the experience of businessmen, government and the banking system should keep the economy on a steady keel. This doesn't rule out the possibility of

adjustment periods termed recessions, but the prospects for depressions as were experienced in the 1930s are remote.

3. *Inflation of about 1.5 percent per year in consumer prices* (47). The Consumer Price Index has been increasing at a rate of approximately 1.90 percent per year over the past 30 years but at a rate of only 1.25 percent per year during the past decade. It is reasonable to expect about a 1.5 percent annual increase between now and 1980.

5. *Average weather and little success in controlling weather* (38). Average weather is a necessary assumption. Meteorologists do not recognize the presence of cycles in weather and cannot predict weather several years in advance. By 1980 many problems in cloud physics will have been solved, but to anticipate a major advance in our ability to increase rainfall would be pure speculation. There is also no evidence to support optimism concerning our future ability to suppress hail, change the course of or suppress tornadoes or reduce destructive winds. By 1980 we certainly will not be able to change the climate of areas of continental scale by such means as deflecting ocean currents or pumping warm water into the Arctic Ocean.

Although widespread weather modification will not be in the picture by 1980, the accuracy in predicting weather will be greatly improved. Predictions for at least a period of a few days will be considerably more accurate. Such forecasts will, however, continue to be made in terms of average conditions over fairly wide regions. Detailed weather changes at a given point will continue to be predictable for only a few hours but should be improved by continuing advances in radar meteorology.

Man will have more ability to combat the adverse effects of climate in his own individual operations. For example, solid set irrigation systems can be used for (a) frost protection, (b) application of chemicals, (c) fertilizer application, (d) supplying moisture, and (e) cooling.

5. *Development and adoption of new technology will be even more rapid in the next 15 years than in the past 15 years* (67, 9). Prospects are good that research in agriculture and natural resources in both public and private institutions will expand. In addition, the entire effort toward scientific inquiry in general is receiving increased support. More funds are being made available. Many more researchers than ever before are at work, and their numbers will continue to increase. Also, tools for research are improving. Often the benefits of research in one area spill over into other areas not directly related.

An assessment of prospective technology is a key element in long range projections. Probably the major error in previous studies of this kind has been to underestimate the impact of new technology.

In recent years, the number of publicly and privately employed people directly attempting to influence farmers to make technological changes has been increasing. For instance, the business of supplying producers with inputs of seed, feed, fertilizer, pesticides, machinery, equipment and structures has expanded greatly. Without attempting to project to 1980 the actual number of these publicly and privately employed "change agents," it is very probable that the ratio of "change agents" to farmers will continue to increase, which in turn will have the effect of speeding up the adoption of new technology.

Farmers will be more receptive to change during the next 15 years. The overall level of management ability will be higher and those farmers whose management abilities are above this overall level will be perceptive in incorporating new profit-making technologies before they become general practice.

The most profitable innovations or changes are frequently the most costly to establish. Only larger operations may be in a position to take advantage of them and bear the risks inherent in early adoption. The trend to larger farms will speed this process.

The discussion here has centered on farmers. Many of the same types of forces will be felt in agribusiness and in natural resource areas. Details concerning new technologies available and in use by 1980 are presented in Chapters II and III.

SOCIO-ECONOMIC CLIMATE

Accompanying the changes in technology will be major developments in the socio-economic climate that will affect rural Michigan.

Population and Characteristics

World (84)

World population is rising at a rate close to 2 percent per year. The rate is nearly twice as large in the low income countries as in the high, 2.4 percent compared with 1.2 percent estimated for 1958-70, according to a recent Food and Agriculture Organization study (69). The world's population in 1980 will be about 40 percent larger than in 1964, barring major catastrophe. The lowering of the death rate in the low income countries is likely to continue to 1975-80, provided large scale malnutrition can be avoided.

There are a number of nations concerned about doing something to reduce the birth rate; there is much scientific activity to find cheap, effective, and morally suitable means to reduce conception. A breakthrough in this area could bring a significantly

smaller birth rate. A continuation of present limited and partial measures would be overbalanced by advances in public health, and the result would be a larger population increase. Thus, a 40 percent population increase is a compromise projection, which assumes a decrease in both the birth rate and death rate, with a realistic range between 35 and 45 percent of the 1964 population. By 1980, even more of the world's population will be located in present low income countries, since they now have the highest rate of population growth and are most likely to lower the death rate further through public health measures.

United States (66)

The population of the United States nearly doubled during the past half century. It increased from 92 million in 1910 to 179 million in 1960. The U.S. Bureau of the Census projected total U.S. population to increase to a level between 233 and 252 million by 1980 (75).[1] Four projections were actually made under different assumptions regarding future fertility, mortality and net immigrations. Using the "Series B" projections, the population of the U.S. would be expected to increase from 195 million in 1965 to 209 million in 1970, to 226 million in 1975 and to 245 million by 1980. The 1980 projection represents about a 25 percent increase over 1965.

East North Central States (66)

The population of the East North Central states (Ohio, Indiana, Illinois, Michigan and Wisconsin) constituted 20.2 percent of the U.S. total in 1960. Its growth closely paralleled that of the nation throughout the past two decades and will likely continue to do so through 1980. The population of the East North Central Region should reach 50 million by 1980 compared with 36 million in 1960.

By 1980, the most rapid rate of growth in the East North Central Region, as in the nation, will have occurred in the age group 20 to 29, an increase of over 80 percent compared with 1960. The older teen-agers will be about 60 percent more numerous in 1980 than in 1960. Elderly citizens, those 65 and over, will increase about 40 percent in number. In contrast, those now in their twenties will be in their forties in 1980 and numerically will have remained essentially stationary. Largely because of the increasing difference in longevity, females are likely to increase more rapidly than males in the future.

Michigan (66)

The population of Michigan nearly tripled in the 50-year period between 1910 and 1960, comprising 3.1 percent of the nation's population in 1910 and 4.4 percent in 1960. Since 1940, Michigan's population has averaged 4.23 percent of the nation's total. On the assumption that this ratio will remain constant, the population of Michigan is estimated at 8.2 million in 1965 and can be expected to range between 9.8 and 10.6 million by 1980. The projection considered most likely is 10.2 million. This represents an increase of nearly 30 percent over 1960 and 23 percent over 1965. The increase will be approximately 100,000 persons in each of the next few years and will probably exceed 140,000 during the last few years of the 1970s.

The population growth is based on the assumption that the birth rate will rise gradually from the present 21.5 to 23.6 (births per 1,000 people per year) and that the death rate will remain constant at 8.8 per 1,000 persons per year. A slowly rising birth rate seems reasonable in view of the increasing number of persons who will be reaching marriageable age in the next dozen years. A general decline in fertility may be imminent. New fertility-control techniques enhance this possibility. A constant death rate of 8.8 seems reasonable in view of the fact that this has been the average over the past 10 years and that the median age of the population will decline from the present 28.3 to about 26 or 25 by 1980.

A difficult prediction to make is the in- and out-migration for Michigan. During the 1950s, Michigan had a population growth of 1.4 million, of which 1,289,196 was a natural increase (1,917,902 births less 628,707 deaths). The balance represents a net in-migration of 162,232 persons, according to estimates of Beegle (8). Michigan was one of 23 states that had a greater in-migration than out-migration. Whereas net in-migration contributed 11 percent to Michigan's population growth in the 1950s, it had contributed 30 percent in the 1940s.

In the late 1950s and early 1960s there was a net migration of people *out* of Michigan. This was related to the unemployment problem. As Michigan's economy moved into the mid 1960s the unemployment problem waned and signs pointed to an end of the net out-migration. This illustrates the importance of economic conditions to population growth. The assumption made in the population projections to 1980 for Michigan is that in-migration and out-migration will be equal.

Migration and differential rates of natural increase have also caused a redistribution of the population within Michigan. Prior to 1900, Michigan's center of population was pursuing a northwesterly, then a northerly course. After reaching a point 9.2 miles northwest of Ithaca in Gratiot County, the center of population has receded to a point approximately 15 miles southeast of Owosso in Shiawassee County.

(1)More recent projections published on March 10, 1966, reflect a lower level of fertility. This would suggest about a 1 to 3 percent lower projection for U.S. and Michigan population than assumed for this study.

Dwindling logging operations in the northern sections of the state and the expanding automobile and heavy industry operations in the southern and southeastern parts have contributed to this redistribution. Currently, nearly 50 percent of Michigan's population resides in the three-county area around Detroit (Wayne, Oakland and Macomb).

Counties. Population will continue to shift within the state. In January, 1964, Dr. David Goldberg of the University of Michigan Population Studies Center projected the population for each of the 83 counties in the state. (28) The projections for 1965, 1970, 1975 and 1980 appear in Table 1 in the Appendix. Percent changes between 1960 and 1980 are indicated in Fig. 1.

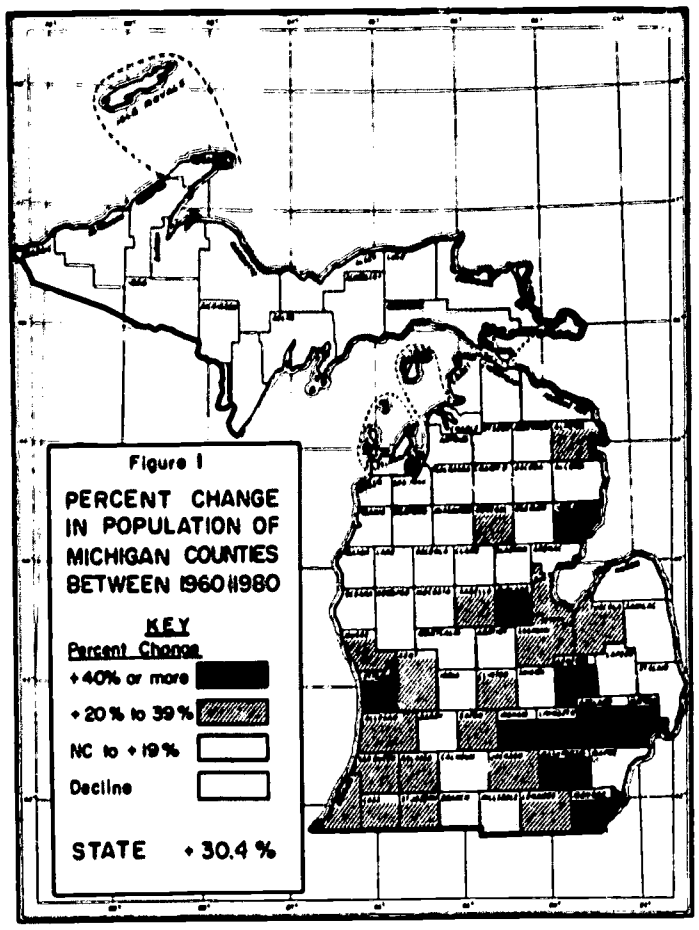

Fig. 1. Percent change in population of Michigan counties between 1960 and 1980.

In 1980, 56 counties will have more people and 27 counties will have fewer people than in 1960. In most instances the population loss will be small in comparison with population gains. According to the projections, 11 of the counties with fewer residents in 1980 will be in the Upper Peninsula and 16 will be in lower Michigan, principally in the northwest sector. These county figures are not predictions, but are merely projections based on the application of a formula that depicts past trends. Many factors can change past trends regarding components of population changes.

Age distribution. The composition of Michigan's population is dynamic, ever changing. This is especially characteristic of the age distribution. The different age groups increased at very uneven rates in the past and will do so in the future.

As a result of the low birth rate of the depression in the 1930s, the 20-to-29-year-old group actually declined in number between 1950 and 1960, a decrease of over 10 percent. On the other hand, the baby boom of the postwar years has increased the number of young folks. Between 1950 and 1960, persons under 20 years of age increased nearly a million, or 45 percent.

The population in the economically most productive years, 20 to 64, increased between 3.7 and 4.0 million between 1950 and 1960, or less than 8 percent. Increasing longevity has boosted the number of persons 65 years and over from 461,650 to 638,184, an increase of 44 percent in a single decade. These senior citizens comprise a larger portion of the population than they did a decade ago in 60 of the 83 counties. The relatively rapid increase of children and teenagers and people of retirement age has increased the burden on persons of working age.

Between 1960 and 1980, Michigan's population under 5 years of age will increase by 20 percent; those between 5 and 14 years will increase by 20 percent; those between 15 and 19 years will increase by 58 percent; those between 20 and 29 years will increase by 97 percent; those between 30 and 64 years by 13 percent; and those 65 and over by 38 percent.

Most counties with heavy out-migration have relatively few people in the younger age groups and proportionally more people in the older age groups. Those who do move out of these counties are, to a large extent, people of an age group with high birth rates and low death rates.

Michigan, for the first time in history, now has a larger female than male population. Woman power is supplanting manpower in more ways than one. The ratio of 1,017 males per 1,000 females in 1950 changed to 985 males per 1,000 females by 1960. And the trend is certain to continue. Men constitute the minority sex in most counties with large cities. The decline in the ratio of males reflects the decrease in immigration from foreign countries, which was predominantly male, as well as the ever-increasing differential longevity of women, a trend marked by every census.

Education. All evidence indicates a gradual rise in the educational level of Michigan's population. The median number of school years completed by its residents 25 years old and over was 8.8 years in 1940, 9.9 in 1950, and 10.8 in 1960.

The median woman has more years of formal education than the median man, 11.1 for women and 10.4 for men. Apparently much of the female advantage

was acquired during the 1940s, when the war effort demanded the services of many men while women continued their education. Women's higher level of median school years completed was due to their greater perseverance in completing high school, rather than in completing college.

In view of great differences in the composition of population – such as age-sex ratio, race, nationality, occupation, rural-urban residence, and marital status – considerable variation can be expected in the schooling of adults among the 83 counties of the state. Median school years completed for males range from a low of 8.3 in Keweenaw and 8.5 in Lake to a high of 12.2 in Washtenaw. The latter is followed closely by Ingham and Midland, each with medians of 12. Older persons and foreign-born generally have less schooling than the younger generations and the native-born. These factors contribute greatly to wide variations among many counties. Selective migration was another factor.

Unquestionably the educational level in the state will continue to rise and projections for 1970 and 1980 are based on this assumption. The assumption is that the rise from 1960 to 1980 will be a repetition of the rise from 1940 to 1960, or about two years of formal education.

Urbanization. For many decades there has been a gradual decrease in the farm population of the state and a gradual increase in both the urban and rural nonfarm population. The Census Bureau counts as urban all incorporated and unincorporated places of 2,500 inhabitants or more, and the densely settled urban fringe, whether incorporated or unincorporated. Changes in population reflect the effect of any annexations or detachments.

As indicated in Fig. 2 and Table 2 (Appendix),

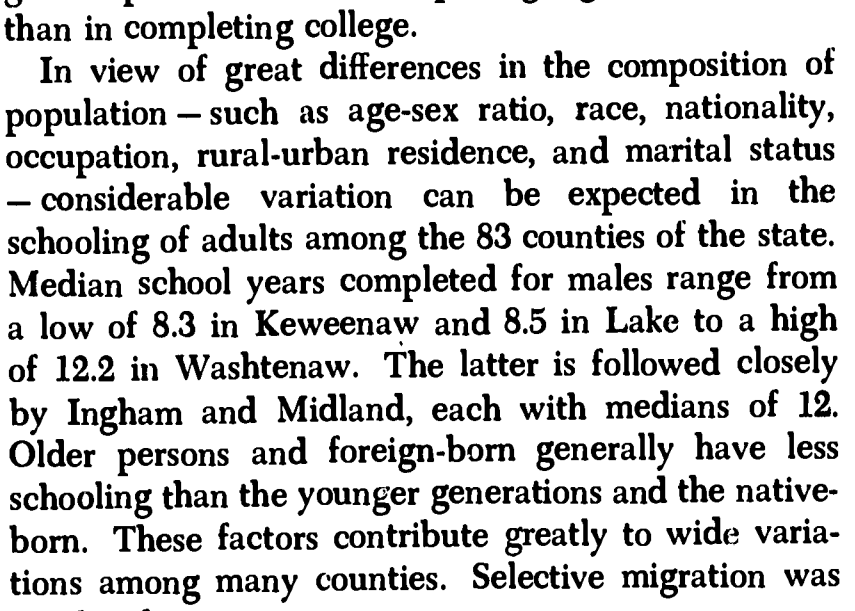

Fig. 2. Michigan's population by urbanization, 1900 to 1964 and projected to 1980.

the farm population will continue to decrease and the urban and rural nonfarm population will continue to increase. The extent of change in each category can only be conjectured. Most likely, the farm population will decline about 62 percent between 1960 and 1980 and represent only 1.7 percent of the population at that time. Total rural population will increase, however, by about 22 percent.

Income (47)

If the U.S. population reaches 245 million by 1980, the labor force will be around 100 million, assuming an unemployment rate of 5 percent. About one-third of the labor force will be female. A projected increase in the output per man-hour of 2.5 percent per year would generate, by 1980, a Gross National Product over the trillion dollar level in terms of 1962-63 prices. This represents a growth rate in the national economy of 3 to 4 percent per year, or nearly a doubling between 1962-63 and 1980. Assumed here is a reduction in the number of hours worked per week of about 0.2 per year.

Disposable personal income *per capita* will be more than $3,000 per year for the average American (again in terms of 1962-63 prices). This represents about $1,000 more purchasing power than he had in 1962-63.

An important feature of the projected increase in per capita incomes is that this will be mostly "discretionary" income, that is, income above the level required to buy necessities. This implies a rapid growth rate for those industries that can entice the consumer to spend this additional income.

Trends in the Michigan economy will be similar to those in the nation as a whole. Yet in several ways Michigan differs from the national complex. The feature of Michigan, of course, is the importance of the manufacture of motor vehicles and parts and the inputs used in this industry. This emphasis provides Michigan with somewhat higher personal incomes per capita than for the U.S. as a whole. (In 1965, personal income per capita in Michigan was 10 percent above the national average.) But at the same time incomes and employment are less stable than in other states.

The growth in Michigan's economy paralleled the nation in the first part of the 1950s, fell behind in the late 1950s, then gained on the national economy after 1961 and into the mid 1960s. Several forces caused Michigan to lose out in the late 1950s – geographic decentralization of several industries, automation, economic recessions and loss of defense business (32). Several of these forces may be operative between now and 1980, but their combined effect should not impair Michigan's growth rate as it did in the late 1950s. Adjustment to the loss of the defense business

has largely been accomplished. Decentralization and automation will continue but this process is well under way and the initial shock has been absorbed. Recessions may well occur again but recent experience suggests that they will be less frequent and less severe.

Beyond the adjustment to recent negative factors, two positive growth factors for Michigan might be mentioned. One is the rapid rise in auto scrappage projected for the next few years. The other positive factor is the growth in real incomes, which will greatly increase the number of two- and three-car households.

There is good reason to assume that the growth of the Michigan economy will be at least as rapid as the general economy between now and 1980.

Trends in Leisure (52)

A rising standard of living will be manifest not only in higher incomes but also in more leisure time. Leisure time is defined as the time not committed to gainful employment or to nondiscretionary activities (sleep, personal care, shopping and work journeys, household care, etc.).

Availability of leisure time can be examined in several ways. One is to look at the life cycle. Youths are tending to delay their entrance into the labor force, save for the growing proportion of high school dropouts and semiskilled. The marked amount of leisure time for these latter groups, including involuntary leisure through unemployment, is well on its way to becoming a major social crisis. Of the college-age population, around 40 percent is at present enrolled for higher education. Continued-trend estimates for 1970 would put this ratio at about 60 percent, and some venture that it will rise at a much faster rate. The precise role of college students as participants in recreation markets is not known, except for the obvious weekend and vacation clustering of their more limited free time and the increased complexity of activities pursued.

Concerning the older population, growing retirement benefits and changing job requirements have been producing earlier retirements, generally. Lengthening life spans have meant a doubling of the average retirement time for men, from almost three to almost six years. A continued trend would result in approximately seven and a half retirement years for men in 1980, and obviously a much higher figure if geriatric advances occur as rapidly as now seems likely. Labor force participation rates for men 65 years old and over are expected to be reduced to around 25 percent, with a corresponding figure of 10 percent for women in that age group.

For the entire U.S. labor force, the approximately 70-hour work week typical in 1850 declined to about 44 hours in 1940, and is now estimated to be a bit over 40 hours. Throughout this period, agricultural work weeks, while remaining significantly higher, have exhibited similar declines. Conservative projections indicate for 1980 an average actual work week for the U.S. labor force of at most 32 to 35 hours.

For the entire economy, the present average paid holiday time appears to be about six days. Estimates of paid vacation time range from one to two weeks, with much higher figures for workers covered by union contracts. Projections for 1980 indicate an increase in paid holiday time to roughly 8.5 days per year, and an extension of the average paid vacation time to between 2.5 and 2.8 weeks per year. Large blocks of vacation time, however, allow much more flexibility in what one does with leisure than small daily increments that might amount to the same total time. Thus a number of recent union contracts have shown a tendency to opt for considerably longer vacation benefits – verging even on sabbatical leaves – than would be suggested by the conventional projections.

The evidence is unclear as to the future roles of part-time and dual job holders. Increasing skill requirements outside of automated jobs suggest a stronger role for the full-time employee, but a more flexible future work pattern may feature more part-time opportunities. Our knowledge of multiple job holding suggests that it is a phenomenon largely of the 25 to 44 year old married substandard income receiver, and restricted generally to about 5 percent of total employment. Whether this sort of group will still be with us in 1980, under conditions of much higher dollar incomes for even the substandard, cannot be known.

Optimists suggest that future unemployment can be held to, roughly, 4 percent of the labor force. There is strong, growing evidence that present pressures of technical change could lead to doubled – and possibly even tripled – unemployment rates in the absence of concerted social action or social change. Conventional projections appear to assume that this unprecedented problem will be dealt with reasonably well by 1980, possibly through the shortened work week cited above. Any such adjustment would vary considerably in its impact by labor force skill levels. There are broad indications that the major "leisure class" would be the unionized and the less skilled workers. Except as relieved by the computer, the professional and technical person would be busy, maybe even busier than ever.

Expectations are for variations in leisure availability by industry to lessen, but still persist in about the present pattern. Hours worked per week in 1980 would be about 15 percent higher in agriculture than

for all industry, and somewhat below average in the construction and service trades. Length of paid vacations would average highest in government employment, and remain quite low in agriculture.

POLITICAL CLIMATE

Federal, state and local governments have played, and will continue to play, an important role in the rural economy. To be sure, rural Michigan will have some voice in shaping future programs, although the development of federal legislation is largely outside its sphere of influence. And in state and local matters, agriculture will increasingly have to seek support from other rural sectors, and the urban population, for desired legislation.

Domestic Agricultural Programs (33)

At first it appears that predicting government programs 15 years in advance would be impossible inasmuch as they might be relatively transitory things that would rapidly change. If, however, one reflects that a majority of the present government programs are extensions or alterations of government programs that were initiated for agriculture in the 1930s, you realize there is a continuity in these programs that is greater than is generally realized.

The kind of government programs operating relative to agriculture in 1980 will be dependent upon economic, social and political conditions, both inside and outside agriculture. Economic conditions are important because, by and large, government programs for agriculture are aimed at alleviating some economic condition deemed undesirable by farm people. The social conditions are important because it is these that determine goals society has for agriculture and in a sense determine the kind of conditions we consider to be desirable or undesirable.

In dealing with government programs, of course, the political conditions are of major importance because it is not possible to get government programs relating to agriculture unless groups that desire such programs have the political power to achieve them (or can obtain the support of those who do). Certainly one of the major changes that will occur in agricultural programs in the future will come about as a result of the changes in the political power of agricultural groups relative to other groups in our society.

In an economy such as ours, almost everything that the federal, state, and local governments do affects in a small or large measure the well-being of almost all of us. Therefore, in discussing government programs there are an infinite variety of programs that might be discussed. This discussion, however, will be limited to those major programs dealing directly with agriculture.

Commodity Price Support Programs

Despite the desires of almost everyone concerned that agriculture be able to operate in a completely free market, devoid of government intervention in the pricing of farm products, it is likely that some type of price support program for major agricultural commodities will be in effect in the period under discussion. Of more importance is the level at which the price supports will be attempted, and as a result of this level the attendant control and other problems that are involved in the price support program.

It is very unlikely that the relative level of farm price supports will be significantly higher than in the early 1960s in any foreseeable period ahead. Experience has shown that attempts to raise farm price support levels significantly above a level of 60 to 70 percent of parity results in excessive output of farm products that will not clear the market at those price levels, and this in turn results in either high federal government budget expenditures (for storage or surplus disposal) or the necessity for production controls in order to hold output in check.

This is not to say that the farm price of some farm products may not exceed these levels in the period ahead. If we are operating in conditions where price support programs are necessary in order to maintain the prices of farm products, it is unlikely that enough political support will be forthcoming to enable these price supports to be at a level substantially higher than the level we have maintained in recent years.

It is probable that some kind of price support program will be operating in 1980 for those major commodities that make up the bulk of the cropland used in the United States. These include wheat, feed grains, cotton, and soybeans. In addition, price supports will probably be continued for several of the commodities having less importance to farm income and accounting for a small fraction of the land under cultivation, but which have a particular political power enabling them to obtain favored treatment. Such crops as rice, peanuts, and tobacco fall into this category, and it is likely their programs will be continued.

One feature of the United States commodity price support program probably will undergo major change in the future. During the post-World War II period the United States has been almost the only major country in the world that attempted to hold the price of wheat used for food substantially above the price of wheat used as feed. In the early 1960s this policy was reviewed and, although we may have a program that prices wheat used for human consump-

tion in the United States at a higher level than wheat used for other purposes, it is likely that the future market price for wheat will be essentially the feed-value equivalent of wheat in relation to the market price of feed-grains. There may be some kind of income transfer program for wheat growers, but it is not going to be one that maintains high market prices for wheat relative to feed grains.

It is likely the domestic program that will include large subsidies and rather extensive controls over the production and distribution of sugar will continue. Thus, the federal programs that support the production of cane and beet sugar in the United States are likely to continue unless there is some kind of unexpected stabilization of the world production and supply of sugar.

Not only will the price support level for United States farm products not be pushed substantially above the relative levels prevailing in the early 1960s, it is also likely that any government programs operating in 1980 to support the prices of major farm commodities will operate on a marginal pricing system. Such a program would mean that a farmer might receive one level of price supports for a given portion of his output. For output above and beyond this portion, his price received would be much lower and the price would actually be the market-clearing price at whatever level that happened to be.

In order to effectuate a system of marginal pricing for output of individual farms, it is likely that more use will be made of some kind of direct production payments. These will be financed from the federal treasury and/or by some kind of certificates that cause domestic consumers to pay a higher price for the product than they might otherwise pay. These kinds of alternatives will be used in lieu of a flat price support program, made effective by the use of a loan and storage program available to all farmers. This does not mean, however, that all loan and storage programs will be abandoned, inasmuch as the United States will continue to hold a large stock of farm commodities as international food reserves and reserves in case of international conflict.

If federal price support programs are in operation and are holding the prices of farm commodities something above the level that would be required to clear the market of all commodities produced, it is likely that there will be attempts at production control for farm commodities. As in the past, however, it is likely that these production control attempts will be something less than successful, leaving a substantial quantity of farm products to be disposed of through other programs, such as foreign disposal.

There is no evidence now that a majority of the producers of the major farm commodities, particularly wheat, livestock, and feed grains, will accept the kind of production controls necessary to reduce the United States farm output in the face of technological advance. Unless nonfarm persons force American farmers to choose between the complete withdrawal of federal price support programs or effective production control programs, it does not appear likely that American farmers will adopt production control programs effective in controlling individual and total farm output. A program that would achieve this would have to involve quantity controls over the output of most individual farm products and from individual farms. There is no evidence that American farmers are willing to adopt such controls; and it is unlikely that they are going to be willing to adopt such controls in the foreseeable future – unless they experience a substantial period of severely depressed prices. Even if farmers were willing to adopt production controls, it is unlikely that these controls could be made effective enough to significantly raise farm prices above the levels of the mid-1960s.[2]

There are several reasons why production controls that would be effective are not likely to be imposed politically upon American farmers. First, farmers themselves give no indication of being willing to adopt stringent production controls even in return for the promise of substantially higher product prices. Second, the political strength of farmers themselves is declining, and therefore they are increasingly dependent upon help from allied groups to protect their position with the national legislature. Some of the groups becoming increasingly important in the formulation of federal farm policy are those interested in the volume of farm products. These include those who store, process, and sell farm products and those who produce the tractors, fertilizers, chemicals, and other inputs used by farmers in production. Both groups are strongly opposed to the use of controls that would be effective in reducing farm output substantially below its potential. Reduced farm output would, for both groups, bring a reduction in their sales and income.

Finally, it should be recognized that the increasingly urban make-up of the United States Congress will make it virtually impossible for any federal program to be inaugurated that would result in a substantial increase in the price of food at the retail level. There is no area where consumers are more sensitive to price increases than for food. Thus, as our Congress becomes increasingly urban-oriented, it is unlikely to adopt highly restrictive price support programs or production control programs that would

(2) For a discussion of the prospects for market order legislation, note section on "Organization of Agricultural Markets," page 63.

result in substantial increases in the price of food to consumers.

Demand Expansion Programs

During the 1950s, demand expansion programs for farm products largely took the form of government programs to dispose of surplus farm products acquired in the course of the price support programs. Starting in the early 1960s, and increasing as time passed, the demand expansion programs, both domestic and foreign, have been directed more toward the needs of the recipients and less toward the matter of getting rid of specific surplus products that the government happened to acquire under support programs.

It is likely that the domestic demand expansion program, similar to the food stamp plan inaugurated on a trial basis in a number of areas in the early 1960s, will be expanded to a general domestic welfare program by 1980. Such a program makes it possible for low income families to enjoy a nutritious and varied diet. Its total effect upon the quantity of farm products consumed by these families will not be large, although it may have a rather substantial effect on the composition of their consumption. By 1980 some kind of food stamp plan probably will be in effect allowing very low-income families to have, if they want, consumption patterns similar to those of families now having income of $3,000 at present price levels.

Capital and Credit

Historically, government programs relating to credit conditions in agriculture have been important in the farm economy. They have resulted in many significant credit institutions, most of them now owned by the farmers themselves. Moreover, some of the federal programs probably have been instrumental in bringing about changes in practices and institutional arrangements of commercial credit organizations.

Looking ahead to 1980, it appears that the conditions relating to capital and credit uses in agriculture will be governed largely by the market forces. The role of subsidized credit in agriculture has been diminishing since the 1930s and, with the exception of certain specialized credit, it is likely to diminish even further in the future as the use of farmer-owned cooperative credit mechanisms and privately owned commercial credit organizations continue to grow relative to the federal credit programs.

This will not mark a major change in the cost or availability of credit to farmers. During most of the postwar period, farmers have been competing with other borrowers in the national capital and credit markets to get the capital necessary to finance their agricultural operations. It is likely that in the future additional institutional changes will be needed. These, however, will be covered in a separate section involved in the credit needs of agriculture.

Land

Federal government policies have had major impacts upon land settlement patterns and land use in American agriculture. However, these impacts have been relatively modest in the years since World War II and it is likely that the impact of federal land programs will decline as far as commercial agriculture is concerned in the immediate future. Federal programs of some kind will affect general land use in recreation and area development programs. These programs will be considered separately in Chapter III.

Labor

American agriculture has probably had less federal regulation of the conditions relating to hired labor than any other industry in the United States. By 1980 this condition will have ended for the most part, and farmers can expect a substantially increased set of federal regulations relating to wages and working conditions for hired workers in agriculture. Certainly by 1980 the importation of migrant agricultural workers from foreign countries will have been completely stopped. In addition, by 1980 it is highly likely that federal regulations relating to the minimum wage, housing, and other working conditions for hired agricultural labor will have been established. While it may be that the federal minimum wage level established for agriculture will be somewhat lower than that established for other industries, farmers may expect to pay competitive wage levels with the nonfarm economy as a result of labor conditions and/or the minimum wage by 1980.

As a result of these programs, plus a general increase in farm-nonfarm labor mobility, the present relatively low labor cost in agriculture is likely to end. Thus, farms heavily dependent upon hired labor can expect this portion of their costs to rise rapidly in the years ahead.

Rural Community Resource Development Programs (39)

Rural community resource development programs have been receiving increasing emphasis, a trend likely to continue in the future. This has been the outgrowth of several influences in Michigan and the U.S.

1. *Social and economic revolutions that require community adjustments.* U.S. and Michigan income

levels are at an all-time high, purchasing power is vigorous and there is a reflection of growing affluence. At the same time there is significant unemployment and underemployment resulting from various social and economic revolutions. Dynamic shifts, such as agriculture mechanization, mining automation and industrial relocation, are an integral part of our private enterprise system. It is primarily these shifts that have resulted in 10 million families in the U.S. – 35 million individuals – trying to find food, clothing and shelter on less than $3,000 per year. Nearly one-half (4.3 million) of these poor families are rural – 1.5 million are rural farm families and 2.8 million are rural nonfarm families (3).

2. *Population increases and resultant pressures.* Population increases and the resultant competition for relatively fixed resources such as land and water bring increasing demands for resource development efforts. There is concern both for reducing undesirable uses and for preventing abuses of resources in the future.

3. *Greater interdependence of people and communities.* The greater interdependence of people everywhere within communities and between communities is a major factor. U.S. citizens have come to the realization that the solution to many of their problems can only come through their joint efforts.

4. *Higher educational levels and increased citizen desires.* Higher educational levels throughout Michigan and the U.S. lead people to want to work on the solutions to their own problems. They have learned they can have much to do with their own destiny. They want to exercise this knowledge.

5. *Outgrowths of earlier successful community development efforts.* Early successful development efforts like land use planning, program projection, rural development, "community bootstrap programs," rural areas development and others have established a threshold for rural community resource development programs. Seeing what efforts like these have meant to others makes people ready to try them.

6. *Increased assistance from educational units, organizations, consultants, and government.* Educational units have geared up to provide resource development assistance. Higher educational institutions have been especially involved. Extension work in community resource development is now commonplace. Cooperative Extension Agents have been assigned major responsibility for "organizational and educational assistance" in community development. In addition, new units for community development have been created at many institutions of higher learning.

Private consultant assistance in community development is more commonly available at prices communities can afford. Each week it seems more new information is available from units engaged in development assistance. Community development agent, community planner, economic consultant, development assistant are regular titles for workers in this area.

Government assistance in community development is exerting a tremendous influence. The "seed money" approach has had significant impact in influencing people to be involved in community resource development.

Each day seems to bring additional legislation and directives for government assistance in community resource development. Universities, and particularly Cooperative Extension Services, have been involved in the various programs in the past and there is strong indication they will be further involved in the future.

Varying Viewpoints on Federal Assistance

Federal assistance is viewed with mixed emotion by many rural communities; some will not even consider the possibilities. The great majority, however, are not willing to make decisions that will cause them to lose eligibility for such assistance. This fact is very significant in the current impact of government programs. Most of the programs require "citizen development plans" to maintain eligibility for assistance. As community leaders meet to work out such plans, there is significant learning in the process and on many occasions local sources of assistance are revealed that were originally overlooked. When local financing is not sufficient, local committees frequently apply for technical and financial loans and grants. There is great variety in the projects, the route of application, the processing time and the amount of capital involved. There is, therefore, considerable variation in the public acceptance of the efforts. Evaluation of impact is now beginning to appear, but much more research must be undertaken before any real judgment can be made on the economic force of completed projects.

The acts and memoranda of these federal programs spell out the objectives of the specific programs and establish a base for all community resource development. The purposes listed are:

1. "To develop the human and economic resources of an area to their fullest potential for yielding human satisfaction. This will be done through projects designed to expand economic opportunities in and outside of agriculture, through reducing unemployment and underemployment, and through training and retraining of youth and adults (74)."
2. "To provide grants for public works and development facilities, other financial assistance

and the planning and coordination needed to alleviate conditions of substantial and persistent unemployment and underemployment in economically distressed areas and regions (72)."

3. ". . . and to aid communities and to stimulate local action to assure to every family the opportunity to secure a decent home in a suitable living environment and to foster economic and cultural growth (77)."

The emphasis through the summer of 1964 was primarily upon increasing economic activity. Priority considerations were those efforts that would provide new jobs in the shortest time possible. The terms "smokestack chasing" and "brick and mortar activities" were sometimes used – and not always favorably.

On August 20, 1964, "The Economic Opportunity Act" was passed:

> "To mobilize the human and financial resources of the Nation to combat poverty in the United States (71)."

In 1965 it was amended for further attacks in the war on poverty.

The pendulum swung. The emphasis moved to human resource development – basic education, training, and retraining.

The Appalachia Act was passed in early March of 1965, to continue the emphasis on low income areas but with new support for construction of transportation routes and special "economic opportunity" projects. Early attempts to reach Michigan's Upper Peninsula and the Northern Great Lakes Area with the benefits of the Appalachia Act failed, but there is new indication that similar special acts will be passed for such provisions.

On August 26, 1965, the Economic Development Act (EDA) was passed for continuation of work begun in the Area Redevelopment Act (ARA) and Accelerated Public Works Program. The less popular aspects of the earlier acts were eliminated but the basic interests were continued.

Further specific help for rural community resource development was provided by Secretary Freeman in the USDA by:

> "creating within the Department of Agriculture a Rural Community Development Service, which will have no operating programs of its own but will devote its energies to assisting other agencies in extending their services (35)."

The Cooperative Extension Service organizational and educational roles were also strengthened with the allocation of additional funds toward President Johnson's and Secretary Freeman's "pledged parity of opportunity in rural America."

Current world conflict raises questions about the extent of funding for all of these new efforts. There is, however, ample evidence that there will be general support for community resource development programs and some specific assistance for providing "pledged parity of opportunity in rural America," even in the face of world conflict or changed administration and domestic policies.

State-Local Tax System (87)

Some major adjustments will be made in Michigan's state-local tax structure between now and 1980. A number of factors will force the tax structure to change: Michigan's population is growing rapidly; most of the added population is moving away from incorporated cities into suburban areas; added costs are incurred to provide public services to scattered residents of suburbia; there are increased incomes and more leisure time for all; and citizens are wanting more and better public services.

Local units of government shoulder most of the responsibilities for providing new and better schools, unpolluted streams and lakes, police and fire protection, health, welfare and judicial services. The property tax has been the main source of tax revenue for local units of government. The property tax base in Michigan increased from $16.7 billion in 1955 to $26.3 billion in 1964, State Equalized Valuation (SEV). In spite of the rapid increase in the SEV, the value of property per school child in our elementary and secondary schools in Michigan has declined during the past decade. The 60 to 70 thousand additional children entering our schools are overrunning the capacity of the property tax. In addition to schools, local governments have responsibilities for furnishing other services already listed, and so tax system adjustments will be made.

A tax reform bill will likely be passed in the near future. This bill will include a state income tax and reductions of the so-called nuisance taxes. There will be some changes of the corporate and business activities taxes, with the probable elimination of the latter tax.

The State of Michigan will handle the collection of an increasing percentage of the revenues of the state and local governments. These will include the sales and use tax, gasoline and motor vehicle taxes, corporation and new state income tax revenues. The state will thus serve as the tax receiving agent and disburse increasing amounts to the local governments to lessen the pressure on the property tax base. Local units of government will receive a larger percentage of their total tax revenue from state collected "shared" taxes over the next 15 years. Local

option income taxes may reverse this trend for a few years but not over the longer period of time.

Michigan's farm tax burden will be more income-oriented and less property-value-oriented in the coming years. In other words, although property taxes will continue to be the larger part of state and local taxes paid by Michigan farmers, income will be an increasingly important factor affecting the tax take. Since there is a projected large increase in the investment in real and personal property per commercial farm by 1980, then one should expect a sizable tax increase per operating unit.

Local Units of Government

The state equalized tax base per child varies greatly from one school district to another. The formulas that guide the distribution of state aid do not correct for this difference. The child living across the road from his playmate may have fewer educational opportunities due to poorer teachers, inadequate laboratory and classroom equipment, and poor physical education facilities. The legislature of Michigan has the responsibility of providing free public elementary and secondary schools without discrimination as to religion, creed, race, color or national origin. But discrimination due to school district origin is all about us.

There will need to be adjustments in governmental organization to correct the educational inequalities now existing and to meet the additional responsibilities now being placed on local governments. It is possible to have the same tax base behind every child in the state of Michigan so that our human resources receive the best training possible. If local governments cannot correct this problem, we may see increasing federal efforts in this area. We may expect mounting pressures to upgrade the ability of local tax assessment officials to bring in automated record-keeping systems, and hopefully expenditures will not be dissipated through overlapping and inefficient governmental units.

Governmental services have lower costs per person in densely populated areas than more sparsely populated areas. A study made in Nebraska showed per capita costs for general administration in counties of less than 5,000 people were $12.67. For counties of 5,000 to 10,000 the costs dropped to $7.23; in counties of 10,000 to 15,000, 15,000 to 20,000, and 20,000 to 36,000, the costs were $6.01, $5.97 and $4.75 per capita, respectively. Cost is related also to the quality of the services provided. The evidence in rural areas indicates that inferior services and high costs go together compared to more urban areas.

Many services can be provided only at high cost in sparsely populated areas, others not at all. Public health services, parks and playgrounds, hospitals, and police and fire protection are sometimes lacking. These problems are especially pressing in counties of relatively sparse population where the population is not growing and in counties where the population is actually declining. Educational cost per student is high and quality of services lower in many of the smaller districts. Road service is also deficient in many of these rural areas and cost per person is high.

Alternatives

One choice might be to continue local governments and levels of service as they presently exist. Another alternative would be the consolidation of townships, counties and other local units of government into larger units. The county-city consolidation is a possible alternative. The internal reorganization of governmental units, especially of the county unit, has possibilities for improvement. School consolidation has drawn most of the attention and tended to obscure the opportunities for consolidating the various other services in the rural community.

In conclusion, the pressures for change on units of government and on the tax dollar that supports them are great. Great changes will need to take place in these units during the next 15 years if they are to remain viable institutions in our society.

SUPPLY AND DEMAND FOR RURAL PRODUCTS AND SERVICES

Given the technical, socio-economic and political climate for 1980, one can conjecture about the supply and demand for food, forest, nursery and floriculture products, recreation and other products and services of rural America. For example, population projections are basic for predicting demands. In addition, the analyst must know how the changing composition of the population (age, education, etc.), rising income levels, new technology, and so on affect per capita demands. He must be able to determine how different combinations of land, labor and capital will affect production and how new technology and improved management will change these relationships. The analyst may be able to discern these relationships from historical data and other sources of information. But the true test comes in applying this information to future producers and consumers, because relationships measured from past observations seldom fit future situations without some modification. Good judgment coupled with an understanding of the past is essential here.

To project commercial demand for any product or service, one must determine not only how much would be purchased but also at what price. Very likely the amounts people would be willing to purchase would increase with lower prices and decrease with higher prices, all other factors affecting demand being held constant. There is some reason to believe that as people become more affluent, price will become a less important determinant in their purchases, especially in buying necessities.

In the long run, the price of any product or service in a competitive market would tend to settle at or near the "cost of production," plus any marketing costs. This cost, in the economic sense, includes a "normal" profit. Returns to land, labor and capital would be sufficient to keep these resources in production but would not attract new resources.

This would be an equilibrium situation. At higher prices, consumers would buy less and producers would want to supply more and a surplus would develop. At lower prices, there would be a shortage. Price and production would eventually adjust back to the equilibrium.

Realistically, factors affecting demand and supply are changing so rapidly that industries seldom are in an equilibrium situation. Enterprises experiencing rapid growth in demand enjoy relatively higher prices during the period production is "catching up." On the other hand, those enterprises facing a falling demand or even a slowly growing demand may be operating under unfavorable prices and profits during the adjustment period.

Cost-reducing technology will tend to lower the equilibrium price. Such technology comes more rapidly to some enterprises than others, causing shifts in prices on some products relative to others. Changes in the market structure or competitive conditions, such as would affect bargaining power, may favor (or hurt) some commodity groups more than others. This, too, would change prices on one product relative to others.

Agricultural enterprises as well as other rural industries will be experiencing differential rates of change in demand, technology and market structure between now and 1980. Although these enterprises will tend to adjust to these changes, complete adjustment by 1980 is not assumed.

In the following sections on the U.S. food and timber industries, the emphasis is on demand. The reason is that, given the projected demands, supplies should be forthcoming without great difficulty. The U.S. has sufficient land, labor and capital available to meet both domestic and commercial export demands; or in the case of imported products, no particular difficulty should be encountered in obtaining outside supplies. Of course, there will be upward pressure on resource prices, particularly land and labor, but not enough to price the products out of the market – at least to any substantial degree.

American consumers will not be forced by a scarcity of land to shift their consumption habits away from livestock products and more toward crops, which would make much more efficient use of the land base. If there is a shift to more crop products, this would more likely be the result of improved quality of crop products relative to livestock. Whether products made from soybean protein and from other crops succeed in making major inroads into the livestock, poultry and dairy markets remains to be seen.

U. S. DOMESTIC DEMAND FOR FOOD

The demand for food is a demand for a complex bundle of goods and services, not solely the product as it leaves the farm. Population and income trends will be major determinants of this demand between now and 1980.

Effects of Income (62)

The composition of diets has materially changed in the past as incomes have increased. We witness today substantial differences in the foods purchased by high income households compared to low income households. This suggests continued adjustments ahead as incomes rise.

The very rapidly expanding *discretionary* income will not only affect what food people buy but also it will increase the volatility of preferences. Demands for specialty items will be particularly subject to rapid changes. Also, people with large discretionary incomes are more easily influenced by advertising and promotion because they are in a better financial position to react. In 1980, we can expect that advertising and promotion will play a larger role in influencing the food purchase pattern.

Because food expenditures will be a much smaller proportion of the family budget, people will be less responsive to food prices. Farm prices thereby will tend to be more sensitive to changing supplies. This may spur efforts to stabilize marketings.

Other Factors

Many factors other than population and income will influence consumer demand for food just as in the past, but perhaps not in the same ways. In the past, the great shift from a rural to an urban society – associated with a rising level of productivity or real income – had a significant influence on the pattern of consumption. However, the shift is now an ac-

complished fact with only about 8 percent of the population left on farms. The continued decline in the proportion of farm to urban population will have an insignificant effect upon consumption patterns. And the style of life of those remaining on farms has changed to the point where farm and urban families of comparable income and region have very similar food purchase patterns.

Similarly, the shift to sedentary occupations is well advanced. Only a small portion of the population now uses great amounts of energy in work. Factory workers in automated plants are now sometimes referred to as "witnesses," indicating the relatively passive role they play in the production process. With increased automation and other labor-saving devices, most of the population will be leading sedentary lives by 1980. This will reduce the need for calories.

Another major occupational shift in the past 20 years has been the great increase in the percentage of women employed, especially married women. The upward trend will continue. The major effect of the working wife on the food purchase pattern is related to higher levels of family income and the increased demand for convenience foods. A family income based upon combined earnings of husband and wife does not include as much discretionary income as would a similar-sized income from the husband alone because of the added costs to the family resulting from the wife's employment. Thus, increases in family disposable income derived from the wife's employment should be discounted by 20 to 25 percent.

Differences do exist in food consumption patterns among regions of the country. These differences are due primarily to variations in income, price relationships, product availability and climate. Differential growth rates have existed among the regions in the past. However, aside from the income and price effects, differential growth rates in the future are not expected to have a significant effect on aggregate patterns except perhaps for a few special items. Improved systems of distribution, national promotion and migration tend to reduce the differences in preferences.

Similarly, the differential growth rates among religious, race or nationality groups are not expected to have a significant effect upon average per capita consumption rates for major commodity groups. The trend has been toward much less difference among these groups, as they experience a similar culture. Even in the past, when the cultural background of the groups was considerably more diverse, much of the difference in consumption patterns was related to differences in income levels.

Recommended Nutritional Allowances (90)

New scientific knowledge concerning the constituents of good nutrition will also have some influence on the composition of diets in the future. The American consumer today chooses his diet from a national food supply that is adequate to meet the standards of our time for good nutrition -- the National Research Council's recommended dietary allowances (25). The amounts of nutrients as recommended not only prevent deficiency diseases, but are adequate to sustain healthy life for persons normally active in a temperate climate. The recommended allowances can be attained with a variety of common foods, providing also other nutrients for which human requirements have been less well defined.

The nutritive value of the national food supply has changed in several respects during recent decades (45). Calories per capita per day have decreased from 3,530 in 1910 to 3,130 in 1965. The sources of some of these calories have changed also. The percentage of calories from starches and sugars (carbohydrates) has decreased, that from fats has increased, and the proportion from protein has remained about the same.

The nutritional significance of fat in the diet is related not only to the total amount of fat we eat, but also to the composition of the fat in terms of fatty acids. The saturated fatty acids are found chiefly in animal fats – butter, lard, and fat portions of meat and dairy products – while the unsaturated fatty acids are found mainly in vegetable oils and in poultry and fish. Studies of the food we eat show that since 1930 there has been no significant change in our use of saturated fatty acids. The decrease in use of butter and lard has been offset by the increased use of other foods with saturated fats, chiefly beef. But there has been a 14 percent increase per capita in the use of unsaturated fatty acids.

Future Recommendations

As knowledge has increased concerning nutrient requirements, the general trend has been toward lowering the recommended dietary allowances (22). Nutritionists see no reversal of this trend in the future.

Much of the current research on nutrient requirements is directed toward adolescent and pre-adolescent ages. It is expected that more changes in recommended allowances may develop for these groups than for the "reference" woman or man. The lowering of the recommended dietary allowances for calcium in 1963 for children and pregnant and lactating women resulted in adjustment downward of the quantities of milk suggested for these groups.

Protein allowances are set on the basis of weight

(one gram per kilogram of body weight) so that increases in body size of the "reference" man or woman may increase the amount of protein needed. The greatest proportion of the population consumes protein in excess of the recommended allowances, due to improvements of the quality of protein consumed (25). Protein supplements will probably not be used extensively in the general food supply, but may be used in products to meet specific requirements of pregnancy, illness, and other conditions in which dietary problems impose a need for more efficient utilization of proteins.

The trend toward fortification of foods is expected to continue to increase. The teaching of nutrition may have to be altered to include as important sources of vitamins and minerals those foods that have been fortified. More fruit juices and drinks in addition to citrus juices now contain significant amounts of vitamin C. And increasingly, margarine and milk are being supplemented with vitamin A.

The caloric recommended allowances in the future are expected to decrease – possibly by 7 percent by 1980 – in an effort to balance with activity requirements. Adult obesity is a major public health problem in the United States. At least 30 percent of the male population and 40 percent of the females over age 40 are more than 20 percent above their ideal weights. The recommended allowances for thiamine, niacin, and riboflavin, based on calorie requirements, would be adjusted downward if recommended calorie allowances are revised downward.

The debate over the relative health values of unsaturated fats and saturated fats is still far from settled, but subject to active research and continuing review. Nevertheless, some food manufacturers have made the health factor an important part of their promotional and sales campaign.

The Food and Nutrition Board of the National Research Council considers that drastic changes with respect to fat in the American diet cannot be recommended at this time. Many factors are involved in the cause and course of heart disease; present knowledge indicates no need for major changes in the eating habits of people in normal health. The American Heart Association and the American Medical Association recognize the possible therapeutic value of increasing the ratio of unsaturated to saturated fats in the diet as one aspect of the medical treatment of coronary heart disease.

Processing (30)

Not only will the American public modify the composition of their diets, but the form of the food they purchase will change. There will definitely be increased processing and increased services attached to the sale of most agricultural commodities. The emphasis in processing will be on convenience, quality control and cost reduction – not on preservation *per se*. The increased processing will cause great increases in specialization of production, drastic and decisive shifts in location of production and great increases in interregional and international trade. Dairy, fruit and vegetables, beef and poultry and eggs will be affected much more than the grain industries.

The U.S.D.A. Utilization Research and Development Division of the Agricultural Research Station at Philadelphia, Penn., and at Beltsville, Md., as well as several universities, has intensive programs to develop an acceptable whole milk powder. Whole milk powder can be shipped at very low cost relative to whole milk. Ultimate wide consumer acceptance of whole milk powder could result in the virtual elimination of dairying in the New England states, states south of the Mason-Dixon line and in the far western states. Production of milk would be concentrated in the Lake States, particularly Wisconsin and Minnesota. Barring severe governmental interference, this adjustment could be under way by 1980. Similarly, without governmental protection countries such as Australia and New Zealand could make severe inroads in the American milk market.

The extent of the changes will probably be determined by legal and social barriers rather than economic ones. The desirable goal of cheaper milk will have to be weighed against the undesirable effects of the disruption of large segments of the American dairy enterprise.

For the fruit and vegetable industry, many new concentrating or cost-reducing processing technologies are already commercially available or are on the immediate horizon. Innumerable new convenience products are being developed. Shifts in production areas will be swift and decisive.

The processing industries will dominate the fruit and vegetable industries. International trade in processed products will be common. While we currently think in terms of competition between Michigan, California, Florida and New York, the new competition (because of cost-reducing and freight-reducing technologies) will be between Florida and Brazil, Idaho and Poland, California and Israel, and Michigan and France.

The technological revolution in processing will also make strides in flour milling (the new instant flour from the foam-mat drying process, for example), but few shifts in comparative advantages will occur because of relatively small changes in freight structures with the new processing technologies.

Prices — Farm and Retail (47)

The demand for food is reflected not only in how much food is purchased but also at what price. Although prices on individual food products will affect how much of that particular food item is purchased, prices are not likely to have much influence on *total* food consumption. Total food consumption per capita as measured by calories is expected to decline about 3 percent between 1959-63 and 1980. A change in demand for food would largely be recorded in the price rather than quantities consumed.

The retail food price reflects the demand for and supply of the farm output *plus* the demand for and supply of the processing and services involved in marketing the product. In the long run, the retail food price (in a competitive economy) would be expected to adjust to costs of producing and marketing food, with allowances for normal profits.

It is assumed that farm prices will not advance as rapidly as the general price level. Expansion in the demand for food will be at a slower rate than demands for nonfood products. In fact, based on historical relationships, the 50 percent increase in per capita incomes projected in 1980 would be accompanied by only a 7 percent increase in per capita expenditures on food. From the supply side farmers will continue to make more progress in lowering production costs than will nonfarmers.

Clearly any projection of farm prices would be highly tentative and dependent on actions taken by farmers themselves. But it is necessary that some projection be made. If the consequences of such a projection were to be considered undesirable, then this would be a signal that some action needs to be taken.

If we simply extend farm price trends since the Korean War, we would project little change to 1980 (Fig. 3). For example, the Index of Prices Received by Michigan Farmers stabilized at about 222 (1910-14 = 100) in the 10-year period from 1955 to 1964. The Index of Prices Paid by U.S. Farmers (no such index computed for Michigan) has increased steadily since the Korean War and is a good bet to continue rising, especially with consumer prices projected to increase by 1.5 percent per year. The prices paid by farmers will not likely rise as rapidly as consumer prices, because prices on farm-produced items such as feed, feeder livestock and seed are not likely to match the general inflationary trend. The Index of Prices Paid by Farmers, 304 in 1959-63 (1910-14 = 100) is expected to reach 380 by 1980. The parity ratio for Michigan farmers (Michigan prices received divided by U.S. prices paid) averaged 73 in 1959-63. If the Index of Prices Received remains at about 222 and

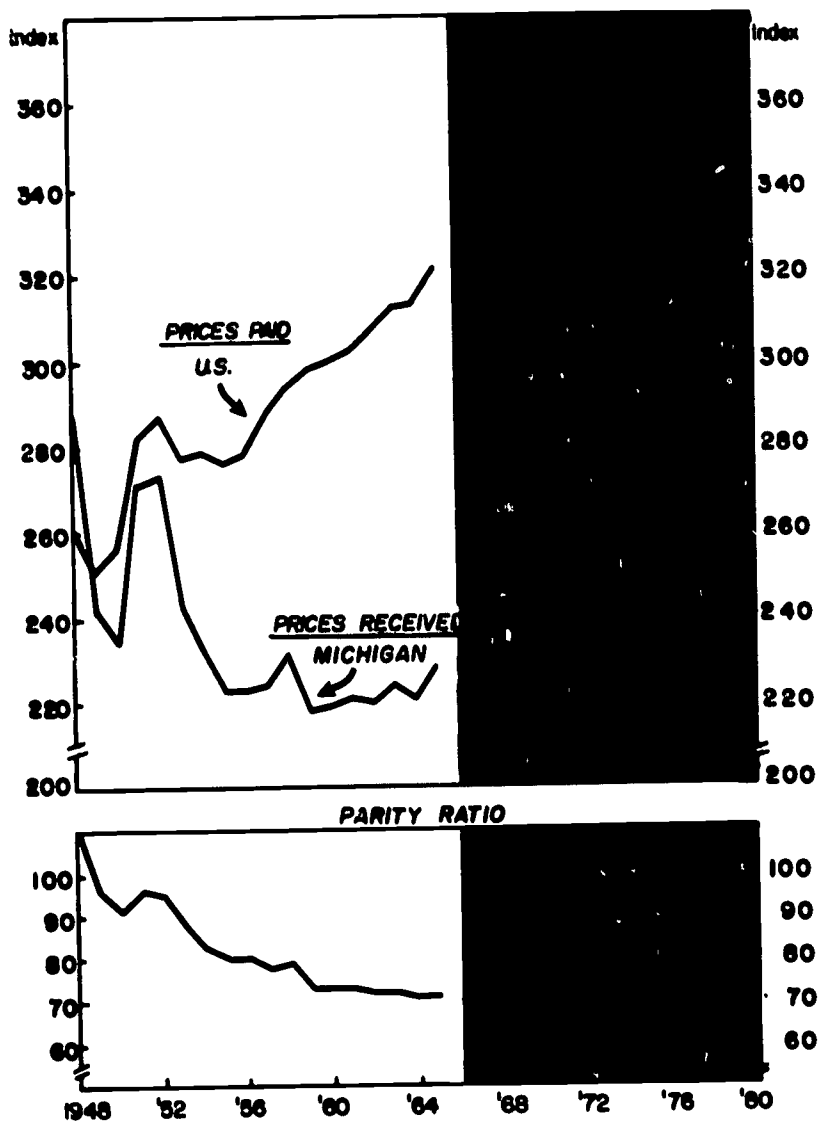

Fig. 3. Indexes of prices received by Michigan farmers and U.S. prices paid (1910-14 = 100); and the parity ratio (prices received ÷ prices paid), 1948-1965 and projected to 1980.

the Index of Prices Paid increases to 380, this would drop the parity ratio to 58 by 1980.

On the other hand, it is altogether possible that expanding domestic and export demands plus some reaction on the part of farmers themselves to the price-cost squeeze could push farm prices up during the next 15 years. A 20-percent increase over 1959-63 would place the Index of Prices Received by Michigan farmers at 265 in 1980 and the parity ratio at 70. This projection would be in line with the very slight decline that occurred in this ratio between 1959 and 1965.

Each of the alternative projections indicates some continuation of the price-cost squeeze in agriculture.

For purposes of projecting U.S. consumer demand for food, the assumption is made that the U.S. Index of Prices Received by Farmers will increase by 20 percent between 1959-63 and 1980. The marketing margin – the difference between the retail price of a standardized market basket of farm foods and the farm value of this same quantity – will likely increase in line with the general price level, or about 30 percent between 1959-63 and 1980. The major compo-

nent of marketing costs is labor. Wages will continue to increase at a faster rate than productivity in agricultural marketing. It seems to be the nature of the kinds of activities involved in marketing that less opportunity exists for increasing productivity than in agricultural production or manufacturing (62). A reasonable assumption is that the farm-retail spread will be more than 68 percent of the cost of the "market basket" in 1980. The figure was 62 percent in 1959-63, but this cannot be compared with the projection since the composition of the "market basket" will be materially changed by 1980.

Adding together the projected farm prices and the farm-retail price spread, retail food prices (using the 1959-63 market basket) will increase about 26 percent between 1959-63 and 1980, less than the 30 percent increase in the general price level.

Demand for Individual Farm Products (46)

All other factors held constant, consumption would be expected to have a "one to one ratio" with population; that is, a 30 percent increase in population would be accompanied by a 30 percent increase in consumption. This is probably a good approximation for most products. But because the composition of the population is changing, some commodity groups will have to be particularly attentive to certain segments of the population. For example, the dairy industry and the breakfast food industry recognize that the population in the 5 to 14 year age group will be increasing less rapidly than the entire population.

The separate effect of income on consumption can be either positive or negative on individual products. The degree to which income affects the consumption of a product is known as "income elasticity," which, of course, can be positive or negative.

As mentioned before, the price of a product will affect its consumption. Generally, the lower the price, the greater will be the amount consumed of a given product, all other factors held constant. Prices of products that are close substitutes, such as beef and pork, will influence the consumption of each other.

The separate effects of many other factors on the consumption of individual products are seldom measured but are lumped together and considered as "a trend factor." The trend factor may be either favorable or unfavorable, depending on the particular product.

Since per capita consumption of all food combined will not change very much from year to year, and, on a calorie basis, will decline gradually over time, products enjoying rising consumption will tend to displace other products.

Projections for individual products tend to be much less accurate than projections for product groups because of the high degree of substitution within commodity groups. For example, projections of pork consumption would be less reliable than projections of total red meat consumption; or a projection of snap bean consumption would be less accurate than one for processed vegetables. Therefore, no attempt is made to project consumption of every individual product.

Projections of Michigan demand appear to have limited usefulness because a national market exists for most agricultural commodities. Fluid milk is one of the few commodities for which regional demand conditions are important today. It is likely that the fluid milk market will be more nearly a national market by 1980.

Past trends in per capita consumption are indicated in Fig. 4. Table 3 in the Appendix shows U.S. per capita consumption and total production of major food

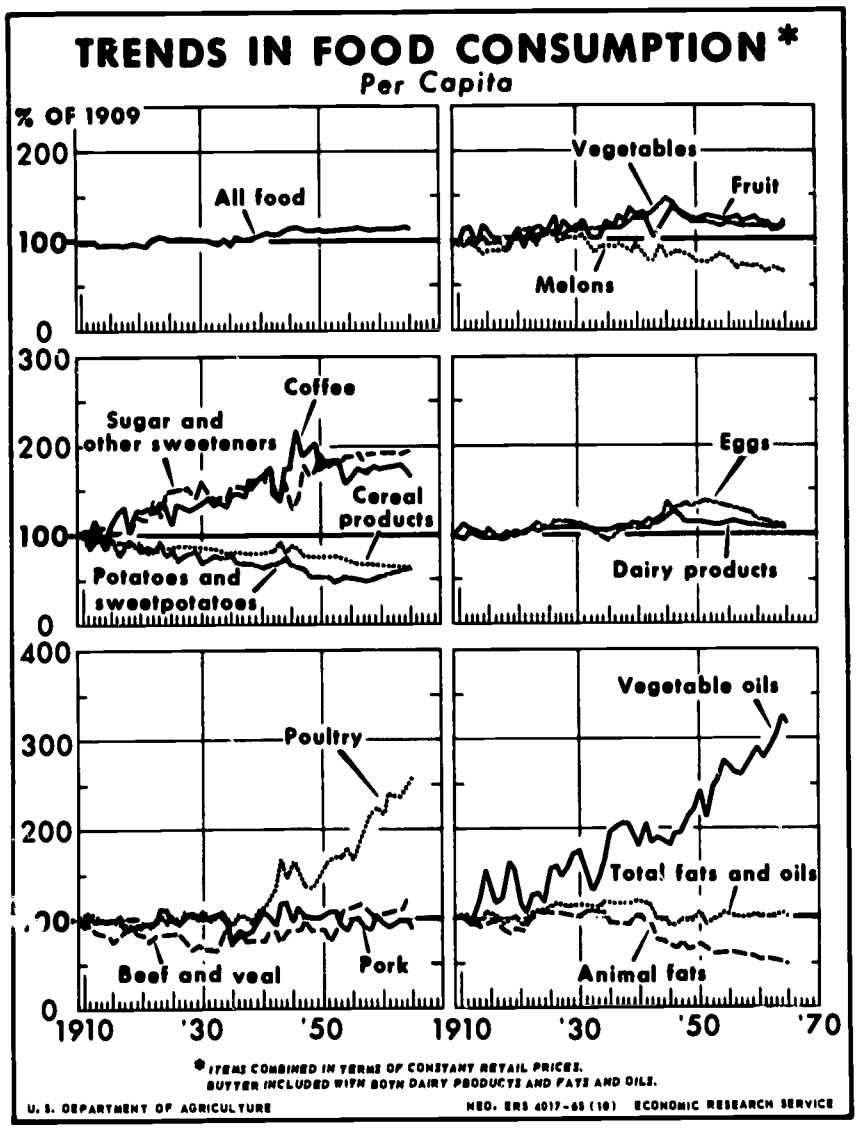

Fig. 4. Trends in U.S. food consumption per capita, 1910-65.

groups in 1959-63 and projected to 1980. As can be seen in the table, substantial shifts will be made in the *per capita* consumption of agricultural products between now and 1980. Even so, expanding population will generate increased *total* consumption for nearly every product. Exceptions will be veal, evapo-

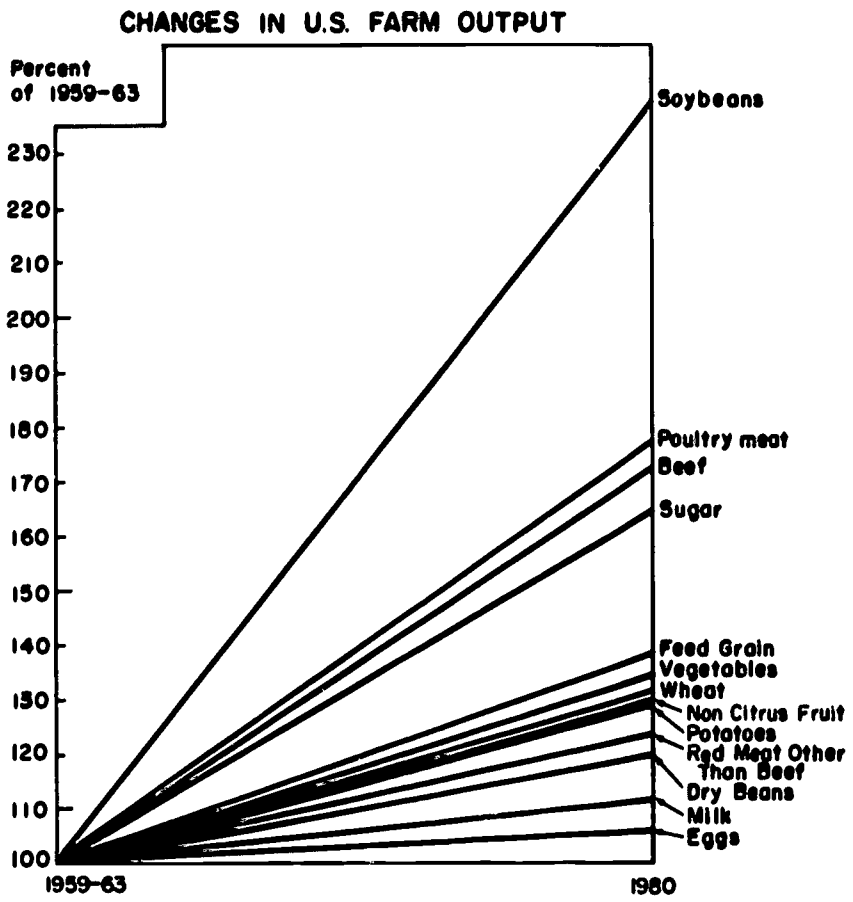

Fig. 5. Changes projected in the output of major U.S. farm products, 1959-63 to 1980.

rated and condensed milk, butter, fresh citrus fruit, and certain classes of dry beans. These projections are discussed in Chapter II.

U.S. production of major farm products of interest to Michigan will be increasing between 1959-63 and 1980, as shown in Fig. 5. Soybeans, poultry meat, and beef will be among the products expanding most rapidly, while growth for milk and eggs will be relatively slow.

U. S. EXPORT-IMPORT PROSPECTS FOR FOOD (84)

Projections and forecasts have very precise and differing meanings. Nowhere is this more evident than in the analysis of the export demand for farm products in 1980. The rapid growth in world population now under way derives from the rapid fall in the death rate as a consequence of dramatic advances in public health. The increment in food production barely keeps pace with population growth in many areas; in some it does not (70). But the nations of North America, western Europe and Japan find food production is rising more rapidly than population. Since the latter group of countries are much smaller in terms of population, a projection of current trends can lead to nothing but world food shortages, local deficits and substantial pressure for the developed nations to export any available food.

This is a *projection*, not a forecast. Many are the events that will modify this projection. In fact, this projection, even in these most general terms, is sufficient to convince many people and some national policymakers that a vast increase in birth control is imperative. Others, equally concerned, push more rigorously to expand the production of food. Scientists in laboratories tracing out the process of photosynthesis, engineers developing pilot plants to desalt ocean water, plant breeders painstakingly crossing and testing various plant strains, the extension specialist developing new programs and new communication techniques, and many, many others — all these contribute to changing the data, perhaps to make actuality less pessimistic than the projection (4). These are but a few of the influences that may affect the relation between population and food supply.

Further examination of international trade points up several more pertinent considerations. An increased population does not necessarily mean more trade, even in food. Most of the world's trade now is among some 20 developed countries; the majority of the rest is between these 20 and the less developed world. Only a tenth of the world's trade is among the less developed nations (56). So, trade occurs where there is income. Changes in the volume and pattern of trade will be dominated by developments in Europe, North America and Japan.

But the past two decades have seen a substantial growth in unilateral transactions — concessional sales and grants from the developed countries to the less developed (86). Food For Peace, the Colombo Plan, and the World Food Program have developed along with other more traditional forms of foreign aid. The United States provides a substantial part of the total of such transactions. Even so, U.S. aid represents a smaller share of our Gross National Product than is the case in several other countries because of our size and high per capita incomes (86).

Also of importance is the existence of complex regulations governing the export and import of products. The European Economic Community is wrestling with internal problems in rationalizing their agriculture. In this process many new and higher restrictions are placed against the outsider's commodities, and some internal producers are stimulated by favorable prices to expand their production (83). Since many of these restrictions are imposed by nations with reasonably high levels of living, an adequate projection must consider how these essentially political decisions will be made during the next 15 years.

Closely related are the possibilities that trade in an expanding number of world commodities will be controlled through International Commodity Agreements (11). In essence such agreements allocate the

rights to export and the responsibility to import by means of a comprehensive multi-nation agreement. By controlling the quantity exported, the prices are raised to or maintained at a level deemed reasonable by those setting policy.

Thus, an adequate projection needs to take account of and make assumptions about the following:

(1) The rate of increase in the world's population, or more specifically the birth rate, and the death rate, and still more specifically: Will birth control be widespread by 1980? Will public health continue to make life less hazardous? Will a new or more virulent disease sweep across the world taking the lives of hundreds of thousands of people? Will small wars take a heavy toll of life, despite their smallness?

(2) The level of income and amount of foreign exchange earnings among the nations heavily involved in commercial trading. We might turn the relationship around and ask about the population increase in the nations that now are important participants in world trade.

(3) The trends in the production of food in the less developed nations, in the importing nations and in the exporting nations. And this means projecting the results of experimental work not yet outlined, some of it to be done by people who have just started college. It means projecting the consequences of institutional changes in extension, in land tenure, in credit policies, in government programs, some only now being debated.

(4) The gap between domestic production and consumption in various nations and their willingness to fill the gap with imported supplies. What restrictions are likely to persist or be erected to hold imports in check?

(5) The nature of the foreign exchange gap among the developing nations. To what extent will they be able to express their demands for imports; how will they array their priorities as among food, durable consumers goods, machinery, raw materials, etc.?

(6) The extent to which noncommercial trade is supported and expanded. Are the developed nations likely to support such programs, to expand them in size, and to shift the focus toward improved nutrition? If so, protein foods will increase in proportions compared to grains. Some proteins may be produced chemically rather than biologically.

(7) The nature of the international controls over world-traded commodities. Will the restrictions be broad, specific, limited to a few commodities or encompassing many? Will there be opportunity for the United States to expand exports, or will the export volume be sharply limited?

Internal Demand for Food

At first glance the rapid rise in population (40 percent between 1964 and 1980) is likely to mean an increase in the world demand for food. Demand, however, is a complex term, representing a combination of need and desire on the one hand (often influenced by values as to what should be eaten), and purchasing power to make the desires meaningful in the market place. World demand is yet more complex since it involves the ability to express internal demand in the currency of another nation. It is useful to begin with a discussion of internal demand.

Low Income Nations

In the low income nations a major part of the family budget is spent for food. In the rural farms and villages the major share of the year's activities is the production of food for their own consumption. The structure of population, that is, the division of population between city and country, is such that nearly every low income country will have *more rural* people in 1980 than they do now (21). Despite a substantial out-migration and industrialization, the rural population birth rate will overwhelm these losses. A large part of the internal demand for food in these countries will be satisfied by subsistence production, to the extent that there are land and resources with which the new farmers can work.

But the urban population will grow more rapidly than the rural population and be much larger than it is at present. Already many cities in Asia, and some elsewhere, are subsisting in substantial part on imported foodstuffs. It is this segment that may provide a future expanding market for food in the low income nations. Here, too, the major fraction of the budget is spent for food; the same will be true for 1980's larger urban population. A rise in levels of real income will raise the demand for food by almost the same fraction, since income elasticities are fairly high, though generally less than 1.[3] The demand for animal proteins, being close to 1, will increase *pari passu* with a rise in incomes, with the demand for cereals rising more slowly (69).

Even this small rise in per capita incomes may be questioned by some. To attain even a stable income level with the vast expansion in population will require a substantial increase in capital and the creation of new resources through science and technology. Perhaps it is an act of faith; yet the amount of effort, funds and talent now marshalled in the high income world to assist development in the low income

(3) Income elasticity of 1 would mean that a 10 percent increase in income would be accompanied by a 10 percent increase in expenditures on food. Income elasticity of less than 1 would mean that food expenditures would increase less than proportionally with income.

countries (unique in world history), and the extraordinary efforts many of these countries are making for themselves, are showing up in higher incomes. The continuance of this trend seems more likely than its reversal. But in recognition of the difficult and long term task, it seems appropriate to expect only modest changes for most countries. The expanding manpower will be utilized in an expanding flow of resources, including knowledge, and per capita incomes will slowly rise. The total demand for food will increase at a rate somewhat below the growth of total income (population times per capita income). The total demand for pulses and animal protein will rise, however, at about the same rate as the growth in population and income.

High Income Nations

High income countries will have a less rapid rate of population growth (69). The absolute increase in per capita income will be substantially larger than in the low income countries, but the rate of growth may not be greatly different. (Four percent of $1,000 is much larger than 4 or even 6 or 7 percent of an $80 per capita income.) But this volume of growth must be discounted because food expenditures are a much smaller percentage of the family budget, and the percentage declines further as incomes rise. (Income elasticities of .6 to .9 on given food products in low income countries are likely to be .1 to .3 on the same products in high income areas, and even below zero for cereals [69].

For cereals and potatoes, demand is likely to increase slowly, only slightly more rapidly than the expansion in population. Animal products, however, and the feed grains that produce animal products, will find a demand expanding more rapidly (29). In Japan and Mediterranean Europe, the demand for animal protein will expand by the product of income and population growth, making these two areas the largest new markets for animal products. The rest of Europe will also expand its demand for animal products but at a less rapid rate unless its growth rate substantially exceeds that of Japan and Mediterranean Europe, an unlikely situation. Present growth rates in Italy and Japan are among the highest in the world.

Local Food Production Compared with Demand

A country may meet its food supply problem by (1) expanding domestic production, (2) importing commercially and paying with industrial exports, (3) importing on concessional terms, as under PL 480, and (4) by rationing consumption to what is domestically feasible. To what extent can domestic production be expanded?

Most reviews of recent trends in world agriculture indicate that only a few countries have attained great success in expanding food production. In most cases food production is barely in step with population growth, and doing little to meet the expanded per capita demands that accompany rising incomes; in a few countries per capita food production is declining (70). But an examination of the *potential* for increasing food production is substantial. There are many areas for improvement. Fertilizers, chemical sprays, improved varieties, better feeding practices, careful use of water control projects, and better husbandry generally can bring significant improvements in yield, while improved market facilities can reduce wastage and transfer a larger part of total production to the ultimate consumer. Such changes do not come without major effort to diffuse information and increase the incentives of those operating the land and handling its product.

The incentives to establish the significant and comprehensive programs necessary to stimulate agricultural growth are not present in many of the heavily populated, low income countries. There are many reasons for this. Underlying most of these reasons are two: First, development has meant industrialization in the minds of many leaders and development economists both in low income and high income countries. Secondly, the availability of U.S. surpluses at small foreign exchange costs postpones and obscures the sharpness of the emerging world food problem (86). Related to this is the low social status of agriculture and secondary role normally played by the ministry of agriculture (61). But these attitudes are changing as more attention focuses on food problems.

It seems likely, unless this situation is revised soon, that between now and 1980 nation after nation will face food crises and famine scares — crises that cannot be fully met by concessional sales and grants of food by western nations (1). The rapid growth in population will be the catalyst setting off of a substantial reappraisal of the food production problem. This reassessment will hasten the acceptance by economists and planners of the idea that an adequate food supply is a requisite, perhaps even a prerequisite, for economic development. The full effects of this reappraisal are likely to come late in the 1965-80 period rather than early, mainly because of surplus food problems in the high income nations.

Surpluses of certain farm products — mainly cereals — have been evident in the United States and Canada for a number of decades (49). This persistent problem is extending its scope to Western Europe, and even Japan. The reasons for the situation need not detain us here; it is sufficient that the application

of new technology and stable internal prices, often above the world level, make expansion of food production possible and probable in the high income countries. But internal demand does not require the additional quantities of certain commodities; they are available for export, but can be sold only under special arrangements. The low income countries are able to purchase cereals, dry milk, and certain other products at very modest prices – thus postponing a possible food crisis and a reshuffling of current development priorities (86).

The situation is more complex when attention is turned from cereals to other products. Some surpluses of dairy products are likely in several Western European countries. The complex market structure and regulations may place certain categories of wine in a similar situation. Though now in surplus, oilseeds, including olives, are likely to be in somewhat short supply, partly because of high income elasticity for oils, the preference for oil over fats in rapidly developing countries, and the long period between planting the olive tree and its first harvest. Also, the rising wage rates increase production costs for olives because much hand labor is required in harvesting (15). The pressures to include oils in Food For Peace programs will push production upwards, with some supplies allocated to that program. (Commercial supplies will be somewhat short because of concessional sales). The production of meat and meat products will expand because of the larger market and improved technology. Feed supplies, domestic and imported, will affect the rate of expansion and level of production.

Handling the Gap

Two types of gaps or disequilibria are expected for 1980. One is the gap in low income countries between food production and the larger local demand for many food products. The second is the inverse – a larger farm production than the local consumers will absorb in the developed nations. Imports and exports, on a commercial basis, will reduce the size of both these gaps. But low income import countries will not be willing to allocate a large fraction of their foreign exchange to farm product imports, preferring capital goods, which facilitate more rapid development. Food imports in these countries will be held in check by tariffs, foreign exchange controls, licenses and other devices. High income countries are not likely to permit prices to decline sufficiently to clear the market, preferring to hold stocks or operate a multiple pricing system. Thus, it is realistic to expect that both gaps will persist, in some magnitude, even with substantial foreign trade.

The gap for the low income countries will be smaller if they forego industrialization and development goals, but this is unlikely. The gap for the high income countries will be smaller if there is large scale migration from agriculture and if policies to reduce farm production are followed. It is unlikely that such measures will be followed on the scale necessary to eliminate the gap (82). So, high income and low income countries will find common cause in the non-commercial transfer of certain farm products, under auspices of PL 480, the World Food Board, or their 1980 equivalents.

Foreign Exchange Earnings

Among the developed countries, foreign exchange and balance of payment problems are common. Although adjustments may take several years, the gaps and disequilibria tend to be relatively short term in nature. It is likely that some of the high income countries will have temporary balance of payments deficits in 1980. It is evident now (1965) that inflationary pressures, wage rate changes and other items are pushing prices up more rapidly in the EEC countries than in the United States; the U.S. balance of payments is much improved. Feed grain exports to Western Europe are expected to benefit from the general rise in income and increase in meat consumption.

Most of the low income countries, however, are likely to have a chronic foreign exchange problem during most of their rapid development period. They will be faced with the need to ration or allocate foreign exchange. And as previously indicated, little is likely to be used to purchase farm products. Thus, the substantial increase in population and even larger increase in the demand for farm products are not likely to be translated into a vast, expanded demand for imported products, that is, for the commercial purchase of North American or European foodstuffs. Whether there will be some increase, some decrease or no change will depend on many items; the most important of these are the price and quantity of the country's own exports, i.e., its own foreign exchange earnings, the grants and loans it receives from other countries, and its view of the urgency of development [68]. (For some countries the purchase of military items may outweigh all others.)

With a few exceptions, the low income countries are likely to place high priority on machinery, industrial raw materials and debt service in the use of foreign exchange. Lower priorities are likely to be given to durable consumer goods and to food and fiber imports (27). The exceptions will include countries with substantial mineral or petroleum exports,

and countries in temporary crises. But as discussed earlier, such crises are to be expected at intervals; when they occur, the commercial imports of food of a particular country will increase at the expense of industrial goods – but just during the period of crises. This suggests a small expanded demand in low income countries compared with today.

Noncommercial Trade

The developments just described will be modified by special food export programs and the availability of reserve food supplies in developed countries. As can be seen in Fig. 6, noncommercial (government) exports have comprised a substantial share of U.S. agricultural exports in the past decade.

PL 480 in 1954, as a temporary surplus disposal program, brought together and expanded existing U.S. policy. The World Food Program – inaugurated in 1963 as a similar, experimental, short term program – has been extended. The nature of the surplus and the nutritional problem both suggest that these programs are likely to continue, to evolve in new directions, and to expand (86). In addition, a number of countries have sold cereals under similar bilateral programs at special, noncommercial or less than commercial terms. The acceptability of these programs, both to high income and to low income countries, and the economic, political and humanitarian convenience of these programs make it likely that these programs or approximations to them will be operative in 1980.

Some changes may be expected. The recognition of the serious protein gap, accompanied by mineral and other dietary deficiencies, may shift the emphasis of the program towards proteins and away from calories. This could result in some use of feedstuffs in Food For Peace or the World Food Program to produce animal products. Another approach would be to purchase animal- and vegetable-type proteins for concessional shipment. Much also can be accomplished through fortification of the cereal products already being shipped under these programs.

Moreover, existing shipping, port and transportation

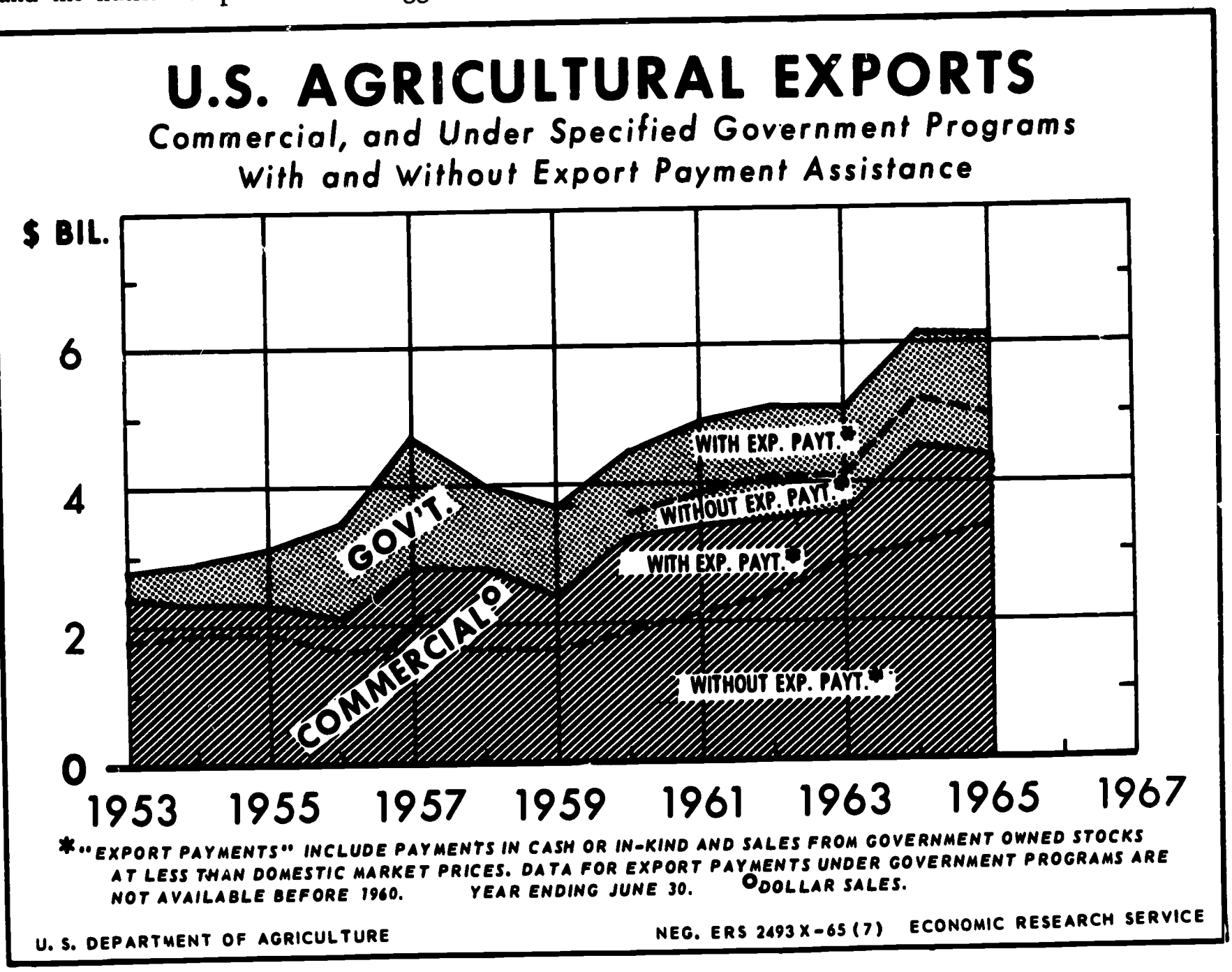

Fig. 6. Trends in U.S. agricultural exports, commercial and noncommercial, 1963-65.

facilities are already fully utilized and thus limit further exports of farm products to the developing nations. The population increase may force new facilities and expanded programs; still it is likely that food aid would be more tightly geared into general or agricultural development programs. It might also be more rigidly confined to the lower income and foreign-exchange-short countries.

Finally, the question of noncommercial food shipments in times of food crises should be examined. If there still are substantial excess stocks – supplies beyond strategic reserves – then shipments might increase to the countries in current food crises. If the stocks are small, barely at the level of needed reserves, then food crises would require an increase in foreign exchange allocations, thus accentuating the economic crisis in the particular low income country. Over time this would reduce the concessional sales and increase the commercial sales of farm product export countries.

Trade Policy and Commodity Agreements

In the immediate future, it is likely that trade restrictions on farm products are likely to be significant inhibitors to commercial trade. A protectionistic Europe, or at least the European Economic Community, imposes substantial barriers against an increase in world trade in farm products (85). Europe's expanding production and the drift in world markets towards lower farm prices compared with industrial products are leading to a strong interest in partial or comprehensive commodity agreements (11). Market shares allocated to export producers, price and market agreements, or special access arrangements for politically related new nations may develop fairly rigid market channels. The farm products from the temperate zone of North America are likely to be discriminated against in most such agreements. Cotton and oilseeds face fewer such access problems.

For the longer term, there is reason to believe that trade restrictions may become less restrictive. Political pressures from the low income areas are now much better organized; witness the April-June 1964 Trade discussions in Geneva. Such pressures are likely to discourage high cost production and self-sufficiency in the high income countries. After all, what does it gain to produce your own food and then give away foreign aid resources? This way the low income countries can earn little by exports. Better to buy their products and save some of the domestic subsidies. Problems of inflation, rising food costs and higher living costs within Europe (and North America), and increasingly urban-dominated legislative bodies will press for cheaper imported food, thus moving slowly and with great political reluctance in the same direction as the pressures from the low income countries.

The GATT (General Agreement on Tariffs and Trade) meetings may be successful in encouraging greater trade and fewer restrictions; more likely they will begin a long debate on agricultural policy. If so, between 1965 and 1970 world trade will grow modestly, by fits and starts, with wheat declining, feed-stuffs and oils expanding, and with other products showing modest increases on the average (85). The United States will share modestly in this expansion. After 1970 or so, in the framework of an uneasy peace, the trade expansion may be somewhat more vigorous.

Countries following the Communist Line

Before drawing these judgments together and relating them more clearly to the commodities, it is necessary to discuss one more large question: sales to communist areas. A disastrous 1963 crop year in Europe led to substantially increased imports of cereals and other farm products by the EEC, and several other countries in Western Europe. The Soviet Union and several of the European satellites became importers on a substantial scale. Poland and Yugoslavia continued to import. Two contradictory views have been expressed: 1. The Soviet imports, like the increases in Western Europe, are a temporary weather-related phenomenon not likely to be repeated. 2. The weaknesses of the Communist system, when applied to agriculture, have become evident with the effort to provide adequate supplies of consumers goods to the Russian people. The latter point is strengthened by the realization of the climatic limitations of much of the Soviet Union's agricultural resources (73). A projection to 1980 must resolve this contradiction, and also project the probable political-economic relations of that time. Purchases from Canada in 1965 do indicate that the Soviet Union is likely to be a purchaser, on balance.

In the framework of a high-tension peace, it is appropriate to assume: 1. A continued slow trend towards more consumers goods in the Soviet Union and Eastern Europe; 2. further experimentation in Soviet agricultural policy, and some success in expanding production; 3. greater political independence of Eastern Europe with larger volumes of trading with the western countries; 4. a less restrictive policy in the United States, in recognition that more independence for Eastern European countries (though they follow the Communist line) is in the interest of the United States; 5. a continued unwillingness by the Soviet Union to become heavily dependent upon outside food supplies; and 6. some easing of tension and somewhat greater trade between mainland China and

the western nations. If these trends do develop, then we can expect more trade in the 1980s than there was in the 1955-64 period, primarily in cereals. But internal policies in the Soviet area will continue to subsidize production by maintaining internal prices substantially above import costs. Obviously, these projections are fraught with uncertainty.

Specific projections of the export-import balance for U.S. farm food products are presented in Table 3 of the Appendix and are discussed under the various commodity sections in Chapter II.

ORGANIZATION OF AGRICULTURAL MARKETS (37)

Not only will domestic and foreign demands change in the future, but rural Michigan will also face many new developments in the organization of agricultural markets. Even though rural Michigan will play some role in these developments, this role will largely be one of adjusting to the trends rather than reversing them.

The marketing system through which agricultural products move on their way from farms to consumers has undergone some dramatic changes in recent years. This marketing system, as we know it, has evolved in response to needs dictated by a rapidly changing society and also in response to new profit opportunities in the provision of added conveniences and services to consumers. During the early history of this country, the marketing system for agricultural products could hardly be distinguished from farming. A large proportion of the population lived on farms and consumed what they produced. Off-farm marketing was largely a proposition of individual farmers peddling their produce directly to consumers.

Today, however, it would be physically impossible for farmers to direct-sell more than a very small percentage of their production. Farm products in an unprocessed state would meet with a very low degree of consumer acceptance. The transportation problems alone in moving food into our complex metropolitan areas are such that the produce of many farmers must be consolidated into efficient loads or transportation facilities would not be able to accommodate movement. The food habits of our nation have evolved to the point where a variety of food must be available when consumers want it and not seasonally. This necessitates extensive storage to avoid wide price gyrations. The result of these changes in our society has been the growth of a gigantic marketing industry that can process, store and transport foods and agricultural products to coincide with consumer demand.

Similar changes have occurred on the farm input side. Again, if we go back to our early history, we find there were very few purchased farm inputs. Farmers raised their draft animals for power, raised oats for fuel, cultivated their own seeds and even fashioned their own crude implements. But the demands of a growing society for increased food and farm products stimulated greater productivity on the farm. This higher level of productivity was achieved in large part through the purchase of more efficient production factors. Thus, an agricultural supply industry has grown on a scale equally as dramatic as the marketing system.

The development of a complex marketing system has had the effect of removing the farmer further from the ultimate user of his product, adding to the complexity of the price system that guides the farmer in his production decisions. The intervention of firms between the farmer and the consumer has added new elements to the demand relation determining the farmer's price. Instead of a relatively simple demand relation based on the consumer's reaction to what a farmer has produced, there are factors of demand related to processors' preferences, such as the quality of product processors need to meet their processing standards or to stand up over the time period required in transit. Processing efficiency may influence the quantity a handler or processor might be willing to take from an individual farmer or the time he may want it delivered, and price incentives may be offered to encourage compliance with these preferences.

An added complication has been the effect of marketing firms in influencing the nature of the consumer demand relation. Food merchants increasingly attempt to anticipate potential changes in consumer demand or influence consumer demand through promotional programs and tend to impress these changes on farmers even before any change is evident in the general level of consumer prices.

Developments in the marketing system have been a matter of concern to farmers in recent years not only as the marketing system has placed new technological demands on farmers but also as the competitive structure of marketing firms may affect the share of the consumer's dollar being returned to farmers. While farming remains a business of relatively small units, with large numbers of farmers producing each individual commodity, the marketing functions are being increasingly concentrated in the hands of small numbers of very large firms. As these firms have increased in size, there has been concern over their ability to wield added market power, and consequently over whether they are exacting an unjustified share of the consumer's dollar spent on food and other agricultural products.

Projecting ahead to 1980, it is not possible to state in any quantitative terms the precise changes that will occur in the structure of the market for farm products or in the industries that supply farm inputs. It does appear possible, however, to project the direction of changes that will occur in these sectors and the general nature of the economic pressure these changes will bring to bear on agriculture. There have been numerous studies in recent years devoted to inquiry into the structure of the market for farm products, and research reports based on these studies do give us some indication of the nature of changes that have occurred and are still occurring.

Concentration of Market Power

It can be assumed almost without question that the trends toward increased concentration in food processing and handling industries will continue. And further, technical inquiries into the cost structure of marketing firms seem to indicate that these firms could realize economies by expanding even beyond the scale of operations presently carried on by the larger firms. A similar trend may also be projected for food retailing firms, though the degree of concentration at the retail level will perhaps not be as great as at the processing level.

While there have been many allegations that the larger firms in the industry are expanding with an objective of gaining monopolistic powers, this does not appear to be borne out by research to date. In general, these studies have concluded that even the larger firms are not realizing excessive profits through their growth and market position. On the other hand, the conduct of some of the larger firms in the marketing industry has not always been what we would expect in a competitive market. There is considerable evidence that the size and resources of some of the larger firms have enabled them to engage in predatory competition. But these departures from competition seem to have been exercised on a horizontal plane toward the objective of eliminating competitive firms rather than toward exploitation of either consumers or the producers of farm products.

While such deviations from competitive behavior may be expected to occur, it would seem likely that even this type of exercise of market power will remain somewhat restrained, tending largely to accelerate the types of changes that competition would eventually bring about. While the capacity to exercise overt market power will increase with continued growth in the size of firms, it is likely that increasing restraints on its use will also develop. Continued inquiry by both researchers and government regulatory agencies will make it increasingly more difficult for a large firm to engage in noncompetitive practices without facing either exposure or prosecution. As a further deterrent, farmers have over the past 30 years developed a number of effective devices, through government programs and cooperative marketing efforts, that might be used to countervail the market power of handlers should their exercise of economic power become obviously exploitive.

Even within the marketing sector it is likely that incidents of predatory competition will decrease as the size of firms occupying a particular plane of competition increases. Predatory competition occurs largely in contests between a single large firm competing against numerous smaller firms. Under such circumstances the larger firm, with its superior resource position and diversified activities, can engage in localized price competition with little risk of losing. But as the size of the competitors increases, the outcome of such competitive skirmishes will become less certain and the cost greater. Thus, the inclination to engage in such competition might be expected to diminish.

Market Channels

By 1980 it would appear farmers will be dealing with marketing firms of much larger size than at present. The trend toward fewer but larger farms will remove some of the present problems of procurement from farmers and there will be an increasing emphasis on direct buying from farmers by processing and even retailing firms with almost complete bypassing of such central marketing facilities as stockyards and commodity exchanges. Futures trading as a risk-shifting device will undoubtedly continue, though possibly as a more specialized risk-underwriting activity divorced from the actual sale and exchange of commodities. As direct buying increases, price quotations of the type now generated by central markets will either disappear or become highly unreliable.

Buyers will seek to purchase from individual farmers in the largest quantities possible with specifications on the grade of product they desire from the farmer, on the timing of delivery and on appropriate discounts or premiums for deviations from the desired standards. For certain agricultural products, where perishability is a problem, meeting given standards of quality will increasingly become a requisite to even finding a market. For many commodities, the increased emphasis on quality factors that bear on yield and perishability will be reflected in more refined standards established by state and federal authority.

Vertical Integration

Poultry

The impact of these changes in the marketing system on producers will vary from one commodity to another depending largely on the characteristics of the individual commodities and the extent to which producers are able to respond to the incentives for change provided by the processing sector. For example, in poultry production it has been demonstrated that extremely large production units can be operated, capable of furnishing individual processors with almost their total requirements. Here a high degree of vertical integration between the production and marketing functions can be expected.

Grain

It is not likely that such nonperishable commodities as grain will be as strongly affected by the demands of the marketing system as in the case of poultry. In the case of both food and feed grains, land – hence, space and distance – will remain an important factor in production. The advantages to the marketing system of concentration of production will not be so great. The marketing system is expected to communicate effectively to producers the changing requirements of buyers for varieties and grades. It is not likely that any substantial amount of integration backwards by processors will be necessary to accomplish such adjustments.

Dairy

Between these two extremes, varying degrees of processor integration are likely. In the case of milk, large herds are in evidence in certain milksheds. In the southeastern Florida and Los Angeles milksheds, individual producers have herds that run to several hundred cows. These herds would appear to be large enough to offer an individual processor a significant procurement advantage. But it would appear the advantages of this type of milk operation are achieved only under the type of climatic and feeding conditions that prevail in these particular southern markets. Individual herds of equal size have from time to time been established in other markets over the country, only to be disbanded after some time. From this experience, the management requirements in operating a milking herd favor a somewhat smaller production unit. While we will see a substantial increase in the average size of milking herds between now and 1980, it is likely that these herds will continue to be operated by farmers independent of milk handlers. On the other hand, it is likely that large handlers will exert some influence on the type of changes that will occur at the farm level between now that that time.

Farmers are already facing the requirement that they install bulk milk tanks to furnish handlers with milk delivered in the manner handlers demand. In the next few years, and long before 1980, it will probably be impossible for a farmer to sell his milk unless he is able to make bulk delivery. In addition, large handlers seeking to maintain their volume of business by emphasizing those products for which there is a growing demand will attempt to influence the composition of the milk farmers deliver.

The larger dairy companies are very conscious of the declining demand for butter, and, with few exceptions, have quit merchandising this product in favor of new margarine products for which they find a growing consumer demand. Similarly, handlers finding a growing market for low-fat fluid milk products among the diet-conscious are using every means to gain their share of that market. As a consequence, the handlers' demand for butterfat in milk is falling off while their demand for milk with a high protein content is expected to increase. Thus, handlers are unlikely to continue paying premiums for milk of high butterfat content and may even exert pressures to change the relative values of butterfat and milk protein. While these prices in many cases are established by government programs, handlers may be expected to be among those pressuring for changes in relative prices under these programs.

Livestock

The subject of integration in the livestock industry has been a matter of some conjecture for a number of years, though to date only a small portion of our finished beef and hogs is grown under integrated arrangements – either through contract or ownership by packers. The grocery retailing segment, increasingly concentrated in ownership, is putting extreme pressure on the meat processing segment to furnish uniform quality meats in large quantity. The packers can meet these demands of the retailers only if the quality of animals they acquire from the farmers will yield the grades being demanded. It is anticipated that the demands of the retailers will persist and even intensify in the years ahead.

In one way or another, packers will have to find a means of procuring the quality of meat animals needed to fill these orders. Three alternative means of accomplishing this goal appear possible. They are: 1. Packers might enter the production of meat animals and produce to their own specifications. 2. Packers might contract with farmers to deliver specified quantities of animals of specified grades at

given times subject to penalty for failure to meet the contract. Or 3. drastic revision might be made in our present grade standards for meat animals and in our method of grading animals sold by farmers so as to permit prices to reflect stronger and clearer indications to farmers of what they should produce.

It does not appear likely that packers will enter the meat-animal production field to any great extent. First of all, the larger meat packers are already under some legal restraint to avoid extending their operations into other market levels where they might be able to wield near-monopoly powers. If they were to move in the direction of entering production on a large scale, it is more than likely that further legal barriers would confront them, either through the courts or through new farm legislation that might overtly prohibit such activities. Furthermore, the capital requirements of entering the production field would be extremely great. It would seem packers would wish to avoid the risk of such investments if either of the other two alternatives before them can be made to work effectively.

The more likely outcome by 1980 is for both of the other two alternatives to be in evidence with most sales of meat animals affected one way or another. There is currently strong resistance to refinement of grades and standards, and it may be some years before an effective basis for reflecting quality premiums to producers can be developed. In the interim, it might be anticipated that contract arrangements between producers and processors will begin to evolve. However, the eventual establishment of more definitive grades appears inevitable. By 1980, it is probable that some part of our livestock will be delivered under contracts but with a substantial number of producers producing and selling to the packers on a refined grade basis. In either event producers will have to respond to the demands for quality and other specifications that handlers will impose, or accept substantially inferior returns on their production.

Fruits and Vegetables

In fruits and vegetables and certain specialty crops, the demands of the marketing system for quality will be exceptionally strong. But here the situation differs somewhat from most other agricultural products. Because of the extreme perishability of many of these products and the importance of delivering long distances within short periods of time, these problems were faced long ago. With seasonal production of many of these crops confined to small areas on the West Coast, it was necessary to solve many of these problems in order to sell in the major metropolitan markets of the East. Thus, a very refined grading system has been developed under state and federal authority, with grading and inspection services to aid in the enforcement of these standards. Because these problems emerged during a much earlier period — before the recent trends toward concentration in processing and retailing were very far along — producers themselves had to establish the institutions under which orderly marketing could be conducted.

Trend to Marketing Orders

Large producer cooperatives dominate the marketing of several fruit and vegetable commodities, and federal and state marketing orders supplement these cooperative efforts. While the restraints imposed upon producers through bargaining cooperatives or marketing orders are as strong as might otherwise be imposed by the marketing system, the use of these producer-oriented institutions has tended to preserve the entrepreneural role of producers and avoid the kind of contract integration that has occurred in the poultry industry. The fact that fruit and vegetable producers in certain areas have successfully organized marketing associations and employed marketing orders to meet quality demands suggests that this example will be followed increasingly in areas where such developments have not occurred as yet.

To date, it has been possible for some producers of specialty crops to continue selling in small quantities, without grading, through local wholesale and retail outlets. But as the trend toward concentration in retailing continues, through direct ownership or voluntary chain retail establishments, the opportunities for sales by individual producers will decline further. Because it is possible for these retailing establishments to buy in the quantities and grades they desire from already established producer cooperatives in certain areas of the country, it is not likely that these chains will find it necessary to establish more extensive facilities of their own for procurement or to contract extensively with individual producers for sources of supply. Thus the pressure facing producers of these crops will be one of being forced to follow the organization pattern already established by producers in the principal production areas if they hope to find any outlet at all for their products.

DEMAND FOR UNITED STATES TIMBER PRODUCTS (34)

Nearly half of the land area of Michigan is forested land, not including parks. Just as trends in Michigan agriculture will be related to the national economy, the prospects for the state's timber industry will also

be tied to the national timber situation and outlook. The U.S. Forest Service recently completed an appraisal of trends to 1980 (26). A brief summary of this study is as follows:

Projections of the U.S. demand for timber indicate widely varying prospects for major product groups as given in Table 10 in the Appendix. The projected increase for pulpwood is about 75 percent, and for veneer logs about 85 percent, between 1962 and 1980. For sawlogs, the projected increase is 17 percent. The use of miscellaneous industrial products will remain essentially unchanged. Fuelwood use is projected downward a third.

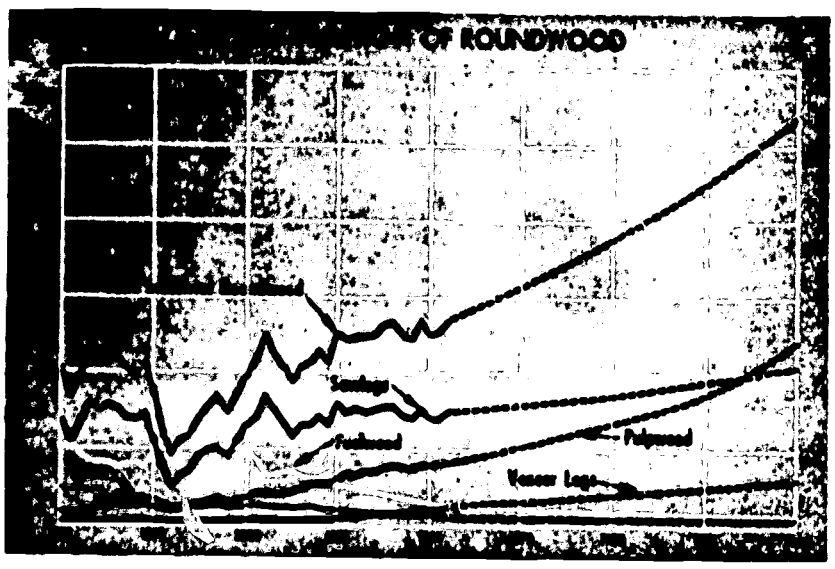

Fig. 7. Consumption of roundwood in the U.S., 1920-62 and projected to 1980.
Source: Forest Service, U.S.D.A.

Most of the domestic production of timber is supplied by roundwood in the form of logs and bolts. The big exceptions are pulpwood (taking 708 million cubic feet of plant residues in 1962) and fuelwood and minor industrial products (taking 863 million cubic feet of plant residues in 1962). A considerable expansion in the use of plant residues for pulping is projected. This assumption is incorporated into a projection of roundwood demand to 15.4 billion cubic feet by 1980, up 30 percent from 1962 (Fig. 7). Net imports, representing about 13 percent of the demand for industrial roundwood, will hold this percentage through the projection period. The result of this assumption is that the demand for domestic roundwood is also projected upward 30 percent — from 10.3 billion cubic feet in 1962 to 13.4 billion in 1980.

INTRODUCTION TO CHAPTERS II, III, AND IV

Having established what the general environment will be for rural Michigan in 1980, we can now consider what adjustments will likely be made within rural Michigan itself – how Michigan will share in the projected national demands, what resources in land, labor and capital will be required, what changes will develop in the marketing and supply industries. Here the central question is, "What is Michigan's competitive position relative to other producing areas?"

Rural Michigan's competitive advantage lies in its proximity to a large and growing metropolitan market, its access to the St. Lawrence Seaway, an excellent freeway system, the moderating influence of the Great Lakes on weather conditions, soil characteristics suited to certain crops, proximity to large supplies of fresh water, and abundant natural beauty.

Among rural Michigan's disadvantages would be listed higher prices on inputs, a shorter growing season and more uncertain weather than in many competing states. Perhaps Michigan's peninsular conformation could be considered something of a hindrance to many wanting access to Michigan's recreation areas.

There are some characteristics that can be regarded as either advantages or disadvantages depending on the viewpoint. For example, Michigan is highly industrialized, with wage rates to production workers the highest in the nation. This creates a strong demand for products and services of rural areas and provides remunerative employment for rural people. Part-time farming is much more prevalent in Michigan than in other agricultural states. On the other hand, this means higher labor costs for Michigan farmers who must compete with farmers in Iowa, Illinois, Wisconsin, and many other states – and foreign countries as well.

Think of the present location of agricultural production in the United States. This has been determined primarily by the comparative advantage of each area as established by these natural and economic forces. Yet think of some of the recent shifts in the concentration of production – broilers and eggs to the South, turkeys to Minnesota, cattle feeding to the West, beans and cherries to Michigan, and so on. These shifts illustrate that the competitive position of an area is not static – that new technology and the human element in the organization of production, processing and marketing activities are also important determinants of location.

New technology that increases labor efficiency would benefit Michigan relative to other areas because of the high wage rates here. On the other hand, new technology that lowers transportation costs would benefit outside producers shipping into Michigan more than those within the state. Of course, the competitive position of Michigan products sold on a national or international market would thereby be improved.

The importance of leadership and human capital in assessing the competitive position of an area cannot be overlooked. This indicates that man need not be entirely passive to his environment but can exercise some control over his destiny.

Chapter II.
Agriculture and Agribusiness in Michigan — Now and in 1980

In this chapter, the outlook for agriculture and agribusiness is examined, first by turning the searchlight on general trends on Michigan farms; then on the production and marketing of major commodities;[4] then on industries supplying inputs to farmers; and finally on the food wholesaling and retailing business. A final section deals with nursery products and floriculture. A statistical summary of these projections is presented in Tables 4 to 8 in the Appendix.

(4) Statements on domestic and export demand included in the commodity section were prepared by L. V. Manderscheid and Lawrence Witt of the Department of Agricultural Economics. Price projections made are in terms of 1962-63 dollars. Prices on most farm products are projected to increase or remain about the same in the absolute sense, but because the general price level is projected to increase by 1.5 perecent per year, several farm product prices are projected to be declining in the relative sense.

FARM ADJUSTMENTS (88)

Anyone projecting the long range outlook for farming in Michigan must look at the comparative advantages and disadvantages of Michigan farmers relative to those in other producing areas. This requires a detailed study of the alternatives farmers have in each area. A simple but instructive method of assessing the competitive position of an industry in a state is to compare its performance with the same industry in other states or countries. This was done with each commodity. The same technique is appropriate in looking at farming as a whole. In comparing Michigan with the United States as a whole, one must recognize that the "mix" is somewhat different here, particularly in that the dairy industry is a more important segment of Michigan's agriculture than it is within the nation.

During the 1950s, the number of farms in Michigan and in the U.S. as a whole declined about 30 percent. Land in farms in Michigan dropped by 14 percent while nationally the decrease was only 3 percent. In terms of cropland harvested, however, both Michigan and the U.S. experienced a 7 to 8 percent decline. However, livestock animal units (meat animals, dairy and poultry combined) in Michigan were down 15 percent at the end of the decade of the 1950s, while livestock numbers increased by 6 percent nationally. Apparently some Michigan farmers chose alternative uses for their labor, feed crops and other resources than keeping livestock.

Michigan farmers have been doing as well as farmers in other areas in terms of boosting crop yields and milk production per cow. Michigan farm prices fell 13 percent between 1949-53 and 1959-63, slightly more than nationally. Sales of Michigan farm products between these same periods advanced only 6 percent while U.S. sales rose 15 percent.

Michigan agriculture is characterized by small farms, including many part-time farms, with the average acreage only 132 and annual gross sales $6,464 in 1959-63. The average U.S. farm had 307 acres and gross sales of $9,239 in this period. The annual realized net farm income per farm in Michigan was $2,257 in 1959-63 compared with $3,186 for the U.S. What is more, the size and earnings of U.S. farms have been increasing more rapidly than in Michigan. One compensating factor is that Michigan farmers have more off-farm employment opportunities than do farmers in other states. In fact, 46 percent of Michigan farmers received more income off the farm than their gross farm sales in 1959, compared with 36 percent nationally. And Michigan farmers moved more rapidly to off-farm employment in the 1950s than did U.S. farmers.

Projections to 1980

Land in farms in Michigan declined from 17.3 million acres in 1950 to 14.8 million in 1959 and 13.6 million in 1964. Considering the amount of relatively marginal land in certain areas of the state, the continued urbanization and the further development of recreational areas, land in farms will probably decline to about 10.0 million acres in 1980, 26 percent less than in 1964. Cropland harvested is expected to drop to about 5.8 million acres, 14 percent less than the 6.7 million acres estimated by the census for 1964.

With increasing yields, total crop production in Michigan would be expected to increase about 30 percent between 1959-63 and 1980. This would be in line with past trends. Based on past trends, little change would be projected for livestock production in total, as cattle on feed, beef cows and turkeys increase; milk, hog and lamb production hold about steady; and egg production declines.[5]

Projecting trends of the last 15 years in prices received and prices paid by farmers would not generate a very optimistic outlook for the next 15 years. The projection is made that *under the assumptions given and no change in government policies,* Michigan farm prices by 1980 will be around 5 percent higher than in 1959-63 and prices paid about 25 percent higher.[6]

If these conditions prevail, the dollar value of Michigan farm marketings should increase by about one-fourth between 1959-63 and 1980 to $915 million. Adding on government payments and perquisites would push gross farm income to over $1 billion. Trends in costs suggest a 30 percent rise in production expenses to $820 million, leaving realized net farm income at about $200 million, 21 percent less than in 1959-63.

This net farm income will be shared by about 45,000 Michigan farmers, compared with 112,000 in 1959 and about 94,000 in 1964. Therefore, average realized net income *per farm* will increase to about $4,400, some 90 percent over 1959-63. This per farm average can be misleading for two reasons: First, it is based on the total number of farms, as reported in the census, including many small farms; and secondly, income from work off the farm by farmers is not included.

If the size of farms is measured by product sales per farm, in 1964 about 2,500 farmers, or about 3 percent of all, had sales of $40,000 or more. Another 7,000, or nearly 8 percent, had sales of $20,000 to

(5) Assumed here are somewhat lower projections on beef cows, hogs, eggs and turkeys than given in the livestock and poultry sections.

(6) This is a somewhat lower projection on prices received than given in Chapter I.

$39,999, and over 13,000, or 14 percent, sold $10,000 to $19,999 of farm products. Some 33 percent had sales of $2,500 to $9,999 per farm, while 42 percent had sales of less than $2,500. In that year, over 41,000, or 44 percent of all farmers, worked off their farms 100 days or more.

By 1980 it is expected that there will be drastic changes in the number and percentage of all farms by income level (Fig. 8 and Table 8 in Appendix).

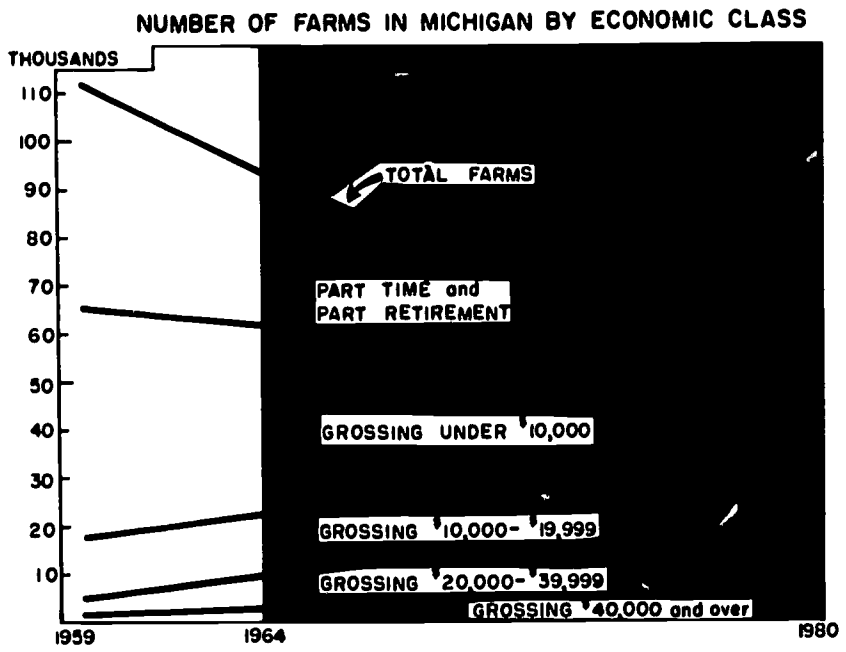

Fig. 8. Number of farms in Michigan by economic class; 1959, 1964 and projected to 1980.

It is projected that there will be about 7,000 farms, or about 16 percent of all, with $40,000 sales and over, and that sales from these farms will account for about 42 percent of total farm product sales for the state. Farms with sales of $20,000 to $39,999 are expected to increase to about 15,000, or about one-third of all farms, and produce about 40 percent of the state total farm product sales. Those with sales of $10,000 to $19,999 are projected to decrease to 10,000 (22 percent), with their sales accounting for 14 percent of all sales. Thus, sharp increases are projected in the number in the two top groups, a moderate decrease in the third, and very sharp decreases in the number of farms with sales of less than $10,000. There probably will still be quite a number who work off their farms 100 days or more.

Farms will become much more specialized. The number of farms classified as general will drop sharply, as will farms with small poultry flocks. Dairy farm numbers will decline more rapidly than predicted for all commercial farms. On the other hand, the number of livestock farms (other than dairy or poultry) and cash-grain farms will decline by a smaller percentage.

Farms grossing $20,000 and over in 1980 will average about 320 acres in size, with an investment of about $200,000. Marketings and production expenses will be around $36,000 and $31,000, respectively. Coupled with higher government payments and allowances for prerequisites, realized net farm incomes on these farms are projected at $8,000.

Even though the average size of farm will increase substantially, family farms will continue to dominate the structure of Michigan agriculture in the next 15 years, although some probably will be two-family farms. Labor requirements per farm will increase but slightly.

DAIRY

U.S. Demand

Domestic Consumption

Milk consumption increases as income increases, but other factors are causing a downtrend in milk consumption. Milk is often consumed because it is nutritious and because children *should* drink it. If the recommended calcium allowance is reduced further (to nearer the levels recommended in other countries), milk consumption might fall significantly. The projected decline in the proportion of young children in the population puts downward pressure on milk consumption. On the other hand, technological changes that lower retail prices could reverse the downtrend. The most likely per capita consumption rate in 1980 is near 260 pounds of fluid milk compared with 306 pounds in 1959-63. This milk will likely be lower in average fat content. Prices will be near current levels but with pricing more attuned to solids-not-fat content.

Butter consumption per capita will continue to fall unless butter prices are significantly lowered. Increasing incomes will not cause people to ignore the price difference between butter and margarine, and many young people now believe that margarine is a superior product – convinced both by advertising and the fact that they were raised on margarine.

Cheese consumption per capita may increase. Cheese is increasingly used to add flavor. It has the largest income elasticity of any dairy product. Consumers are likely to demand a large variety of cheeses with considerable variation in preferences over time. Low-fat cheeses may be important.

Ice cream consumption appears to be increasing. Future consumption will increase if the current trend and income elasticity continue. However, ice milk and/or ice cream-type products made from nondairy products may gain increasing popularity. Consumers' preferences for flavor and technological advances in processing will be important factors determining con-

sumption. The ratio of ice milk to ice cream will reflect consumers' attitudes regarding fat in the diet.

Evaporated and condensed milk consumption will continue to decline. Their use for baby formulas may be continued if acceptable whole milk powders are not available, but even here they may be displaced by "ready to feed" formulas in disposable bottles.

Shifts from bottled fluid milk to milk powders will depend on technological developments, sanitary laws, and price relationships.

A decline in total per capita consumption of dairy products is projected. Total consumption (in milk equivalent) will decline from 645 pounds per person in 1959-63 to about 560 pounds in 1980 – a decline of over 10 percent. Price increases will be slightly less than the expected rise in the general price level.

Exports and Imports

Dairy products will continue to move in world trade, but the United States is unlikely to participate very heavily as an exporter. Domestic and trade policy may shift in such a way that slightly higher prices in the United States may attract a small volume of imports. Between now and 1980 New Zealand's export situation may become fairly critical because Britain outside of or within the EEC is less willing to purchase overseas. Expanding production of dairy products is likely to make dry milk a surplus commodity in Western Europe, with substantial sales on a concessional basis. More concern with nutrition will help increase the consumption of dry milk. While world commercial sales probably will increase, the U.S. participation is likely to be small because of higher costs. Most of the increase in U.S. shipments is likely to be concessional sales.

Production (53)

Over the past 40 years, milk production in Michigan increased at a rate slightly greater than for the nation as a whole. Michigan lost some ground relative to other states after World War II but began gaining on other states in the early 1960s. In 1959-63, Michigan produced 4.4 percent of the U.S. milk output. In 1980, Michigan is expected to about maintain its share at 4.2 percent and produce around 5.8 billion pounds, 5 percent more than in 1959-63.

The basis for projecting Michigan's dairy industry to keep pace with the U.S. output is that the state's population and income are expected to grow at a rate equal to that of the nation. The assumption is that production for fluid markets will continue to be close to the centers of population. Michigan will also be shipping some Class I milk to Ohio markets where Class I utilization is now a high proportion of the total supply and alternative farm enterprises will strongly compete for dairy resources. Price differentials between Michigan and nearby states will diminish.

Milk production per cow on Dairy Herd Improvement Association farms averaged 12,490 pounds in 1964 and is expected to reach 16,000 pounds by 1980. For all cows, milk production is estimated to increase from 9,280 pounds in 1964 to 13,000 pounds in 1980. The demands of 1980 will thereby be met by about 450,000 cows compared with 639,000 on farms in 1959-63 (Fig. 9).

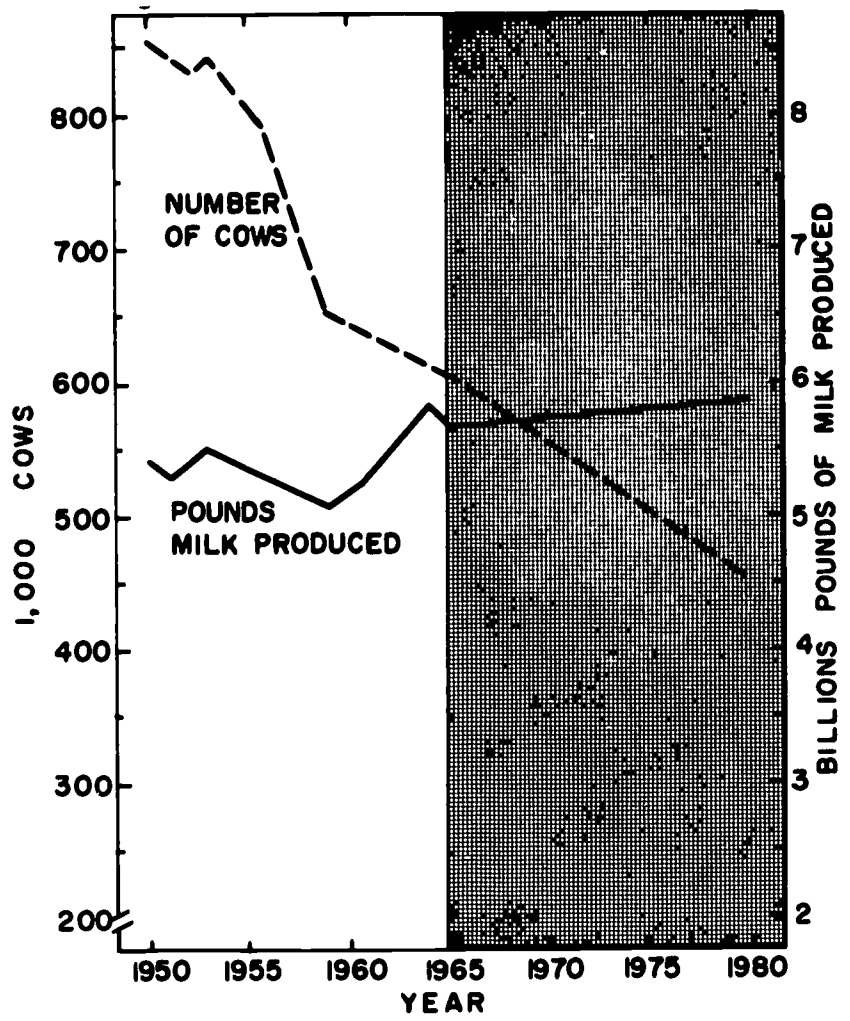

Fig. 9. Total number of milk cows on Michigan farms and total milk produced, 1950-1965 and projected to 1980.

To step up milk production per cow, grain and protein supplement feeding will be pushed to 6,300 pounds by 1980 in DHIA herds (compared with 4,400 pounds in 1964) and to 4,500 pounds on all cows by 1980 (compared with 2,950 pounds in 1964). More silage will replace much of the hay and pasture. At present price relationships, urea could replace as much as a third of the plant protein supplements in rations. Dry lot or storage feeding will be more generally practiced on a year-round basis. By 1980, research will reveal the answers to many physiological problems that will contribute to higher milk production per cow.

More efficient use of labor will be achieved as dairy herds increase in size and as these larger units benefit from greater mechanization in both stanchion and loose housing-milking parlor systems. Parlor milking of cows will increase, with most of the larger commercial herds using this system by 1980. An expansion in liquid manure handling systems is also foreseen. The conversion to bulk tank storage of milk will continue, with virtually all milk being handled in this manner as early as 1970. The hours of labor required per cow and replacement per year are expected to decline from about 90 hours in 1959-63 to 70 hours by 1980. This would reduce the total labor requirement for the Michigan dairy enterprise by 45 percent between 1959-63 and 1980.

Total investment per cow will increase from $1,900 in 1959-63 to about $2,800 by 1980. The increased investments are due largely to newer and more highly mechanized buildings, storage and feed handling equipment and higher land values. (Farm real estate values are assumed to increase by 3 percent per year.)

The total number of dairy herds in Michigan is projected to decline from 33,176 in 1964 to 8,000 in 1980. The following changes are expected in numbers of herds by size classification. The 1980 projections are compared with 1959 (when Michigan had 51,766 herds), because 1964 data were unavailable at publication time. Herds of less than 10 cows will virtually disappear; herds of 10 to 19 cows will drop from 14,000 to 700; herds of 20 to 29 cows will decline from 6,744 to 1,700; herds of 30 to 49 cows will decline slightly to about 3,200; and herds with 50 cows and over will increase sharply from 685 in 1959 to 2,400 in 1980 (Fig. 10). If dairy farming is not able to compete in the labor market for competent labor, expect a further decline in total dairy farm numbers or less expansion of herd size beyond available family labor than indicated here.

Increasing production per cow, a higher proportion of milk going to Class I use and improved labor efficiency will all contribute to a more favorable labor income for dairy farmers. To achieve a satisfactory labor income, say $6,500, in 1980, a 40-cow dairyman producing 13,000 pounds of milk per cow would have to receive about $4.40-$4.70 per hundredweight, assuming costs increased by 15 to 20 percent between 1965 and 1980. A 40-cow dairyman producing 16,000 pounds of milk per cow could reach this labor income at a $4.00-$4.20 milk price.

Marketing and Processing (58)

Fluid milk consumption in Michigan is expected to reach nearly 2,900 million pounds (milk equivalent) by 1980, about 14 percent greater than in 1965. In addition, out-of-state shipments of Class I milk, 336 million pounds in 1964, are expected to jump to over 800 million pounds by 1980, pushing the fluid utilization of Michigan's supply up by one-fourth over 1964 (Fig. 11). This would bring Class I utilization up to 65-70 percent of the total. Amounts

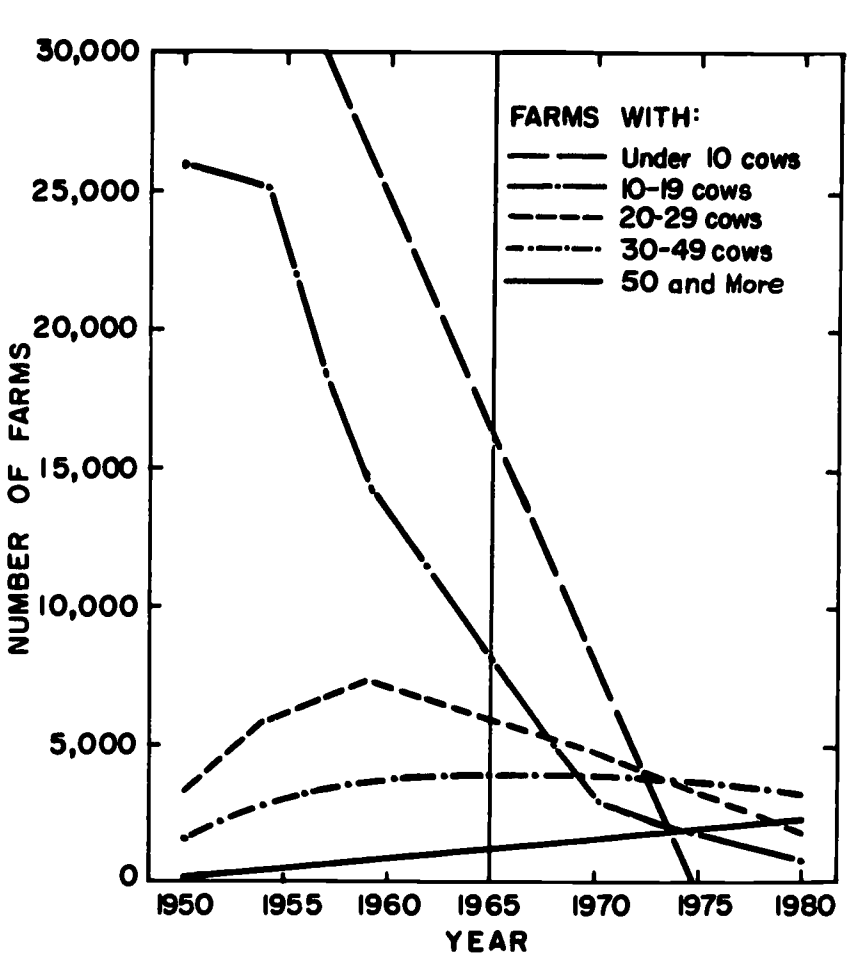

Fig. 10. Numbers of dairy farms in Michigan by size of farm, 1950-1965 and projected to 1980.

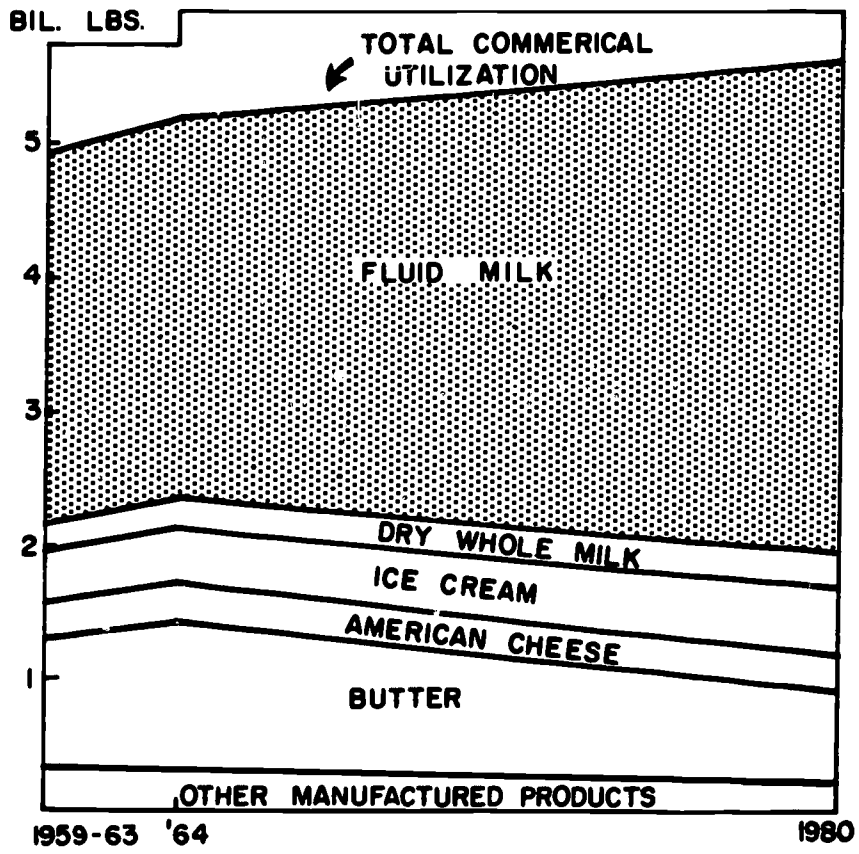

Fig. 11. Total commercial utilization of milk from Michigan farms (milk equivalent), 1959-1963 average, 1964 and projected to 1980.

going into manufacturing will decline from about 2,356 million pounds in 1964 to 1,945 million pounds by 1980. Most of the decline will be in amounts going into butter.

The trend in processing and distribution of dairy products will be to fewer and larger processing plants. The number of processing plants (fluid and manufacturing) will decline sharply from about 294 in 1964 to about 130 in 1980. In addition to consolidation and mergers, there will undoubtedly be central processing plants owned by individual distributors. This might be an individual plant with one brand name for all independent owner-distributors or two or three plants each of which would specialize in a product such as bottled milk or ice cream.

Fewer plants will result in the transportation of products over greater distances. With the advent of superhighways has come the development of gas turbine trucks that can haul two 40-foot trailers at highway speeds of 60 to 70 miles per hour. These trucks operate more efficiently than diesels over long distances and by 1980 will probably figure in the transportation of dairy products. This could also result in easier movement of milk out of and into Michigan.

Continuous butter churns will have an impact on the butter industry in the near future. Production per worker is usually increased with the continuous equipment to about 1,000 pounds per man-hour, which includes packaging in bulk containers. The production rate is approximately 2,500 pounds of butter per hour with a foreign-made continuous churn. Only a few plants are likely to invest in this equipment, but by 1980 there could be about six in the state.

Improvements have been made in recent years to improve cheese production efficiency. Cheddaring and draining vats, with mechanized hoop filling, will be helpful when more widely adopted.

A potentially revolutionary process is currently being tried in a commercial plant in Illinois for making cottage cheese. The process eliminates the use of bacteria cultures traditionally necessary for acid development during setting and cooking. An acceptable product has been made with pilot plant equipment, using the continuous flow mineral acid process. It is conceivable that by 1980 this method may be in use in some Michigan plants.

Some new cheese products will probably be manufactured by 1980. These would include spray-dried Cheddar and perhaps other cheeses. Commercial production of blue cheese, employing a recent modification in processing that requires a mere 10-day curing period, will likely be realized. Some Michigan cheese plants may produce smoked cheese. A Swiss-type cheese known as Dagano, a new variety currently made by one Michigan firm, will undoubtedly be made by other companies.

Freeze-dried cottage cheese is being marketed commercially, but the product is not expected to have a significantly large place in the consumer market. Whether any Michigan plants enter the field will depend upon availability of outlets.

Changes in packaging dairy products can be expected. Blown plastic containers for fluid products will very likely be in use. Bulk containers of 2½- or 3-gallon capacity, delivered to the home and kept in the refrigerator at all times with milk drawn off by the glass or larger container, are a new development and may achieve more widespread use. Other packaging innovations and improvements in filling equipment are anticipated.

The impact of sterile milk on the industry is difficult to project and evaluate. With stable economic conditions in prospect, the trend is for housewives to purchase foods ready for serving. Fluid milk presently meets this requirement.

If there is sufficient difference in price to create a demand for sterile milk or dried milk for reconstituting, milk consumption would likely be adversely affected. This opinion is based largely on palatability. In general, it is felt that reconstituting with water will not be done in sufficient time before serving to provide a cold beverage, which most consumers prefer.

If an acceptable, practical means of preserving dry whole milk over long periods of time can be achieved, the impact on the dairy industry would likely be great. Technical problems affecting the keeping quality of dry whole milk are still to be overcome, although constant progress is being made through research. But it is assumed that only a small increase in dry whole milk production will develop by 1980.

LIVESTOCK

U.S. Demand

Domestic Consumption

Per capita consumption of red meat has increased and will continue to increase at least through 1980. Meat prices, at the farm level, are likely to increase relative to the general price level between 1959-63 and 1980. Favorable meat animal prices coupled with declining feed prices make this area a relatively bright one in the farm income picture. But, part of the price increase is based on the premise that quality will be improved – that pork will be leaner, beef animals higher yielding (less waste) – that

market weights will be standardized and some of the present seasonality eliminated.

Within the meat group, beef appears to have the strongest upward trend in demand, the highest income elasticity and the brightest future. Beef and veal consumption is likely to increase from the 93 pounds per person in 1959-63 to 123 pounds by 1980, with all of the increase coming in beef consumption. Within the commodity beef, there is much variation between steer and heifer beef and cow beef. Domestic production of cow and bull beef has been declining (on a per capita basis), while consumption has remained relatively stable because of increasing imports. Domestic production may continue to decline (if dairy cow projections are correct); imports may continue at relatively high levels. Consumers will continue to use a large share of their beef in forms where price is more relevant than quality. But the increase in consumption will be largely in the higher quality steer and heifer beef. Increased emphasis will be placed on less wasty carcasses, enzymatic tenderizing, and standardized carcass size. If more meat is cut to individual portions, there will be more steer and heifer beef – the cutting "scraps" – going into lower quality uses.

Variety is a factor that may cause consumers to increase beef consumption less than projected. If diet variety becomes important, consumption of other meats may increase more than is projected here.

Many consumers consider pork an inferior meat. As their incomes increase, they shift purchases to beef or poultry. The future demand for pork is closely related to this attitude. If the attitude continues, pork consumption will decline further. Pork consumption may run near 60 or 61 pounds per capita in 1980 compared with 65 pounds in 1959-63. Fully cooked hams, lean pork chops, and bacon are likely to be consumed as pork, with an increasing part of the carcass being used in variety meats. Pork will likely compete with low-quality beef on a price basis for use in the processed meat products. However, this projection assumes that pork will be leaner by 1980. If not, consumption will be under 60 pounds.

Pork prices may rise if lean pork is produced but the rise will be less than the beef price rise.

Demand for lamb and mutton is now concentrated in certain urban areas. Consumption is projected at 5 pounds per capita, the same as for 1959-63. This projection assumes that consumers will experiment with lamb for variety and that lamb will be readily available in urban areas. Some studies have indicated a negative income elasticity for lamb. This is likely to be offset by the variety factor. Further, demand expansion activities for lamb might have a large payoff. Many consumers have not had favorable experiences with lamb; many stores have not merchandised it well. The right promotion could tap a demand for variety in meat consumption. Lamb prices also will likely increase but not as much as beef prices.

Processing, Meat Substitutes (57). The 1980 consumers will be demanding more built-in services in their meat purchases. Therefore, more ready-to-cook, convenience, "heat and serve," or "boil-in-bag" processed meat items will be made available. Items such as prefried canned or irradiated bacon, freeze-dried stew and barbecue, and prepackaged boneless-frozen meat cuts will constitute a greater proportion of meat sales. Increases in sales of such items will not be great by 1980 but will be offered to complement fresh meat sales.

Meat substitute items made from plant protein sources experimentally produced in the early 1960s will be in commercial production by 1980. Consumers of these items will be persons requiring special diets or perhaps those with low incomes. The availability of substitute meat items will have a neglibible effect on the demand for red meat in 1980. Plant protein sources that might be formulated as meat substitutes will complement meat utilization by being allowed in minor proportions in sausages and prepared meat dishes. Over an extended period of time, these plant-protein materials may indeed "substitute" for meat as greater proportions are allowed in "combination" foods. This effect on livestock production will just be coming apparent by 1980.

Leather and Wool. Some mention should be made of the nonfood output of agriculture, particularly those products of interest to Michigan, such as leather and wool. Both leather and wool face declining per capita demand between now and 1980.

Wool consumption is likely to decline more in carpet than in apparel wools. But apparel wool demand will also decline some. Total wool per person will likely decline about 30 percent. Population increases will leave total wool consumption near present levels but with downward price pressures.

Leather has been increasingly displaced by plastics and other substances. The recent introduction of a high quality leather substitute for shoes will put heavy downward pressure on the demand for shoe leather. Since our livestock projections imply large increases in available hides, only one conclusion is possible: relative price declines for leather enabling it to compete with synthetics for current uses or to become attractive in markets where it is not currently used.

Exports and Imports

Meat and meat products will encounter an expanding demand. Production will need to increase significantly to satisfy this demand. It is expected that Europe will import feed grains as needed, rather than import meat. Meat-type hogs, processed to European specifications, might be an export product under some circumstances. Tallow for soap making, and lard where the consumer preferences are appropriate, will find a considerable export market. In the case of beef the pressures are likely to be in the other direction; U.S. prices above the world level will attract exporters in some countries. Feeder cattle from Mexico will continue to come in; imports of beef animals from Canada will be limited by the rising incomes and population of that country.

Production (10)

Cattle

The Michigan cattle industry can be separated into six types of operations: (1) feeding beef-type cattle, (2) feeding dairy steers, (3) raising beef-type feeder cattle, (4) raising veal calves as feeders, (5) selling deacon and veal calves for slaughter, and (6) selling cull cows and bulls (dairy and beef). Total slaughter of Michigan cattle in 1959-63 averaged 445,000 head, of which an estimated 200,000 head were cows and bulls and the balance of 245,000 head were steers and heifers. The 245,000 head of steers and heifers included about 180,000 head of fed cattle. The remaining 65,000 head of nonfed cattle presumably represent most of the dairy steers, although some dairy steers were classified as fed cattle. Slaughter of Michigan calves amounted to about 223,000 head per year in 1959-63.

Production of grain-fed cattle has expanded rapidly in Michigan, keeping pace with other Corn Belt states since World War II. The Corn Belt as a whole, however, has not expanded as rapidly as the western states. But Michigan is expected to improve its competitive position and triple fed cattle production between 1959-63 and 1980 while national output about doubles in this period (Fig. 12). The corn production of the state is expected to be adequate and the expanded use of corn silage in rations should strengthen the competitive position of the entire Corn Belt. Nearness to markets is expected to keep slaughter cattle prices higher in Michigan than in other major cattle feeding areas. The ease of shifting from dairying to beef feeding (in terms of buildings, equipment and management skills) also is a unique advantage of Michigan over most of the cattle feeding states.

Feeding of dairy steers has increased markedly in

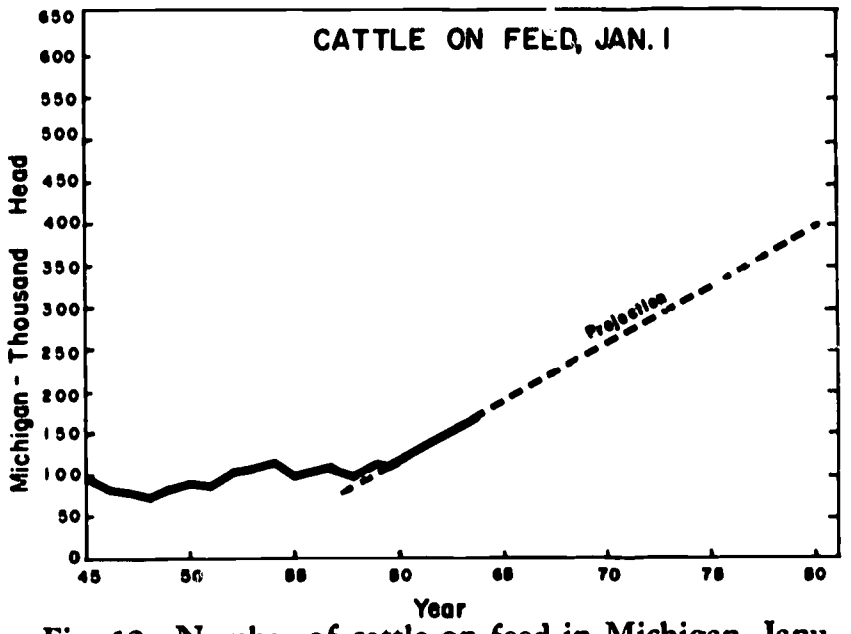

Fig. 12. Number of cattle on feed in Michigan, January 1, 1945-1965 and projections to 1980.

recent years in Michigan. However, declining dairy cow numbers will put an upper limit on the feeding of dairy steers. Little change is expected in the number of this type of cattle fed on Michigan farms in the long run.

One disadvantage confronting Michigan cattle feeders is that they must pay higher prices for feeders than do producers in most other states. More than half of the cattle on feed in recent years have been shipped into the state. On the other hand, this offers encouragement to cow-calf operators within Michigan. In fact, beef cow numbers have increased more percentagewise in Michigan than in other states. The availability of grazing land in northern Michigan will support a continuation of this growth. As possibilities for expanding cow herds in the West and Southwest are rather limited, much of the expansion projected to 1980 must come from the Southern and North Central states. Consequently, beef cow numbers are expected to triple in Michigan by 1980 (Fig. 13).

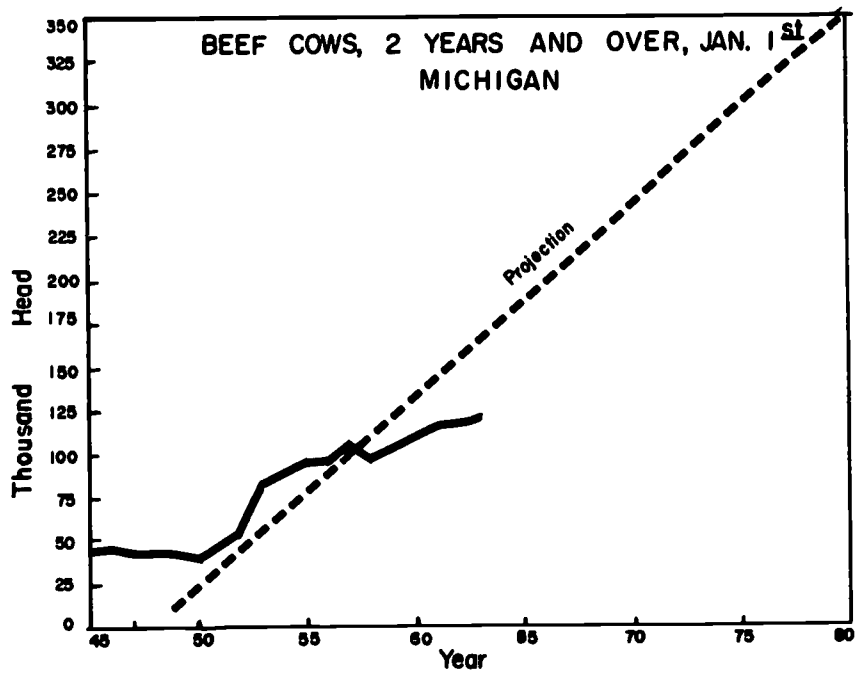

Fig. 13. Number of beef cows two years old and older on Michigan farms, January 1, 1945-1965 and projections to 1980.

Increasing beef cow numbers will offset declining dairy cow numbers, so that cow and bull slaughter will continue at about 200,000 head per year between now and 1980. Marketings of veal calves for slaughter will decline to about 100,000 head per year, more than a 50 percent drop. This reflects declining dairy cow numbers and the pressure to feed out a larger portion of the calf crop.

The number of Michigan farmers feeding cattle has dropped sharply and will continue to decline into the next 15 years. But size will increase from about 60 head per feeder in 1965 to 300 by 1980. It is projected that by January 1, 1980, between 1,300 and 1,800 cattle feeders will have on feed an average of between 250 and 350 head per farm and more than 100 feeders will be feeding more than 1,000 head each.

Cow-calf operations will continue to be basically one- or two-bull units, numbering 25 to 60 mature beef cows. Some increase will occur, however, in herds with 100 cows or more. An expansion is expected in the number of herds established and operated by part-time farmers, particularly near metropolitan counties. Management systems for maintaining brood cows under dry lot conditions in southern Michigan will not be widely adopted by 1980. Controlled estrus and artificial insemination of beef cows will perhaps be the most significant management change and this practice is expected to be in wide use by 1980.

No real breakthrough is expected in stimulating the rate of growth in beef cattle. Improved management in feeding practices, such as weighing and mixing ingredients, and feeding to lighter weights will increase efficiency of gains.

The type of facilities for feeding cattle is not expected to change appreciably from what the requirements are today. Facilities for maintaining beef breeding cattle will continue to be at a minimum, representing a small part of the total investment in such operations.

Swine

Hog production has dropped slightly in Michigan during the past 15 years and Michigan's share of the total U.S. output has also declined. With the per capita demand for pork expected to level off from the sharp decline of the past decade, production in Michigan is projected to increase slightly between 1959-63 and 1980 (Fig. 14). Compared with national trends, Michigan's share will continue to decline. This is because many farmers of Michigan have a background in dairy production but few have had experience with sizable swine operations. Also the availability of off-farm employment has encouraged many farmers to

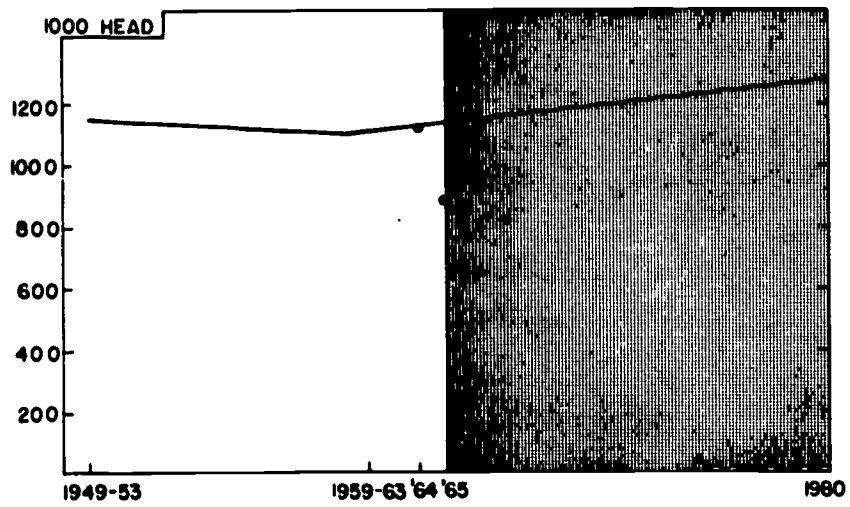

Fig. 14. Hogs marketed in Michigan, 1949-1965 and projected to 1980.

farm on a part-time basis. This situation is more conducive to cash crop farming than carrying on a livestock program.

Improved feeding efficiency, more pigs per litter, and artificial insemination will be in the picture. Disease problems will continue to be the major factor affecting efficiency of production, although many of our present disease problems will be completely or partially solved. But new diseases will take their place as an increasing number of hogs will be raised in complete confinement.

In 1964, approximately 18,000 farmers reported raising hogs in Michigan, about half the number in 1959. By 1980, 1,200 farms will be producing approximately 80 percent of the hogs in Michigan and will average between 800 and 900 hogs marketed per year. But even in 1980 there will be a place for the farmer with 20 to 30 brood sows. The large feeders will tend to become more specialized – and because of the labor and facilities involved, will prefer to buy rather than produce their own pigs. Also, the part-time farmer may be interested in a finishing operation.

Feeder pig production will require a strong marketing program and this favors concentrated production areas. Although such a program could be developed in southern Michigan by experienced hog producers, it is believed that more and more of the feeder pigs will be derived from outside sources.

Sheep and Lambs

Lamb marketings in both the U.S. and Michigan have declined since World War II, with Michigan's output down even more than nationally. The drop in Michigan's share was in a loss of ewe flocks rather than in lamb feeding.

The difficulties in mechanizing feeding and management of ewe flocks are a major reason why the number of ewes in Michigan is expected to continue to decline, by about 7 percent, between 1959-63 and

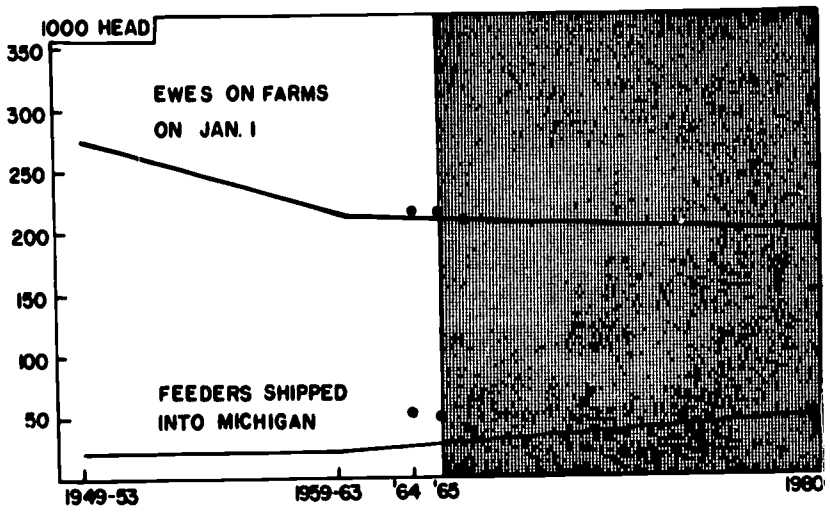

Fig. 15. Sheep and lamb numbers in Michigan, 1949-1965 and projected to 1980.

1980 (Fig. 15). Lamb feeding, which is becoming more mechanized, should increase, pulling about 50,000 head of feeder lambs into the state annually by 1980, a 78 percent increase over 1959-63.

Wool production is expected to drop to about 2.5 million pounds, 15 percent under 1959-63.

Horses

Although no longer of any significant importance as a source of farm power, the number of horses kept for pleasure is rapidly increasing in Michigan. With 36,000 head in Michigan in 1959, a reasonable projection would be 50,000 to 60,000 by 1980. The importance of pleasure horses to the economy is indicated in a recent California report, which estimated that owners spent $560 annually per horse.

Marketing and Processing (57)

Consumption in Michigan

Considering trends in population and consumption and estimates of per capita consumption levels in Michigan, the projected 10.2 million people in Michigan will consume approximately 1,428 million pounds of beef, 25 million pounds of veal, 672 million pounds of pork and 41 million pounds of lamb and mutton in 1980. This represents an increase of 71 percent in beef consumption, a decrease of 36 percent in veal consumption, an increase of 21 percent in pork consumption and a 24 percent increase in lamb consumption between 1959-63 and 1980.

Retailing and Wholesaling

The fewer and larger retail firms will continue to emphasize their desire for increasingly precise product specifications. They will continue to seek more stable sources of meat and attempt to develop their own private labels. This may lead to improved vertical coordination through forward purchases agreements and contracts as well as vertical integration within firms.

One of the major changes in meat marketing by 1980 will be the shifting of most of the processing activities that still occur in retail stores back to centralized processing centers operated by retail food chains or to other slaughtering and processing plants. Retail food stores will receive most of their meats as prepackaged fresh, frozen or processed items.

Slaughtering and Processing

Livestock slaughter has been declining in relative importance in the East North Central states, shifting closer to major producing areas. Packers are finding that it is usually more economical to ship dressed meat rather than live animals. Also, labor costs are often lower at interior locations in the surplus livestock producing areas as compared to the large urban centers.

Michigan is a deficit producing area and has been importing more than two-thirds of its beef and pork requirements. In the 1959-63 period, 21 percent of the beef supply and 15 percent of the pork supply came into the state as live animals for direct slaughter. By 1980 it is probable that live animal inshipments will be substantially replaced by inshipments of dressed meat and meat products. The reduction of cattle inshipments will be more than offset by increases in marketings from Michigan farms; the reduction in hog inshipments will be partly offset by expanded Michigan hog marketings. In the aggregate, Michigan slaughter will increase gradually between now and 1980 but will continue to decline as a percentage of total U.S. slaughter (Fig. 16).

In 1965, there were 174 commercial slaughtering establishments in Michigan, a 25 percent decline from

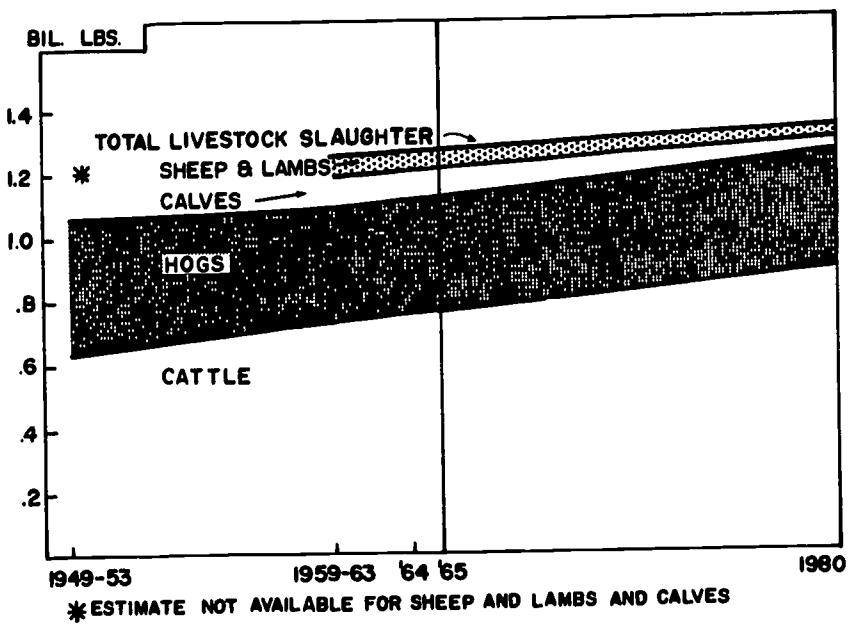

Fig. 16. Livestock slaughter in Michigan, liveweight, 1949-1965 and projected to 1980.

1955. Most of the decline was in the plants slaughtering between 300,000 and 2 million pounds live weight per year. There were 91 such plants in 1965 but they, along with a large number of small butchers and custom slaughterers, handled only a small percentage of the total livestock slaughtered in Michigan.

By 1980 there will be substantially fewer slaughtering plants in Michigan. The plants that remain will be larger than most of the present slaughter plants, reflecting efforts to realize economies of scale in buying, processing and distribution. The State Meat Inspection Act of 1965, because of its facility requirements for inspection of livestock, may prove discouraging to many small slaughterers.

Packers will seek lower cost methods of procurement through direct buying and other means. Forward contracting arrangements will be used to reduce short term fluctuations in volume of slaughter and to attain better control of raw material quality.

While livestock slaughtering plants tend to be located close to livestock producing areas, meat processing has tended to be located near areas of consumption. There were 81 specialized meat processors in the state in 1963, not including the firms that also slaughter livestock.

Michigan sausage makers now produce approximately 5 percent of the total U.S. sausage output. If present locational tendencies persist, the volume of meat processing in Michigan will increase at about the same rate as population increases. However, certain developments could have an adverse effect on the growth rate. Improved processing and packaging techniques are extending the shelf life of sausage. This coupled with improved transportation will have a significant impact on the location and size of meat processing plants.

Livestock Marketing

The principal market outlets for Michigan livestock are a terminal public market in Detroit, 49 auction markets, approximately 25 local markets scattered throughout the state and 300 to 400 livestock dealers. Small quantities of slaughter livestock are sold through dealers or directly to packers. Auction markets handle more than one-half of the slaughter livestock and the terminal receives about one-fourth of the dollar volume.

Auction markets have received an increasing share of the marketing over the past 25 years, particularly dairy calves, slaughter cows and slaughter hogs. The terminal market has continued as a principal outlet for slaughter steers and heifers and sheep and lambs. In recent years, cooperative auction sales have been increasingly important in the selling of feeder calves produced in Northern Michigan.

By 1980, the importance of auction markets as outlets for slaughter livestock will decline. With fewer and larger producers and fewer slaughter plants there will be less need for assembly-type markets. The auctions that remain will be larger and will offer packer buyers larger lots of uniform quality animals. Auctions will continue to be a major transaction center for feeder cattle, cull dairy stock, and hogs through 1980.

Producers will be more interested in selling fat cattle and slaughter hogs on the basis of carcass weight and grade. Producer groups will continue their efforts to organize marketing associations to act as a bargaining agent with packers. If properly organized, such associations could effect significant improvements in market coordination that would better gear farm production with demands from slaughterers, processors and retailers.

EGGS AND POULTRY

Eggs

Consumption

Egg consumption has exhibited wide cyclical swings of long duration since 1900. There now appears to be a downtrend in egg consumption and a negative income elasticity. These forces combine to put severe downward pressure on egg consumption. Declining egg prices will offset some of this downward pressure. Annual egg consumption is projected at 34 pounds (farm weight) or 260 eggs per person, compared with 43 pounds in 1959-63.[7] Prices are likely to increase by less than the general price level.

Production (63)

The egg industry, as well as the turkey and broiler industries, in Michigan is one that is particularly difficult to project to 1980. The outlook depends so much on the decisions of relatively few large producers, industry leaders, processors and feed companies. Depending on these decisions, the poultry industry in Michigan can show substantial growth – or decline to minor importance.

Egg production in Michigan declined in most of the postwar period and Michigan egg producers lost some of their share of the U.S. output and Michigan consumption. Some reversal of these trends was noted in the early 1960s. For the last 10 to 15 years Michigan has produced approximately 50 to 60 percent of the eggs consumed within the state. By 1980, this per-

(7) Alternatively projected to 300 eggs by the Poultry Committee.

centage could drop to 25 or increase to 75 percent. The assumption is that Michigan egg output will continue at about 50 percent of the state's needs. This would mean that egg production in Michigan in 1980 would be 130 million dozen, 12 percent more than in 1959-63 (Fig. 17).

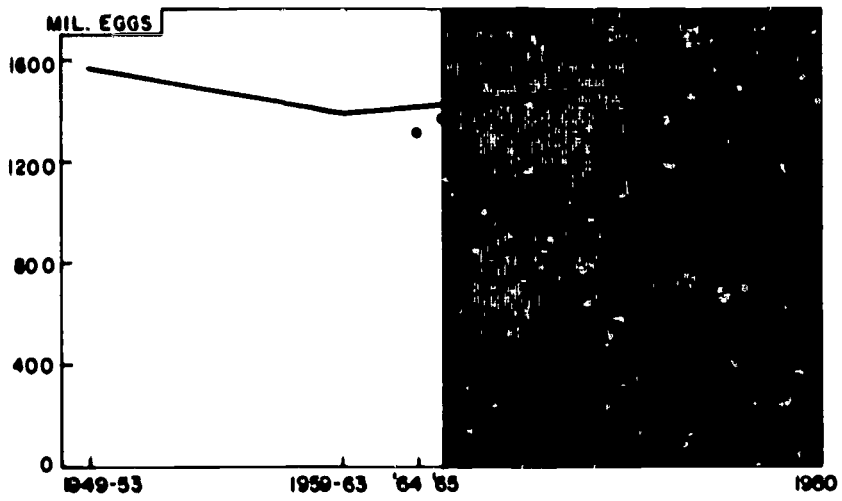

Fig. 17. Eggs produced in Michigan, 1949-1965 and projected to 1980.

One development that would favor Michigan's poultry industry would be a lowering of feed costs primarily through reducing overhead costs in the distribution of feed. Also, a breakthrough in soybean processing may allow small plants to be built in Michigan and thereby eliminate considerable handling and transportation costs. Because of the proximity of large retail outlets, the Michigan egg industry can realize some economies in distribution not available to many other producing areas.

Besides the possible breakthrough in soybean processing, several other developments are in the offing in the poultry feed business, including the 100-ton hopper car in rail transportation, direct truck delivery from processors, and a superconcentrate that includes everything but soybean meal and corn.

With annual egg production per hen likely to increase from 213 eggs in 1959-63 to 265 by 1980, the number of layers on farms will decrease from 6,558,000 in 1959-63 to 5,874,000 by 1980, a 10 percent drop. Poultrymen will be able to produce a dozen eggs with 4 pounds of feed in 1980, as compared with 5.5 pounds in 1959-63. This will be due not only to increased feeding efficiency but also to management, to breeding and to progress in solving disease problems, principally coccidiosis and leukosis.

Labor efficiency will also increase. One man handling 7,500 birds in 1959-63 should be able to care for 25,000 birds by 1980.

The size of flocks will continue to increase, from the present average of about 2,000 laying hens to about 25,000 by 1980. The number of flocks in Michigan for egg and pullet production will decline sharply to about 350 by 1980. The increase in size will reduce housing and equipment costs from the present $4.50 per bird to $2.50 per bird. The started pullet business is relatively new, having been developed since 1959. Costs of producing started pullets, relatively high in the developing stage, are expected to decline with the growth of the industry. By 1980, 75 to 80 percent of the birds sold in Michigan will be sold as 18 to 22 week old pullets. The cost of pullets is expected to drop from $1.85 to $1.60 per bird. (These figures are in terms of 1965 dollars.)

Marketing and Processing (63)

Coordination of the various steps of the production and marketing of eggs will continue to increase. Essentially the operations will be such that the route by which lots of eggs will flow from farm to retail outlet will be predestined for several months at a time. There will be exceptions but most retailers will not wish to finance or directly manage the production and processing of eggs. However, they will discover, if they haven't already, that eggs from "good" coordinated programs will better enable them to obtain more egg business by having uniformly high quality eggs at reasonable prices available for sale. Such coordinated programs in Michigan or elsewhere will likely be developed under the leadership of feed suppliers, hatcheries, producers, grading stations or distributors. As these groups tend to be bound together by contractual arrangements, it will be that much more difficult for any one of them to operate independently. In addition, significant savings will be realized in the direction of enabling each operation to achieve the greatest economies of scale throughout the year. Several problems, however, can be foreseen.

1. A tightly coordinated plan will also call for equitable distribution of returns through the various steps of the industry.
2. Coordinated plans with their expected advantages of larger and more uniform scale of operation may tend to create more expansion of egg production than changes in consumption needs warrant without extremely low prices. If this situation develops, adjustment will take place, but it will be painful, especially for those who have recently invested in fixed facilities in the industry.

The prime price focal point will be the transactions between the production-marketing complex leader and the buyers for the retail store, primarily chains, and the large users of processed eggs as ingredients in other finished products.

The hatchery business will become concentrated in about 40 operations in 1980, with 10 or so hatching 90 percent of the egg-type chicks hatched in Michigan. In 1965, about 82 hatcheries were in operation.

Shell egg processing will move in two directions. A larger share of Michigan-produced eggs will likely be processed on the farm (about 50 percent in 1980 versus 20 percent in 1956-63) due to larger scale production units and the possible development of moderate volume equipment among other reasons. Probably about 10 off-farm grading stations will process the other half. Off-farm grading is being carried on now at about 30 points in the state.

The off-farm grading plants will process about 4,200 cases a week and will likely take on further processing, that is, breaking and freezing. This further processing will grow slowly in Michigan and by 1980 it is possible that at least 10 percent of the eggs handled by these plants will be sold in broken-out form.

U. S. Consumption and Exports of Poultry Meat

Consumption of chicken per capita has expanded rapidly since World War II due to falling prices and some increase in demand. Further expansion in consumption, to 38 pounds per person (ready-to-cook basis) is likely, compared with 30 pounds in 1959-63. This increase largely results from a positive income elasticity and a substantial income increase. Broiler prices will also be a contributing factor as they are likely to decline slightly relative to the general price level.

Turkey consumption should rise because of a high income elasticity. An even faster rate of increase is projected based on the variety factor and a trend factor. The trend factor is based on an assumption that turkey will be better merchandised. Better merchandising means a greater variety of "cuts," regular availability and, perhaps, greater emphasis on preparation methods. Consumption of 10 to 11 pounds (ready-to-cook basis) per person in 1980 appears realistic, a 3 to 4 pound increase over 1959-63. Consumption at this level would place upward pressure on prices, but prices are projected as stable to declining relative to the general price level on the assumption of improved production technology.

Prospects for rapidly expanding exports of poultry meat are not particularly bright. Poultry technology is likely to be widely distributed throughout the world, so that normal sales will be of feed grain, with conversion to poultry occurring near the area of consumption.

Turkeys (63)

Production

It is estimated that less than 10 persons control 90 percent of the turkeys grown in Michigan. One would hesitate to predict what decisions these individuals will make. Michigan has the capacity for expansion but apparently lacks the persons or organizations willing to risk the capital. The assumption is made that Michigan will hold its own in turkey production and increase along with the other areas by about 90 percent over 1959-63. In the past 15 years, Michigan turkey production has been about stable and has declined relative to competing areas.

The turkey production forecast for 1980 in Michigan would amount to 42.5 million pounds. It will be possible to reduce feed conversion to 3 pounds of feed per pound of turkey meat by 1980 compared with about 4 pounds in 1959-63.

Marketing and Processing

The turkey industry is largely in the hands of organizations where feed, hatching, production, and processing are well integrated. These kinds of groups will continue and those not in these setups will find economic success almost impossible. Both turkey production and processing operations will move toward year-round operations. The Michigan poultry processing industry, in addition to the traditional form of processing, will engage more and more in so-called fabrication operations. Michigan processors will have some advantage in this regard because of their proximity to retail outlets. They will be in a position to perform the fabrication efficiently according to various customers' needs.

FIELD CROPS (54)[8]

The demand and price outlook for major field crops is closely linked with the federal government's price support policies and export programs. Government loan rates will likely be lower in 1980 than in 1959-63. Wheat prices will average lower while feed grain soybean and dry bean prices will not be much different than in 1959-63. Because of general inflation, crop prices will decline relative to the general price level. One reason for this projection is the expectation that fertilizer prices will decline sharply in the 1965-1980 period.

The prospects for expanding crop production in Michigan are good. The potential exists for substantial increases in yields per acre, which will more than offset the projected decline in harvested acres.

(8) Marketing of field crops is discussed in the following section on "Grain Marketing and Farm Supply."

Both domestic and export demands will be increasing for most crops. Michigan's location relative to the St. Lawrence Seaway should enable the state to share in the growing export market. A pronounced shift to cash crop farming in recent years indicates Michigan's competitive position in these enterprises is relatively strong – perhaps due to rapid improvement in labor-efficient technology in crop production and to the suitability of cash cropping for part-time farmers.

Wheat

Domestic Consumption

Domestic wheat consumption per capita is likely to continue its downward trend. Wheat consumption does not respond to increasing income, even though specific products are highly responsive. The products (crackers and bakery products) that respond to income increases are products using a higher percentage of soft wheats. Therefore, projected per capita consumption indicates a decline in the consumption of hard wheat and either stability or a very small decline for soft wheat. (Michigan produces soft wheat, both white and red, with white predominating.) Wheat prices will continue near their feed value equivalent (which would be substantially lower than wheat prices were in 1959-63). Soft wheat prices are expected to parallel hard wheat prices in spite of the greater decline in hard wheat consumption. Several reasons may be suggested. Production will likely be increasing, particularly in the Pacific Northwest where yields will be rising very rapidly. Soft and hard wheat compete for acreage over a broad area. Millers are likely to search for technologies that permit substitution of hard for soft wheat if prices "get out of line."

Exports

The exports of wheat to Western Europe are likely to decline; it is unlikely that 1963-64 levels will again be attained, except as a consequence of very unfavorable weather. Canada's high protein wheat will have advantages for blending purposes. Technological developments, which permit the U.S. to efficiently make a higher content and better quality protein available, would improve the competitive situation compared with Canada. Wheat exports to Eastern Europe and the Soviet Union will increase, probably to higher levels than the 1963-64 sales of the U.S. and Canada. Canada and Australia are likely to increase their sales to Communist China. There may be some participation by the United States.

There will be continued concessional (noncommercial) sales of wheat to the underdeveloped areas. By 1980 and despite some increase in shipments by other countries, the volume of these shipments probably will be gauged by current availability of surpluses; i.e., stocks will be sufficient for needed strategic reserves but not much more. Shipments on concessional terms will be made more cautiously, since there are likely to be more requests than available wheat, and export programs will be approved only when the wheat serves a substantial development and/or political interest.

Production

With increasing yields on a fairly constant acreage base, Michigan wheat output has been increasing even more than the wheat output in other states. But with lower wheat prices in prospect for the coming 15 years than in 1959-63, wheat land will be shifted to other crops. With 43 percent less acreage in wheat by 1980, Michigan will produce about 31 million bushels per year, about 13 percent less than in 1959-63 (Fig. 18). This would represent a smaller share of the total U.S. wheat crop and of the U.S. soft wheat crop as well.

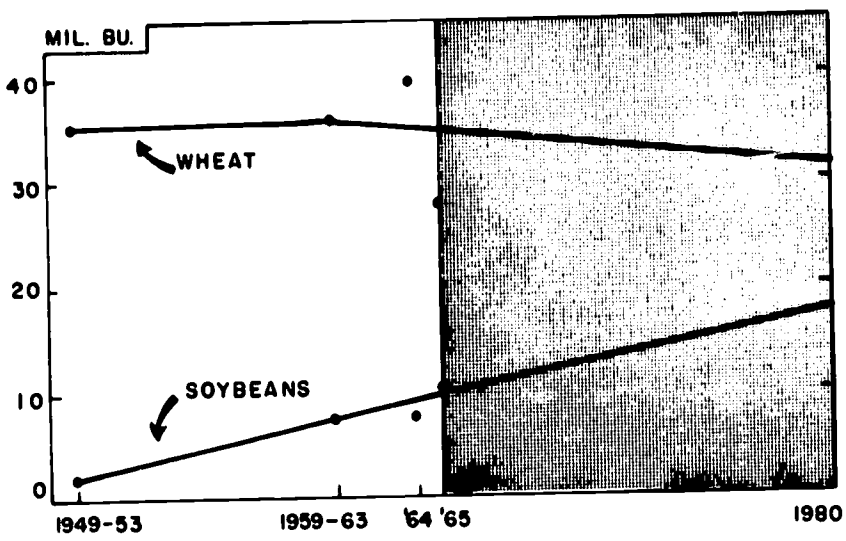

Fig. 18. Production of wheat and soybeans in Michigan, 1949-1965 and projected to 1980.

Wheat yields are expected to increase from 34 bushels per acre in 1959-63 to 52 bushels per acre in 1980. This represents an acceleration of the upward trend and will be brought on by new technologies. New semidwarf varieties with resistance to the major diseases and insects will be available by 1970. These varieties will enable farmers to fertilize more heavily and to plant earlier. Progress is being made on developing hybrid wheat, though it is not expected to be a major factor by 1980 – later, perhaps.

Dry Beans

Domestic Consumption and Exports

Domestic per capita consumption of dry beans has fallen with increasing incomes and a trend toward

meat as a protein source. The fall in domestic demand is likely to continue, but the decline may well level off. In fact, per capita consumption of navy beans has been increasing slightly in recent years and may continue gradually upward for several years. By 1980, per capita consumption may reach 2.8 pounds compared with 2.6 pounds in 1959-63. Navy beans have been strong competitors in the expanding processing market because they hold their shape after canning. Trends to convenience foods in dehydrated and purée forms might put Michigan at some disadavantage, unless suitable varieties are developed. The flatulence problem should be solved by 1980 and some progress made toward adding methionine and tryptophane to beans, two essential amino acids lacking.

Dry bean exports will benefit from a greater emphasis on nutrition in both high and low income countries. The protein in dry beans serves purposes not usually supplied by protein in cereals, and animal products are more expensive. Thus, a greater European concern with nutrition would increase the dry bean purchases of low income groups within the economy, while the rise in income and shift to animal products will tend to reduce the demand for beans by middle and higher income groups. But the growing use of canned goods and other convenience foods will benefit Michigan navy beans in the interim period. By 1980, however, it is expected that the interim upsurge will slow down considerably.

There are likely to be increased sales of beans to low and medium income nations looking for a cheap source of animal-type protein. Soybeans for human consumption will participate in this growth in some countries. Finally, if Food For Peace programs do give more attention to nutrition, dry beans will play an important role.

Production

Michigan produces nearly all the U.S. navy beans and will likely continue to do so. This would mean that Michigan would produce about 10,800,000 bags of navies in 1980 compared with an average of 6,560,000 bags in 1959-63, about a 65 percent increase.

Yields of dry beans in Michigan, about 1,316 pounds per acre in 1959-63, should increase to about 1,800 pounds by 1980. Several developments will contribute to this increase: the development of better adapted varieties that are more adequately suited to direct harvest, mature earlier and resist disease; the gradual adoption of improvement in production practices such as weed control, use of superior seed and increased planting rates.

Michigan has also increased in production of colored bean varieties, both in an actual amount and in its share of the U.S. total output over the past 15 years. New varieties that will be available prior to 1980 will enhance Michigan's competitive position. New varieties combined with other production practices should boost yields appreciably.

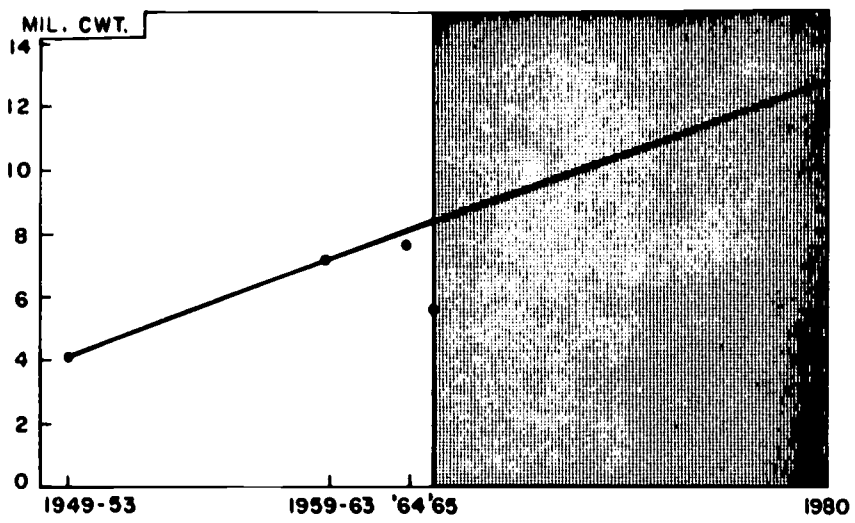

Fig. 19. Production of dry beans in Michigan, 1949-1965 and projected to 1980.

Production of all dry beans in Michigan, white and colored, should be about 12,600,000 hundredweight by 1980, 76 percent more than in 1959-63 (Fig. 19). Acreage is expected to increase to 700,000 acres, about 29 percent more than in 1959-63.

Soybeans

Domestic Consumption

U.S. production of soybeans is expected to reach about 1,500 million bushels by 1980 compared with 627 million bushels in 1959-63, 702 million in 1964 and 844 million in 1965. Domestic use of meal will expand, with the livestock industry requiring slightly more than 1 billion bushels of soybeans compared with 428 million bushels in 1959-63, 479 million in 1964 and 525 million bushels in 1965. This projection assumes an increase in the use of urea in accordance with presently recommended practice.

Soybean oil will continue to displace not only butter, but also lard and cottonseed oil in domestic consumption. Total consumption of fats and oils (other than butter) per capita is expected to increase by about 20 percent between 1959-63 and 1980. The increase is based on a positive income elasticity but is limited because of consumers' calorie consciousness. Individual oil crops will compete largely on the basis of price as technology permits a wide substitution of oils in producing various products. This conclusion must, of course, be modified if some oils or fats are proven superior from a health standpoint.

Exports

Exports of soybean meal to commercial markets abroad will increase even more rapidly than the expansion of livestock numbers in these countries due to the increased rate of feeding of high protein feeds. Amounts moving under concessional sales and grants to low income countries will be small.

Oilseeds, especially soybeans, will supply an expanding commercial market. Olive oil will decline relatively, for reasons stated in Chapter I. There may be international agreements that provide developing areas such as West Africa (palm and palm nut oil), the Philippines, Indonesia (coconut oil), Egypt, Sudan and others (cottonseed oil) with an expanding share of the world market, and perhaps with prices a bit more favorable. Concessional sales under Food For Peace, or its successor, will sometimes be supplemented by small donations from other producing nations. These shipments occasionally will be of some significance but are not likely to be a major fraction of concessional sales programs.

Production

Soybean acreage and production have expanded in Michigan at a faster pace than for the nation as a whole. This growth is expected to continue and by 1980 annual production could well be 14 to 15 million bushels, more than double the average output in 1959-63 (Fig. 18). Michigan has some advantage over other areas in being located close to the seaway. Also, the current advantage other producing areas have in being located near processors would be lessened if Michigan can encourage processors to locate here. The prospects for this would be greatly enhanced if infrared cooking of soybeans for animal feed can be developed. Such an operation would require a much smaller investment than current processing plants. Michigan is at some disadvantage in that the oil content is below the accepted standard. But efforts to develop better edible types of beans for the export market may help to erase some of this disadvantage.

A major breakthrough in yields has not yet occurred nor is it expected in the next 15 years. Some upward trend in yields will develop with improved cultural practices, such as row spacing and use of herbicides.

Sugar Beets (23)

Demand for sugar beets must be discussed in the context of total sugar demand. Consumption of cane and beet sugars has been stable over a period of years while corn syrup consumption has increased. Maple syrup consumption has fallen, with consumption of other syrups steady. Sugar prices face downward pressure from advocates of freer trade and because of competition from synthetics. Sugar consumption will likely remain fairly stable except as synthetics become increasingly important. Consumption is projected at 95 pounds per capita, down 2 percent from the 1959-63 average. This projection assumes no major shift to synthetics. Sugar prices are more likely to fall relative to the general price level than rise. This comment applies to present (1965) price levels, not the inflated prices caused by temporary shortages associated with the Cuban situation.

With sugar beets under some type of production control, it is assumed that Michigan will maintain its share of the U.S. output. Domestic producers' share of the U.S. market is slated to increase within a few years. By 1980, Michigan's sugar output is expected to reach about 400 million pounds, about 45 percent more than in 1959-63 (Fig. 20). This additional sugar

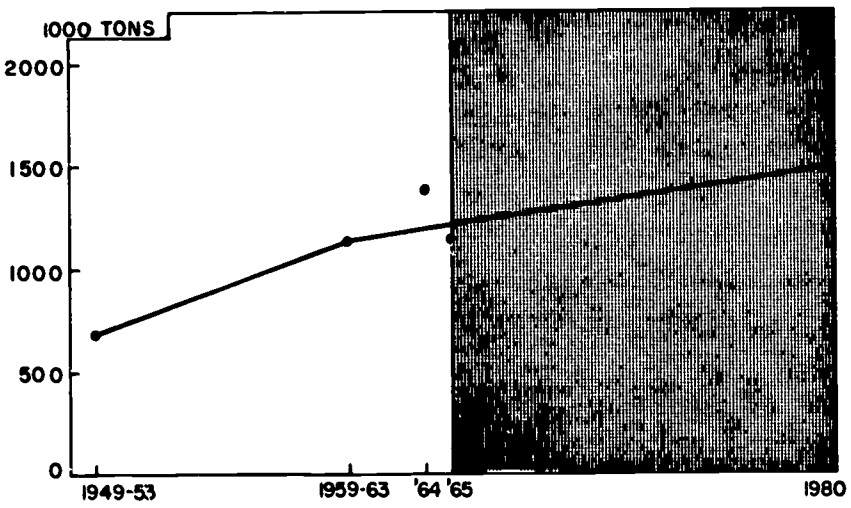

Fig. 20. Production of sugar beets in Michigan, 1949-1965 and projected to 1980.

will easily be produced on 70,000 to 75,000 acres through increased per acre yields of sugar beets, and through improved beet quality, storage, and factory technology, which will result in more recoverable sugar per ton of beets.

Several technological developments will have an impact on the industry: (1) Weed control with herbicides will be widely adopted by 1980. (2) Production will be completely mechanized. (3) Higher yielding varieties will be available from several sources. (4) Storage methods will be improved. (5) Strip cropping with field beans will allow beets to take advantage of "border" effect. These developments will be rapidly adopted by growers.

The sugar industry in Michigan will remain quite stable with no change in the number of firms and factories. Little further integration, either horizontal or vertical, is foreseen.

Potatoes[9]

Potatoes (white) are expected to decline slightly in per capita usage. Processed potato products will have a large share of the market. Few, if any, potatoes will be peeled in the home. Potato consumption is projected at 105 pounds per capita, 5 pounds less than in 1959-63. A lower figure is more likely than a higher one. Prices are likely to increase slightly less than the general price level on a national basis.

Potato production was fairly stable in Michigan following World War II and through 1964, while production increased in other states. Michigan is expected to maintain its share of the fresh potato market and will increase its share of the processing market between 1959-63 and 1980. At the present time it appears that the business and economic climate and the raw product supply in Michigan are attractive to food processing companies. In addition to Michigan's proximity to large population centers, the fact that Michigan once produced potatoes on over 300,000 acres is cited as a strong point in attracting processing companies. New varieties with desirable processing characteristics will be ready for release from the MSU potato breeding program by 1970.

By 1980, Michigan is expected to triple production over 1959-63 and produce 24 million hundredweight of potatoes per year (Fig. 21). This will be accomplished on about 80,000 acres compared with 48,000 in 1959-63. Yields will nearly double to about 300 hundredweight per acre, but this will be due more to improved management, expansion of acreage onto better quality soil and more irrigation rather than technological innovations.

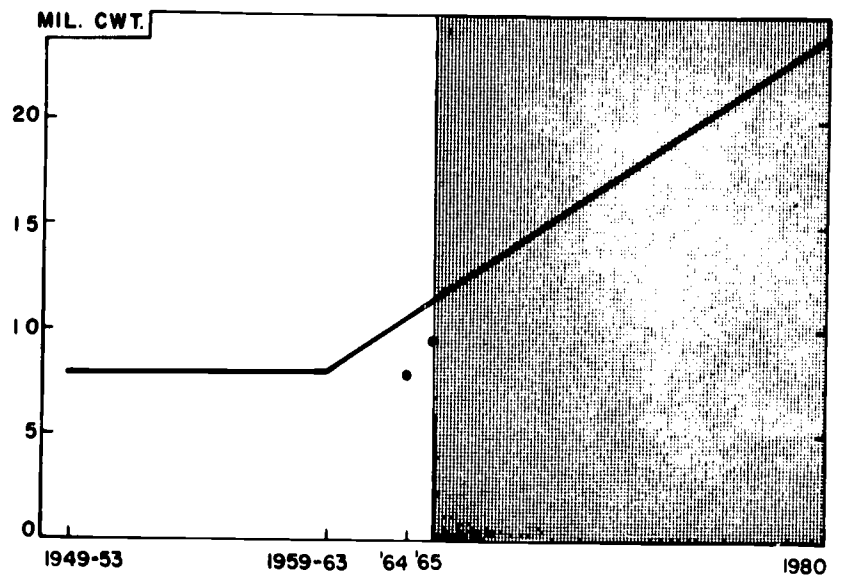

Fig. 21. Production of potatoes in Michigan, 1949-1965 and projected to 1980.

(9) Potato marketing is discussed in the section on "Fruits and Vegetables."

Buckwheat

Buckwheat is a minor food grain that has received increased attention recently. Present consumption is estimated at 0.1 pound per person. Production is concentrated in four states. This kind of product has a quite volatile demand. It offers variety and has a much larger potential use for flavoring cereal products. Can processors be assured of a steady supply of consistent quality? Are consumers convinced that they want buckwheat pancakes? Until someone answers these questions, projections of a 300 percent increase or a 100 percent decrease appear equally reasonable. A look at history shows that consumption of buckwheat flour has fallen from over 2 pounds per person to 0.1 pound in 50 years.

Buckwheat acreage and production declined after World War II in Michigan but have increased in the early 1960s. The outlook depends very much on the decision of one firm in Michigan that processes buckwheat. The assumption is that production will expand modestly in Michigan without much change in acreage.

Mint

Mint demand is derived from the demand for gum, candies, toothpaste, and other mint-flavored products. Mint oil is also exported but the bulk of exports are from the lower quality northwest U.S. production. Demand appears relatively stable and insensitive to income or small price changes. Substitute flavoring would probably be developed if prices increased substantially. Unchanged per capita consumption is projected for 1980.

Acreage and production of mint have dropped sharply in recent years. The future is not bright unless verticillium wilt disease, caused by a soil-borne organism, can be controlled. The most promising solution is the use of soil fumigants. Although present costs are prohibitive, there is a good chance that such treatments will be economically feasible by 1970. This would generate a revival of the mint industry in Michigan.

Feed Grains

U.S. Domestic Use and Exports

Feed grain demand is largely derived from the demand for livestock. Feed prices are projected to be falling relative to the general price level, while livestock prices will be generally stable or higher. This, in itself, would imply increased profits in livestock operations and improved feed prices as feeders increase the size of their operation and bid for feed. However, increases in other than feed costs will re-

quire a higher product-feed price ratio for the same profitability. No large change in feed conversion rates is projected. Thus the demand for feed grains is closely related to the demand for livestock and can be inferred from it.

Within the feed grain group, prices will largely reflect relative feeding value and the crops yielding the most feed nutrients per acre will increase in production. Therefore, technological change will be important in determining the acreage of specific crops.

Total feed grain use as feed is related to high protein concentrate use. For instance, the development of feeds based on roasted soybeans would lead to a decline in corn and other feed grain use. On the other hand, development of high protein corn could lead to a shift away from soybeans toward corn.

Exports of feed grain are likely to increase, but most of the increase in demand will be for feeding livestock domestically. Human consumption will likely be stable on a per capita basis.

Feed use of some 320 to 325 billion feed units is projected for 1980 – a feed unit being equivalent to one pound of corn. This implies feeding of about 5,750 million bushels of corn or its equivalent in other feed grains. Allowing 1,400 million bushels for food use, exports and seed brings total feed grain disappearance to about 7,150 million bushels of corn equivalent, compared with 5,140 million bushels in 1959-63.

Feed grains will be exported in much larger quantity to commercial markets, mainly in Western Europe, as consumers in that area shift diets toward livestock products, fruits and vegetables. Some sales will be made to Eastern Europe. In addition, small surplus shipments to produce livestock products abroad will be used to improve the diets of people and countries participating in Food For Peace programs. Such programs will be small, because the amount of feed grain available for concessional sale and grants will be limited.

Improved nutrition is likely to become a policy goal in a number of partly developed countries, with consequent increases in animal production. Concessional programs may develop which further emphasize this trend, and bring more of the less developed countries into this picture.

Corn

The Corn Belt has moved northward through southern Michigan during the past 15 years due primarily to earlier maturing varieties. Michigan's production has nearly doubled. In 1959-63, Michigan's corn for grain crop represented about 2.5 percent of the U.S. total, compared with about 1.6 percent 15 years earlier. Michigan's corn for grain output is expected to increase about 40 percent between 1959-63 and 1980 (Fig. 22). The predicted 1980 corn for grain output, 135 million bushels, will require some 1.5 million acres, slightly less than the 1,572,000 acres in 1959-63. Corn yields are expected to increase from 62 bushels per acre in 1959-63 to 90 bushels in 1980.

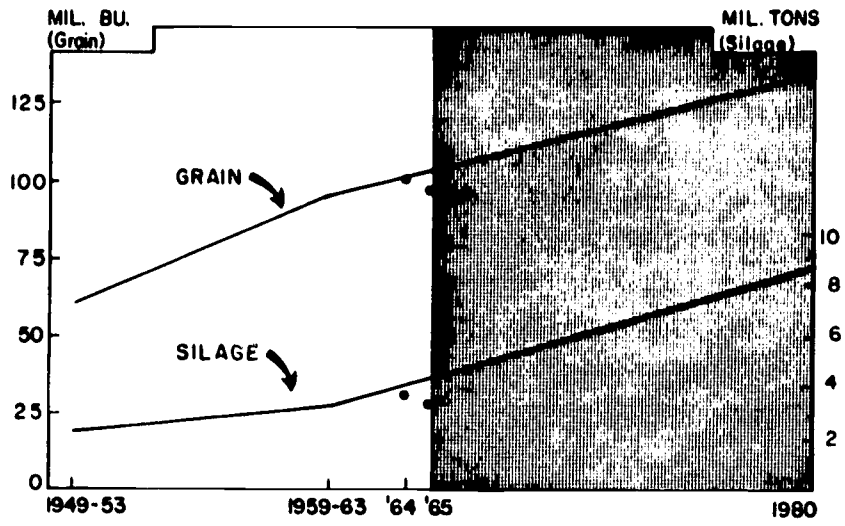

Fig. 22. Corn production for grain and silage in Michigan, 1949-1965 and projected to 1980.

Increased feeding of corn silage will require an expansion in production to 8,818,000 tons, 2 to 3 times the output in 1959-63. With yields expected to increase from 10.24 tons per acre in 1959-63 to 17 tons in 1980, acreage for corn silage would increase from 325,000 acres to 500,000 acres in this period.

Major technological innovations are not anticipated in the next 15 years, but improved hybrids, narrow rows, increased use of fertilizer, weed control, and certain other production practices will contribute to a steady growth in yields. Corn diseases (viruses) and insects pose serious threats but can be controlled. Special-purpose corn types will be produced in increased amounts, such as high lysine, high oil, high protein and high amylose. New developments may be expected in types that are specially adapted for certain food products such as breakfast food.

In 1959-63, about 57 million bushels of Michigan's corn for grain crop were used on the farms where grown and about 40 million bushels were sold. Some of the sales were to other farmers within Michigan, but substantial amounts moved out of the state. By 1980, about 86 million bushels will likely be used on farms where grown and sales will amount to about 57 million bushels.

Oats

Oat acreage and production have been dropping in Michigan, as in other states, as corn has been replacing oats as a feed grain. Acreage is expected to continue to decline in the coming 15 years to about 450,000 acres. Yields could jump from 48 bushels per

acre to 72 bushels just by putting present technology into practice. The incentive, however, may be lacking. The future of oat production will be closely tied to new techniques of harvesting, storing and feeding of the crop.

Michigan's average oat production in 1959-63 was 37 million bushels, of which 27 million bushels were used on the farms where grown and 10 million bushels were sold. In 1980, production is forecast at 32 million bushels, nearly all of which will be fed on the farms where grown (Fig. 23).

Barley

Barley acreage has declined in Michigan in the past 15 years, and is expected to continue to decline in the next 15 years. But new varieties should boost yields from 37 bushels per acre in 1959-63 to 62 bushels per acre by 1980. This would increase production from 2.4 million bushels in 1959-63 to 3.1 million bushels by 1980 (Fig. 23). Unless there is a dramatic

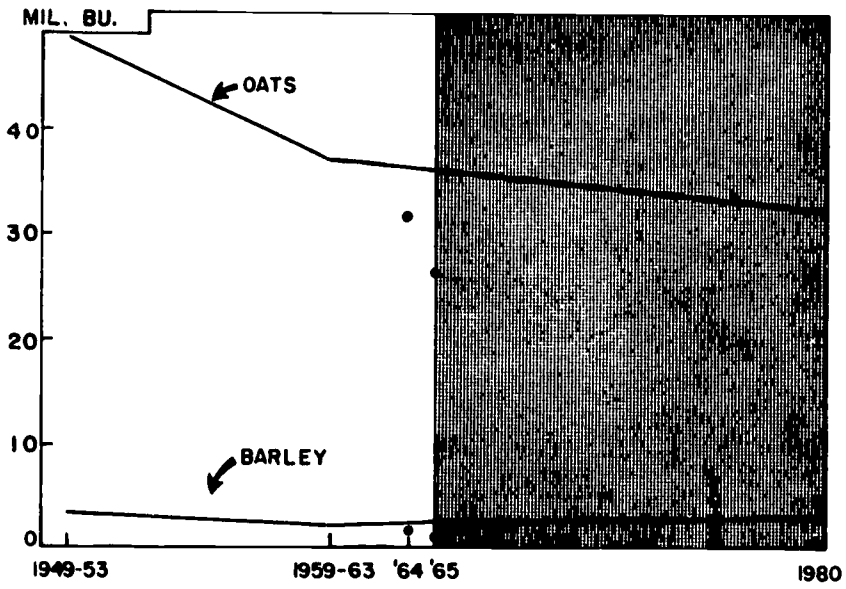

Fig. 23. Production of oats and barley in Michigan, 1949-1965 and projected to 1980.

increase in corn yields, the new barley varieties should put Michigan farmers in a better position to compete with the Corn Belt in the production of feed grains.

Michigan has some advantage over other Corn Belt states in barley production because of its cool climate. Over half of Michigan's barley crop is used for feed and will likely continue to be. At the same time, the demand for malting barley will likely increase by the 25 percent expansion in population expected in the coming 15 years. Winter-type malting varieties may be available.

Rye

Rye in Michigan is planted mostly as seed for winter cover, green manure and pasture production. In 1959-63, about 166,000 acres were planted for these purposes and about 40,000 were harvested. Production on the harvested acres amounted to 861,000 bushels, of which about 609,000 bushels were sold to millers or whiskey distillers. Some increase in acreage is anticipated, but mostly for winter cover, soil improvement and forage. Harvested acreage will likely continue at about 40,000 acres by 1980. Yields should increase from 22 bushels per acre in 1959-63 to 33 bushels per acre by 1980. Production would increase to about 1,320,000 bushels.

Hay, Pasture and Annual Forage Crops

The feeding of all hay to livestock in Michigan is expected to decline from about 3.7 million tons in 1959-63 to about 2.2 million tons by 1980 (Fig. 24).

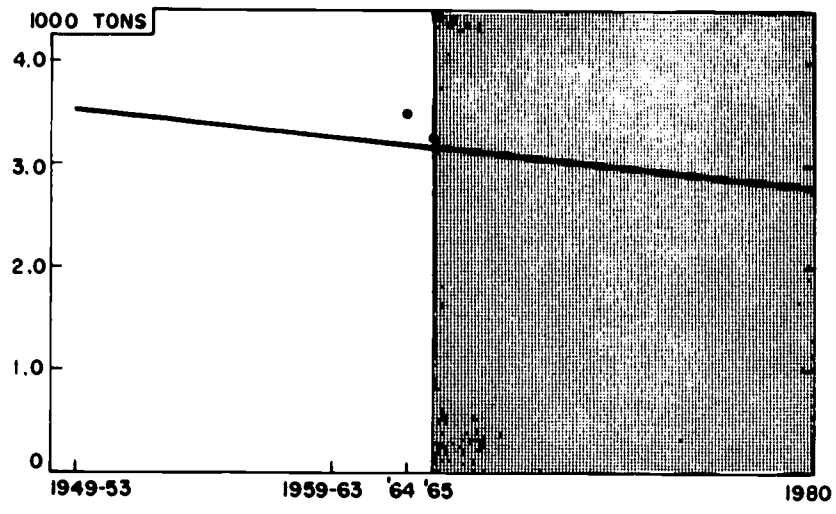

Fig. 24. Production of hay in Michigan, 1949-1965 and projected to 1980.

This is attributed to declining dairy cow numbers (beef cow numbers will be increasing) and a shift in feeding to more corn silage. On the other hand, the feeding of haylage will increase. Hay and haylage production will be closely tied to the livestock demands, although alfalfa hay may develop into a more important cash crop for export outside the state. Hay acreage will decline from 1,786,000 to 800,000 acres as yields nearly double, increasing from 1.84 to 3.50 tons per acre between 1959-63 and 1980. The trend to more alfalfa and alfalfa-grass mixtures and less red clover will continue.

This jump in yields will follow new fertilizer practices and cutting systems. The variety picture will change several times with the introduction of more special-purpose types, such as those designed for pasture and others for hay production. The feeding value of alfalfa may be improved as more is learned about the antimetabolites in legumes. Forage handling equipment is available to handle higher yields and hay making can be better systematized.

The alfalfa weevil poses a serious threat to alfalfa and to some other forage legumes. Satisfactory control measures may be difficult to develop.

With the trend to more green chopping and stored feeding for dairy animals, less pasture will be utilized by producing dairy cows. This plus the effect of higher yielding forages and fewer dairy cows will result in a substantial reduction in dairy pasture acreage. Some increase may develop in acreages of annual forage sorghums.

Turf

The turfgrass industry in Michigan has become a $200 million annual business. The industry began to develop rapidly in the state about 1946 and the growth of it is expected to accelerate due to population, economic and leisure-time influences.

This enterprise includes three phases: sod production; seed production; and turf establishment and management.

Sod

Sod production in Michigan has recently become a major crop. Estimates indicate that there were 15,000 acres under production in 1964 and that this expanded by 25 percent in 1965. Michigan ranks first in sod production and Michigan-grown sod is marketed in Toledo, Cleveland, Pittsburgh, Columbus, Indianapolis, Chicago and Toronto.

The mild summer climate and the extensive organic soil deposits place Michigan in a very favorable position for sod production since a crop can be produced annually. The proximity to a large and expanding market adds to the advantage.

Seed

Seed production of the fine-leaved turfgrasses could be developed in Michigan by 1980, but probably will not develop until a research program is organized in variety development, variety evaluation and seed production techniques.

Turf for Grounds and Recreational Purposes

Extensive turf areas include home lawns, parks, industrial grounds, athletic fields, institutional grounds, highway road sides, airports, golf courses and cemeteries. Continued growth of all of these areas is expected.

GRAIN MARKETING AND FARM SUPPLY (20)

Structure of the Industry

In 1965, there were approximately 650 local grain and farm supply firms in Michigan varying considerably in terms of size and services rendered. Many of these installations were built when the major means of farm transportation was the horse and wagon. This determined the limit to the trade area that could be served by a country elevator.

By 1980, the number of elevator and farm supply firms will decline to around 400, each with a trade area at least 30 percent larger than today. The typical local firm will do well over $1 million worth of business annually and will have over $500,000 in assets.

Mergers and consolidations will continue and by 1980 most of the country elevator and farm supply firms will be operated under some form of an incorporated organization. These multiple firm groups or chains will do a larger percentage of the total grain, bean and farm supply business.

Grain and Bean Handling

Approximately two-thirds of the elevator and farm supply firms now participate in grain and bean storage activities. Government programs will determine future storage requirements for carryover stocks, but it seems unlikely that the carryover stocks in commercial storage facilities will again reach the levels of 1957 through 1962.

The outlook is brighter for seasonal grain storage due to projected increases in grain and bean production in Michigan. The movement to field shelling and artificial drying of corn should give impetus to the trend toward off-the-farm commercial storage. New point-to-point rail rates that eliminate in-transit privileges for storage or processing will make storage more advantageous near producing areas.

Commercial Feed Industry

Although extremely large producing units may acquire storage and processing equipment and expand on-the-farm mixing of feed, commercial feed sales by country elevators will expand. For one reason, a smaller percentage of livestock producers will likely raise all the feed grains needed for livestock production. Feed manufacturing capacity will double. At least one major soybean processing plant will likely locate in southern Michigan. New techniques for processing soybeans for livestock feed could modify this projection.

A substantially larger percentage of livestock and poultry feed will move to the producing units directly from a manufacturing facility without intermediate warehousing or transshipment. Ninety percent of all feed purchased through commercial channels will be delivered to the producing units in bulk and feed manufacturers in turn will receive concentrate inputs in bulk.

Country elevators will do less custom mixing as we know it today. More complete rations will be supplied to the producers, particularly in association with grain bank activities.

Fertilizer and Limestone Usage

Since 1940, there has been a phenomenal increase in the use of fertilizer because of the high return on investment and the relatively stable cost of plant nutrients. Further increases in the rate of application would prove economical on many farms. A prospective drop in fertilizer prices will make increased application even more economical. One study predicts prices to farmers for nitrogen to drop as much as 50 percent in the next 15 to 20 years and for phosphorus and potassium to decline gradually (in 1965 dollars).

Combining projections of recommended rates with projections of crop acreages, nitrogen use in Michigan would reach 161,000 tons by 1980, about 2½ times the 1959-63 level; phosphate use would increase to about 150,000 tons, a 50 percent increase; and potash use would reach 175,000 tons, an 80 percent increase. These figures include an allowance of about 10 percent sales for nonfarm use such as lawns, golf courses, cemeteries, etc.

Greater use of fertilizer, the added cost of containers, and high labor costs will encourage continued upgrading of the analysis and more bulk spreading. We will see greater use of blends using such basic material as urea, ammonium phosphate and muriate of potash. The use of computers will speed up fertilizer recommendations based on soil type, yield goals and fertility reserves.

FRUITS AND VEGETABLES (including Bees and Pollination)

Per capita consumption of fruit and vegetables is not expected to change very much in the aggregate in the next 15 years, but the shift from fresh to processed forms will be dramatic.

Fruit

U.S. Consumption

Per capita consumption of citrus fruit in fresh form is expected to decline by 50 percent while consumption of processed citrus increases by 50 percent. These combine to yield a net increase in farm weight equivalent citrus consumption from 83 pounds to over 90 pounds per person.

Consumption of other fruits in fresh form will continue to decline. Part of the decline can be attributed to reduced home processing and part to improved processed products. Total fruit consumption in processed form will increase by a third. Dried fruits will decline in importance.

Fresh apple consumption has increased as a result of controlled atmosphere storage. Without further technological advances, fresh apple consumption may again trend down. The decline will be dampened by increasing incomes but per capita consumption may fall to 16 pounds per person from the 20 pound level of 1959-63. Applesauce consumption appears to have stabilized and no change is projected. A slight increase is projected for other processed apple products.

In looking at noncitrus fruits other than apples, we should note that half of the consumption in fresh form is bananas. Peaches, grapes, and pears follow bananas, with other fruits contributing little to total consumption. Per capita consumption is likely to decline for all, but especially for pears and peaches. Fresh strawberry consumption is likely to decline further in spite of rising incomes, unless a low-cost method is developed for preparing table-ready berries.

Fruit consumption in processed form is likely to increase substantially as noted above. Just as for the fresh market, the share of the processed market captured by various fruits is quite uncertain. Processors' merchandising policies may greatly affect the result. Will they "push" apple, peach, or cherry pie? Part of the answer will be true consumer preferences. Much of it will depend on technology. To some extent, price will influence the decision; processors will tend to push the lower cost products. On the other hand, rising incomes will permit more consumer experimentation with processed fruits. Well-merchandised products with good-flavor characteristics are likely to win.

The expectation is that peaches, blueberries, apricots, sweet cherries, and pears will fare well in this competition. Strawberries will if a process is developed that permits reconstitution of "fresh" strawberries. Per capita consumption of tart cherries will not increase – and may have trouble maintaining its 1959-63 level. Grapes used for wine will increase substantially if wine consumption increases with rising incomes.

Prices for fruit crops will likely decline relative to the general price level. Commodities with declining demand will be under the most pressure. Decreased harvesting costs associated with increased mechanization and increased delivery to processors will permit price declines because costs will be lowered.

Production (43)

Fruit acreage and production have been increasing in Michigan, with the exception of peaches. The 1964 fruit tonnage of 840,000 tons was more than double the average production of a decade ago. Much of the increase in production has been due to increasing yields per acre.

What is more, Michigan has been increasing its share of the total U.S. fruit output in all lines except

peaches, strawberries for processing and grapes for the fresh market. Michigan is in a position to at least maintain or increase its share of the total fruit industry in the next 15 years because of 1. a favorable climate and the moderating influences of Lake Michigan; 2. excellent soils and sites; 3. closeness to large centers of population; 4. prosperous and growing supporting industries, including processors, chemical and equipment companies, and fresh sales agencies; and 5. capable human resources for growing, processing and marketing and supplying technological information for continued development.

The present trend toward higher yields per acre of good quality fruit, lower labor usage per acre, and larger farms will continue. Further yield increases will result from improved varieties, better utilization of the ground space by closer plant spacing, improved training and pruning, chemical growth regulation and thinning, better use of needed nutrients (including in some instances irrigation), improved soil management and weed control, and improved control of diseases, insects and rodents. Fertilizers will be applied as single needed nutrients determined by leaf analysis and plant response. Systemic insecticides and fungicides and specific herbicides will reduce pest control problems.

Improved machinery and chemicals for all cultural activities will reduce high labor requirements for pruning, thinning, soil management, etc. Mechanical harvesting will be widely used for cherries, plums, grapes, cling peaches, processing apples, and blueberries. It is doubtful, however, that any quantity of the major fruits going to fresh market will be harvested mechanically by 1980. Most of the fruit will be grown on farms about twice the size of today's average full-time commercial fruit farm. But there will be many small, part-time fruit operations surrounding major population centers of the state.

Apples. Michigan apple production may double between 1959-63 and 1980, a greater increase than

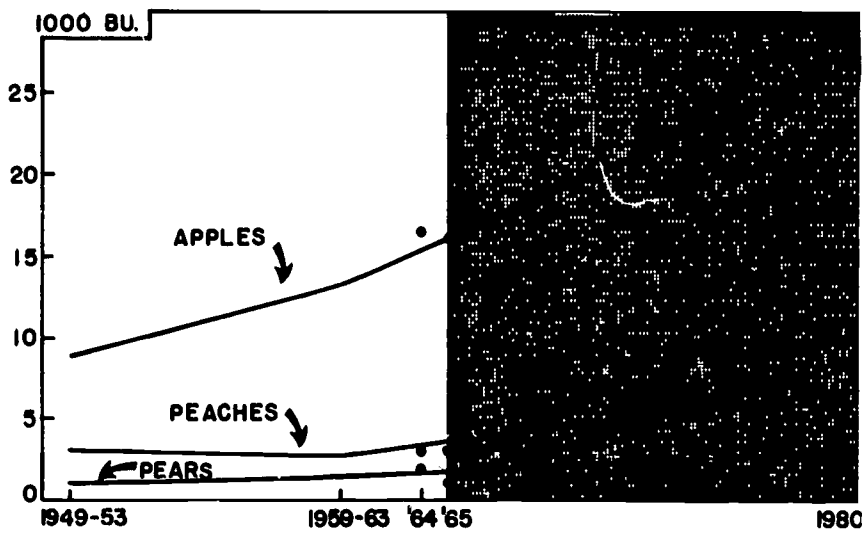

Fig. 25. Production of apples, peaches and pears in Michigan, average 1949-53, 1959-63, 1964, 1965 and projected to 1980.

projected for the nation (Fig. 25). The advantage will be in Michigan's closeness to markets, highly acceptable diversified varieties for both fresh and processing markets, and dynamic and growing market organizations. With production expected to increase from 13.2 million bushels in 1959-63 to about 29.0 million bushels in 1980, acreage is likely to increase from 60,500 acres to 70,000 acres of bearing trees in this period. This assumes an increase in yield from 218 bushels to nearly 400 bushels per acre.

Technology affecting apple production will include improved nutrition, pest control, soil management, chemical growth and fruiting regulation, and irrigation. Improved rootstocks and closer planting distances will be used in new orchards.

Pears. Michigan pear production will also likely double by 1980 to about 3.0 million bushels from the 1959-63 average of 1.4 million bushels (Fig. 25). This production level will require about 12,000 acres with an average yield of 275 to 300 bushels per acre, compared with 9,800 acres and 143 bushels per acre in 1959-63.

This would mean that Michigan would continue to increase its share of the U.S. pear output. The West Coast will remain the major pear producing region. Some areas in the East and South would become more competitive with Michigan if the fireblight problem were solved. But Michigan has certain advantages in that 1. pears fit in well in an already large and diversified fruit industry, 2. growers have the professional know-how, and 3. processing outlets are developed and growing.

It is assumed that progress will be made in controlling fireblight or in developing resistant varieties.

Peaches. During the past 15 years Michigan peach production has declined primarily because of cold injury to the trees. Although Michigan peach production has expanded more rapidly than the nation's since 1920, winter damage has caused Michigan to lose out in the past 15 years. If Michigan can maintain its present share of 3.7 percent of the national output, this would mean an output of about 3.7 million bushels by 1980, 33 percent more than in 1959-63. But if long term trends resume, Michigan peach output could double to about 6.0 million bushels by 1980 (Fig. 25). Whether Michigan reaches this level of production will depend primarily on the extent of cold injury in the 1966-80 period.

If production does double, bearing peach acreage in 1980 would be about 20,000 acres. Cultural improvements should boost yields from 141 bushels per acre in 1959-63 to about 300 bushels per acre in 1980.

Michigan's advantage over several other peach areas will be in its high quality peach varieties and promising new cling selections. The shift to more

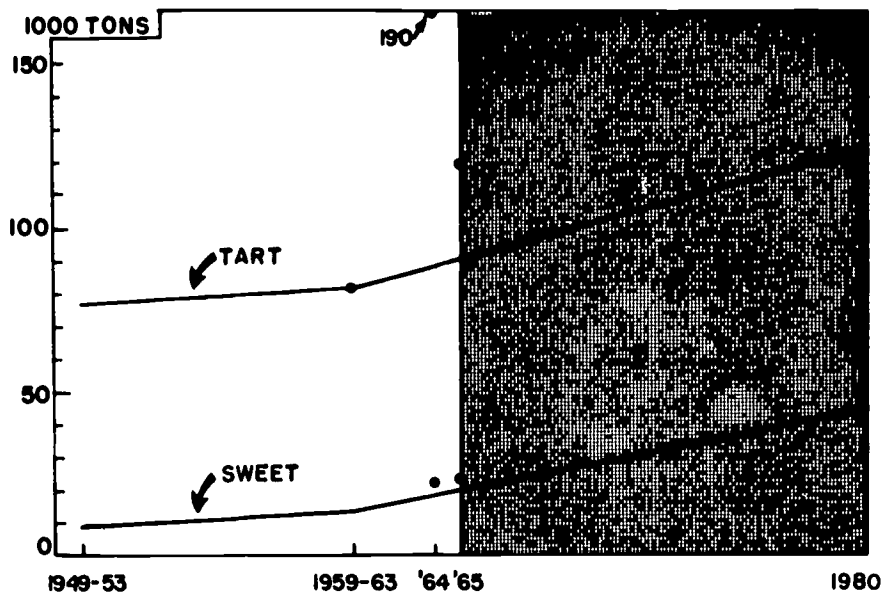

Fig. 26. Production of tart and sweet cherries in Michigan, 1949-53 average, 1959-63 average, 1964, 1965 and projected to 1980.

processing should benefit Michigan over some of the other peach states.

Tart Cherries. In 1980, Michigan will likely be producing an average tart cherry crop of 125,000 tons, 50 percent more than in 1959-63 (Fig. 26). This amount will probably be produced on 35,000 acres, about the same as in 1960. As orchards are removed from poorer sites and growers adopt new cultural technology, yields should increase from 2.0 tons per acre in 1959-63 to 3.5 tons by 1980. This should help reduce part of the excessive year to year fluctuations in production.

Michigan is expected to continue to increase its share of the U.S. tart cherry output, from 60 percent to about 70 percent during the next 15 years.

Sweet Cherries. Sweet cherry production is expected to increase sharply in Michigan from 13,600 tons in 1959-63 to about 42,000 tons by 1980 (Fig. 26). Improved rootstocks, varieties and cultural technology may result in increased yields from the 1959-63 average of 2.1 tons per acre to 4.5 tons per acre by 1980. This would mean bearing acreage would increase from the present 7,000 to about 10,000 acres.

Even though Michigan has improved its competitive position in sweet cherry production, other areas have extensive new plantings and imports of brine cherries may capture part of the market. Michigan is likely to about hold its own with other areas of production. Most of the sweet cherries go for processing. Briners and canners have a good source of excellent quality cherries in Michigan and are highly competitive with other U.S. processors. Improved fresh market varieties and changes in harvesting and handling methods would help Michigan compete with the quality packs of the West.

Plums. Plum production will probably double in Michigan in the next 15 years for several reasons. A high proportion of the present trees are under 10 years of age. Yields should increase from the 2.2 tons per acre in 1959-63 to 3.5 tons by 1980. Mechanical harvesting and bulk handling will greatly increase and make plums more competitive for fresh market and for processing. The demand for processed plums, particularly for baby food, will continue to increase rapidly between now and 1980.

Michigan should be producing an annual crop of 17,500 tons on 5,000 bearing acres by 1980, compared with 7,340 tons on 3,300 acres in 1959-63 (Fig. 27). Because of Michigan's location advantage, its share of the national plum output should increase somewhat.

Grapes. By 1980, Michigan should be producing about 95,000 tons of grapes on about 25,000 acres, compared with 51,200 tons on 22,400 acres in 1959-63 (Fig. 27). Yields should increase from the recent 2.28 tons per acre average to about 3.5 to 4.0 tons.

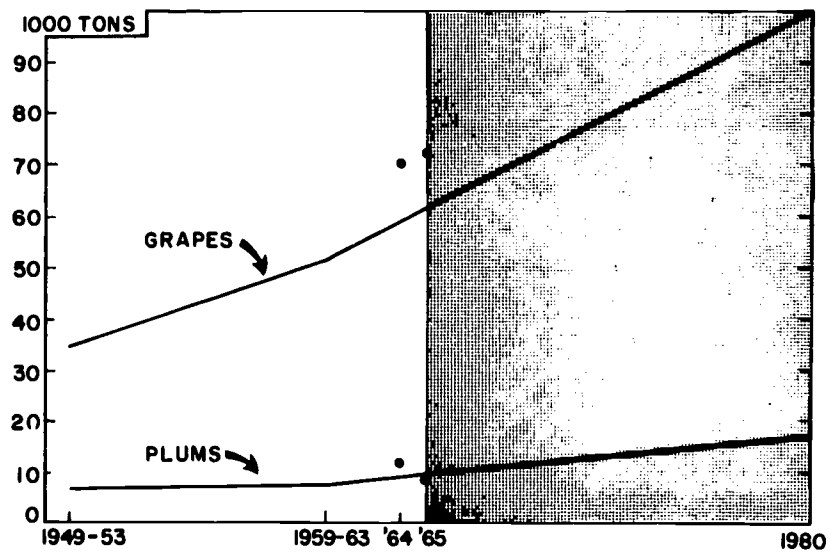

Fig. 27. Production of grapes and plums in Michigan, 1949-53 average, 1959-63 average, 1964, 1965 and projected to 1980.

Michigan's share of the juice industry will continue to expand, but the fresh and wine markets will continue to be dominated by California. New systems of pruning and trellising may be in use by 1980 and cut costs by 50 percent. Mechanical harvesting and bulk handling will also sharply reduce harvesting and handling costs.

Strawberries. The future of strawberries is more uncertain than most other fruit crops, but Michigan will probably produce about the same proportion of the U.S. output as in the recent past. This would increase Michigan's output to 50 million pounds in 1980, 33 percent more than in 1959-63 (Fig. 28). Yields would be expected to increase to 8,000 pounds per acre from the recent 3,780 pound level. This would reduce total acreage to 6,000 to 7,000 bearing acres compared with 9,440 acres in 1959-63.

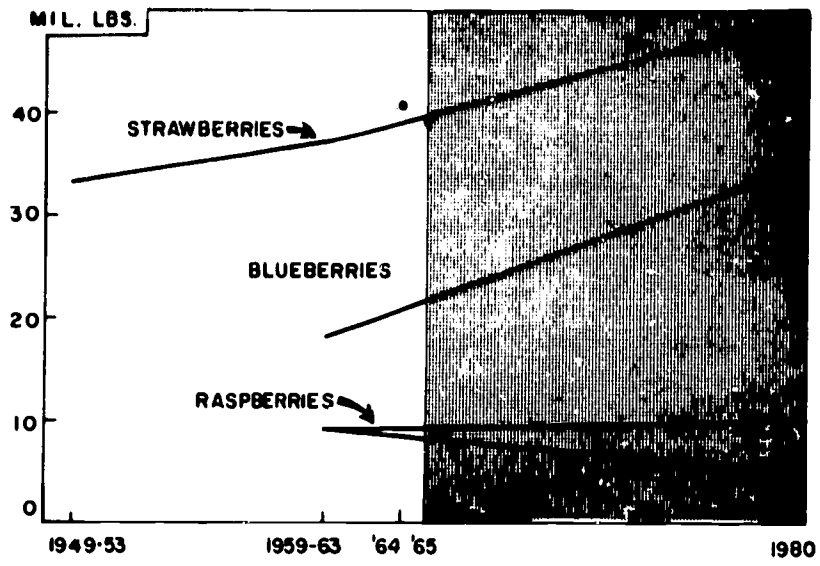

Fig. 28. Production of strawberries, blueberries and raspberries in Michigan, 1949-53 average, 1959-63 average, 1964, 1965 and projected to 1980.

Michigan's position in the strawberry industry has been maintained by its closeness to fresh market outlets and by its good freezing outlets for one-third of the crop. The West Coast and Mexico have improved their position by strong variety and cultural development programs and improved processing technology. A strong variety program could improve Michigan's competitive position.

Blueberries, Raspberries and Other Fruit. Blueberry production in Michigan will probably increase 25 to 50 percent from the present 18 million pound level (Fig. 28). The development of suitable varieties may also lead to some expansion in the Upper Peninsula. Most of the increase will be due to increased acreage as little change in yield is expected. Most of the crop will be mechanically harvested.

Unless new disease-free, highly productive varieties and mechanical harvesting are developed, commercial raspberry acreage will decline 50 percent or more in Michigan.

Apricots may become a commercial crop in Michigan by 1980. If presently available and/or future varieties prove satisfactory, at least 1,000 acres could quickly come into production. There will likely be little increase in commercial production of other crops, but limited quantities of several brambles, etc., will continue to be produced.

Vegetables (including Melons)

U.S. Consumption

Vegetable consumption measured in farm weight equivalent is likely to increase slightly on a per capita basis. This increase will generally be in the processed rather than the fresh product. Within the vegetable group, preferences are likely to be volatile and differences in trends among commodities great. Vegetable prices, on the average, are expected to fall relative to the general price level, with salad vegetable prices about steady and other vegetable prices dropping more than 5 percent.

Salad vegetables are an exception to the general trend toward declining fresh consumption. Prices are likely to be stable but, as is especially true for all vegetables, the supply side may alter price projections. Prepared salads offer interesting possibilities for a greater variety of salad ingredients. Minor ingredients may be added that are not commonly used in the home – unusual lettuces and specialty crops.

Lettuce consumption is now over 20 pounds per person and will increase further with rising incomes and increased consumer preferences for steak and salad. The projected increase is about 10 percent with increased emphasis on a variety of lettuces.

Cabbage will probably exhibit a downward trend. Fresh use will decline slightly. Lettuce salads tend to displace cabbage salads as income increases. Consumption of processed cabbage (sauerkraut) will fall.

Tomato consumption in fresh form will be stable but with consumption more evenly distributed over the year. Summer consumption will appear to fall as fewer tomatoes are home processed, but will be nearly stable in terms of table use. Winter tomato consumption will increase because of rising incomes and improved technology, which will provide a better quality salad tomato during these months. Tomato consumption could increase if the winter tomato is of sufficient quality and reasonably priced. Tomato use in processed form will probably increase sufficiently to offset any decline in summer use of fresh tomatoes. Tomato products are often used to complement beef, which is expected to substantially increase in consumption.

There is a whole list of green and yellow vegetables including broccoli, brussels sprouts, snap beans, lima beans, peas, carrots, squash, peppers, etc. Consumption of these in fresh form is likely to decline while consumption in processed form is projected as unchanged to slightly higher. Freezing will increase more rapidly than canning in both percentage and total terms. Consumer preferences are likely to be quite volatile. Increased emphasis on prepared foods will result in increased consumption of the more common vegetables: carrots, peas, and beans. Processors will want volume and will standardize menus around commonly preferred vegetables.

Other vegetables include corn, cucumbers, beets, cauliflower, eggplant, garlic, onions, etc. Consumption of other vegetables will likely decline in both fresh and processed form. These vegetables have a small income elasticity and are generally less preferred than salad vegetables.

Per capita consumption of cucumbers may remain near current levels as an increased quantity of fresh cucumbers is used in salads. This will likely be a year-round demand. This increase presumes a trend toward prepared salads.

Onion consumption may increase slightly if processed products are readily available and acceptable to consumers. If not, consumption will fall. Onions have a quite small response to income changes. Price response on the part of consumers is not large but processors may respond to changing onion prices by reducing their use of onion in their formulas for prepared meals or dishes.

Celery consumption will continue its downward trend unless it gains acceptance in prepared salads.

Corn consumption in fresh form may increase if some of the preparation function can be transferred to a processor without lowering quality. Corn probably has a positive income elasticity but consumers appear to prefer more convenient foods. Consumption will likely fall unless the preparation can be transferred from the home.

Beets and cauliflower are likely to continue their downward trend in per capita consumption.

Cantaloupe consumption will likely increase since the income elasticity is probably positive and large. Cantaloupe may become important as a summer breakfast while coffee, rolls and juice become important winter breakfasts.

Watermelon consumption appears to decline with increasing incomes, and a trend to other desserts also supports a projected decline in watermelon consumption.

Production (55)

The value of vegetable crops has been increasing in Michigan and in 1964 reached $47.5 million. Since 1949, Michigan has held its place with other states in the production of vegetables for the fresh market and has outgained other states in the important processing market.

Fresh market production is projected to increase from the 1959-63 average of 624 million pounds to 874 million pounds by 1980. Production for processing is expected to double from 596 million pounds in 1959-63 to 1,106 pounds by 1980 (Fig. 29).

Perhaps the key to the rather optimistic outlook for the vegetable industry in Michigan will be the development of mechanization. By 1980, three-fourths of the vegetable acreage will be harvested mechanically compared with one-fourth in 1959-63. In the case of some crops, it is assumed that Michigan will

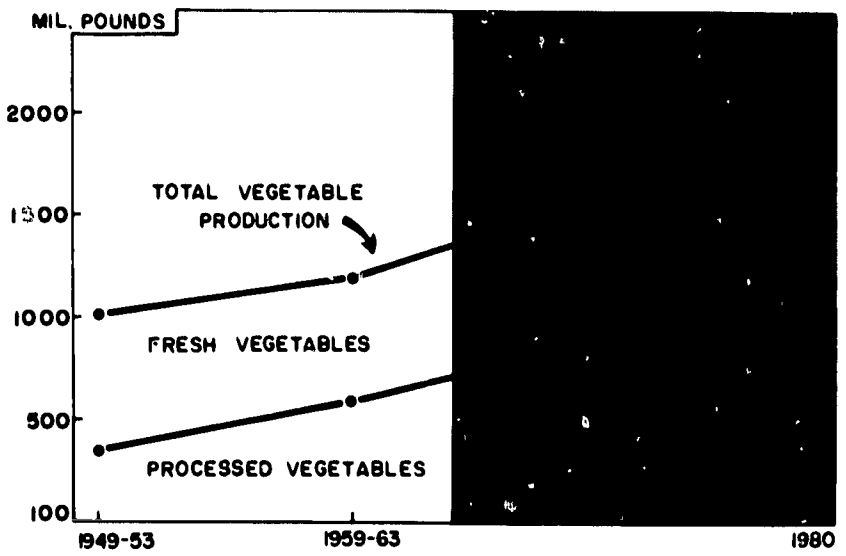

Fig. 29. Production of vegetables in Michigan, 1949-53 average, 1959-63 average and projected to 1980.

attract some large processors into the state. Such processors will likely pack several items.

Production of asparagus, snap beans for processing, lima beans, carrots, pickling cucumbers, lettuce, peppers, and sweet corn for processing is expected at least to double between 1959-63 and 1980. A modest expansion in output is predicted for red beets, cabbage, slicing cucumbers, cauliflower, celery, muskmelons, onions, green peas and tomatoes. Production of fresh snap beans is expected to decline and fresh sweet corn will hold about steady.

Total acreage in vegetables will remain at about 111,000 acres as yields per acre increase sharply. Improved varieties, chemical weed control, closer spacing, irrigation, and more widespread application of improved cultural practices will contribute to increasing yields.

How rapidly the Michigan vegetable industry will grow will be greatly dependent upon the ability of growers, processors, researchers, and educators to work together for the common good of the industry.

Bees and Pollination (48)

Beekeeping is in danger of serious decline because of uncertain honey markets, reduced numbers of new beekeepers, industrialization, urbanization, and periodic bee losses from pesticide poisoning. Bees are indispensable in the commercial production of several of Michigan's important crops, including apples, tart cherries, blueberries, cucumbers, and other fruit and seed crops.

If the downward trend is to be corrected, positive steps must be taken to encourage the industry. This can best be accomplished through expanded research and extension; increased bee pasture; reduced damage from pesticides; and advertising support to encourage honey sales.

Marketing and Processing (31)

During the period 1959-63, the estimated total production in Michigan of fruits, vegetables and potatoes was 3,233 million pounds; of this, 56 percent was sold fresh and 44 percent was processed. By 1980, total production will double to 6,344 million pounds and about 60 percent will be processed. Total fruit, vegetable and potato processing will about triple by 1980.

Production of fruits, vegetables and potatoes for fresh market will also increase, but not at the rate projected for processing. By 1980, total production for fresh market is projected to be 2,511 million pounds, 39 percent greater than the 1,804 million pounds for 1959-63.

Fresh Fruits, Vegetables and Potatoes

The number of firms specializing in packing and shipping fresh fruits and vegetables in Michigan is rapidly decreasing, even though the total volume shipped is increasing. Further, business is becoming concentrated in a relatively few large firms. As production becomes highly specialized and more concentrated, the opportunities for effective group action rapidly increase. Thus, by 1980 many of the fresh fruit and vegetable crops will have only one or two major sales agencies. In the case of the minor crops, one or two sales agencies may handle nearly all of several commodities.

The importance of farmers' markets has been decreasing for some time and is expected to continue to decrease. The decreases in these markets have been attributed to the increased by-passing of these markets by chain store and other large-volume buyers who buy direct from grower-packer-shipper organizations.

Processed Fruits, Vegetables and Potatoes

Although recent data are not available, it would appear Michigan has not had the growth in value of products shipped that has occurred nationally in fruit and vegetable processing. While there has been a slight decrease in the number of establishments canning fruits and vegetables, the increase in value of products shipped has not been as great as that for the U.S. as a whole. The number of plants processing pickles and sauces has declined but the value of product shipped more than doubled between 1947 and 1958. Between 1947 and 1964, the number of establishments freezing fruits and vegetables increased from 13 to 33; no recent data were available on estimated value of shipments. The value of shipments in 1964 was probably well over $200 million. With the expected increase in processing by 1980 and with many products being processed to a much higher degree, the expected value of shipments by 1980 should be around $500 million per year.

In the years to come, small individually owned processing plants will face increased competition from large national companies. Perhaps by 1980 over half of the plants currently individually owned will be integrated into firms of national scope, either by merger, by contractual arrangements or by outright purchase.

With increased concentration and specialization and increased processing will come a tendency for increased grower-processor integration. Integration arrangements will probably be for a longer period of time than the current annual contracts for many vegetable crops. This does not necessarily imply that processors will own extensive acreages of fruit and vegetables or that growers will control a large portion of the processing operations.

Production areas can shift drastically when an industry changes from fresh to processed and also when processing technologies change. The many new processing technologies, such as dehydrofreezing, freeze drying, explosive puff drying, vacuum drying, foam-mat drying and other as yet undeveloped technologies, can and will cause shifts in many fruits and vegetables as extensive as the shifts caused by orange juice concentration and the production of frozen and dehydrated potato products. Some of these developments could be an advantage to Michigan; others could cause losses in complete enterprises.

Individual Crops

Michigan is becoming more competitive in apple processing, and, with aggressive leadership, Michigan could become one of the major apple processing states in the future. The tart cherry industry may face serious problems unless new products and other methods to increase demand and stabilize marketings are developed. It is believed existing problems can be overcome.

An increased supply of raw product of peaches, pears, prunes and sweet cherries for Michigan processors will improve their competitive position through greater use of plant facilities and increased ability to supply buyers with a full line of processed fruit products.

By 1980, Michigan potato production will about triple the 1959-63 level and at least one-half of the crop will be processed. Onions offer the greatest potential for increased processing of nearly any fruit or vegetable crop. By 1980, over 40 percent of the Michigan crop could be marketed in processed form.

Michigan has the potential for a much larger fruit

and vegetable industry, particularly the processing industry. The attainment of the potential, although conditioned by natural environmental and other locational factors, can and will be largely determined by human endeavor.

FARM LABOR (65)

Enterprise analyses suggest that a 40-percent reduction in farm labor requirements can be anticipated by 1980, compared with 1960. Poultry, livestock, field crop, fruit and vegetable enterprises will all require less labor, in spite of increases in output for many of these enterprises. The actual number of workers in the labor force will be reduced by approximately 60 percent from 215,000, the average number of workers from 1959 to 1963, to 89,000, the average number of workers expected in 1980.

Further mechanization, increased opportunities for nonfarm employment, and the social and legislative environment affecting the conditions whereby labor may be employed, will influence the structure of the agricultural labor force. The composition of the farm work force will consist of 50 to 60 percent fewer farm operators, 70 percent fewer family workers, 47 percent fewer hired seasonal workers, and 17 percent more year-round hired employees in 1980 as compared with 1959-63.

In 1959-63, 80 percent of the agricultural labor was supplied by farm operators and their families, and 20 percent of the labor was hired. Approximately one-third of the hired labor was supplied by year-round hired workers, with seasonal employees supplying approximately two-thirds of the hired labor requirements. In 1980, approximately 65 percent of the agricultural labor will be supplied by farm operators and their families, with approximately 35 percent being provided by hired employees – two-thirds of the hired labor input being supplied by year-round employees and one-third by seasonal workers. The greatest seasonal employment will occur in September as opposed to June, July, and August, the case in 1959-63.

The 1980 labor situation will be characterized by the following:

1. Well-trained year-round workers capable of coping with the increasingly complex tasks brought about by greater mechanization.
2. A sharp reduction in the number of interstate and foreign seasonal workers in favor of intrastate and local seasonal workers.
3. Shifts away from family work groups to all-male teams of seasonal workers.
4. Increased wages, better housing, and better working conditions in general for all agricultural workers as agricultural employers compete for labor in a labor market dominated by the nonfarm economy.
5. Improved farm labor management practices including training programs for all types of workers, and better supervision of workers as employers attempt to upgrade the quality of labor and step up labor productivity.

FARM MACHINERY AND EQUIPMENT (80)

A key alternative to rising labor costs on Michigan farms will be a continuing substitution of capital for labor. The best farm operations will improve labor efficiency by 15 to 25 percent in the next 15 years through improved equipment and the adjustment of feeding and livestock practices so as to enable mechanization to do a better job. Low efficiency farms may have to improve the productivity of labor by at least 100 percent to stay in business.

The number of tractors in the over-50 horsepower class will continue to increase as farmers demand more power to do more work in a shorter time. Tractors in the over-100 horsepower class will be much more common. The trend toward diesel tractors will continue, and the conventional internal combustion engine will become more efficient. Research is progressing on new engine types, including the gas turbine. It is doubtful, however, if tractors with new or exotic engines will appreciably replace the conventional power units by 1980. Considerable advancement is expected in tractor transmissions, with wider use of hydraulics. The use of electricity for the control of implements and to drive tractor-mounted or -trailed machines may be available by 1980.

The use of garden tractors and small motor tillers is expected to become more popular on Michigan farms primarily for odd jobs.

The total inventory of farm equipment on Michigan farms will change somewhat due to declining numbers of farms and the trend to larger units. Numbers of pickup balers, side delivery rakes, corn pickers, grain drills, mowers, and manure spreaders will decline. Little change is seen in the numbers of machines such as corn planters and hammer mills. On the other hand, forage harvesters, power elevators and liquid manure handling equipment will be increasing between now and 1980. The number of moldboard plows will decrease, but the number of plow bottoms will increase.

Implements and Practices

By 1980, most farm machines will be larger in size to match the trend toward larger tractors and to help meet the increased production requirements of large farms. There will be a continuation of the trend to

self-propelled implements, some of which will have quick-detachable units for multipurpose application.

Minimum tillage practices now commonly used on corn will spread to many other crops. Planting of most crops will be done with high-speed, precision planters. Current thinking among research workers is that seeds will be planted in a more closely controlled environmental situation, possibly by the use of tape.

The use of chemicals in weed control will continue to gain in popularity. Because of possible toxic and residual effects, however, it is doubtful that the use of chemical herbicides will completely replace mechanical cultivation methods by 1980. Flame cultivation shows considerable promise, and by 1980 it may be in use on some Michigan farms, particularly on certain fruit and vegetable crops.

New methods of high-speed mowing and preparing hay crops for baling will be commonplace. Haylage or high-moisture hay stored in upright silos is gaining in popularity due to the reduced labor requirements for harvesting and ease of mechanizing feeding operations. Hay wafering also offers possibilities for reducing labor requirements in harvesting, and appears to offer possibilities for mechanized feeding.

Sprinkler irrigation equipment will be used for irrigating nearly 100 percent of the potato crop by 1980 and will be used extensively in fruit and vegetable production.

Major changes in the mechanization of fruit crops will be in harvesting and handling methods. With certain crops, the development of mechanical harvesting equipment is essential if Michigan farmers are to continue to compete.

Spraying equipment will continue to increase in size, and spraying from airplanes will be more widely practiced. The development of refined and precise metering devices is expected to increase the use of concentrated spray materials, including zero dilution. Mechanical aids for pruning fruit trees will be in common use as will artificial thinning of fruit set. As chemical thinning techniques are perfected, these may gain in popularity over mechanical thinning.

Vegetable growers will tend to specialize in one or two crops, thereby utilizing more highly refined special-purpose equipment and specialized techniques. Mechanical harvesters will be used on all vegetable crops. Experiments with once-over tillage, in which the top soil is removed and completely processed before being laid on the field, has shown promising results and may be practiced with selected vegetable crops by 1980.

Farm Equipment Dealers

The number of farm equipment dealers in Michigan declined from 1,016 in 1953 to 662 in 1965. It is anticipated that the number of dealers will continue to decline, and that by 1980 there will be approximately 400. Average sales volume per dealer will be around $550,000, or about 60 percent greater than in 1964.

Dealers will tend to locate adjacent to areas where farmers go for their other normal business transactions. There will be a tendency to concentrate farm service-type activities in one location, thus creating a type of farm equipment and service shopping center.

Future farm equipment dealers will be expected to provide more service, including advice on the ownership and use of equipment and farming practices in general.

FINANCING MICHIGAN FARMS (12)

As we review the factors affecting the total capital and credit needs of Michigan agriculture, we conclude that the total capital assets of Michigan farmers will increase moderately – from $4.66 billion in 1959 to $6.22 billion in 1980. There are several reasons. First, the expected increase in land prices will more than offset the loss of land leaving agriculture. Second, substitution of capital (in the form of larger machinery, equipment and labor-saving facilities) for labor will continue. Third, the increase in prices of production items will increase capital needs. This will be moderated but not offset by the reduction in number of farms.

Total credit needs of Michigan farmers are expected to increase even more than total capital needs, perhaps tripling between 1959 and 1980. There are a number of reasons for this. First, as operating expenses become larger, obtaining a given net farm income will require more credit. Second, continued rapid adoption of new technology will put a premium on "keeping up with the times." This need to adopt new technology – often before present technology is completely depreciated – will tend to increase credit use. The third reason is the continuing expansion in farm size. As farmers expand their farm size by purchase of nearby parcels of land, they often do so almost entirely with credit. Finally, the average repayment times on farm loans are expected to increase slightly. If average repayment times lengthen for both long term and short-intermediate term loans, as expected, there will be more credit outstanding, even if the original loans were the same size. These factors along with the increase in total capital point toward increased credit in Michigan farming.

On a per-farm basis, the change in capital and credit is likely to be much greater than for total Michigan agriculture. Farm size is expected to increase substantially – over 40 percent on the average.

Add to this the increase in land price from $224 per acre in 1965 to nearly $350 per acre in 1980. Then consider the increased investment in machinery, equipment and other labor-saving facilities, not to mention the price increases in these items.

The average farm is projected to have over five times as much credit outstanding in 1980 as in 1959. Real estate credit per farm may increase by over five times and non-real-estate credit per farm by nearly six times from 1959 to 1980. This would represent a change in the debt asset ratio on the average Michigan farm from about 12 percent in 1959 to 26 percent in 1980.

Sources

While a large increase in total farm credit in Michigan is projected to 1980, there should not be any particular difficulty in meeting these needs. However, such an increase in farm credit will mean loan funds will come increasingly from nonlocal sources such as insurance companies, correspondent banks, and bonds and debentures of the Federal Land Bank Associations and Production Credit Associations.

Along with this trend toward nonlocal sources of capital, there will probably be more attempts to bring into farming other forms of outside capital. Incorporation of farm units will likely receive increased attention as one means of drawing in such outside capital. A second type of outside capital may come from agricultural marketing or processing firms. These firms may purchase farm units as one means of controlling some of the raw product needed for their main business. Finally, it is expected that there will continue to be purchases of farm units by successful professional people as a form of investment.

It is likely that a great deal of capital will leave agriculture through the inheritance process when farm operators die and leave a major part of the farm capital to nonfarm heirs. While the farm corporation is one means of keeping this capital in farming, probably the lending agencies will be much more important as a means of recapitalizing agriculture.

Changes of the magnitude projected have many implications for Michigan lenders as well as Michigan farmers. Lenders will need to do a better job of evaluating loan applications and exercise increased supervision and guidance of their farm customers. By 1980, lenders will be much more concerned with the problems of estate planning, inheritance and orderly tranfer of the farm unit from one generation to the next. More services will be offered, such as record keeping.

As capital requirements increase, farmers will find it more difficult to obtain full equity in a farm operation within their lifetimes. Perhaps more attention will be given to rental of real estate and machinery as possibilities for controlling rather than owning some of the capital. Pressures will likely be exerted on lending agencies to provide loans with lower down payments – particularly on real estate purchases.

FOOD WHOLESALING AND RETAILING (64)

Food retailing will be undergoing great change during the next 15 years. Population and income projections for Michigan for 1980 prophesy a retail food sales volume some 75 percent larger than the $2.6 billion estimated for 1963. The market structure of food retailing will be characterized by more corporate and affiliated food groups, increasing store size, and increasing integration between retailers, wholesalers and manufacturers. Trends in market concentration are likely to place approximately 75 percent of the state's total food sales in the hands of about 12 organized groups or chains by 1980.

Food store numbers in Michigan were reduced approximately 10 percent from 1958 to 1963 and this reduction will likely continue at least through the decade of the 1960s. Retail units lost during the past five years were mainly small food stores and specialty shops whose volume has been taken over by modern up-to-date supermarkets. Store numbers will tend to level off during the 1970s, and there is some likelihood that we may even see an increase in store numbers by 1980.

The era of the small wholesaler has been replaced by the corporate and/or affiliated wholesaler who, through merger or affiliation, has become an important economic force in the distribution system. Modern technology such as electronic warehouses, automation and electronic data processing, place bigness as an important criterion for the successful wholesaling operation. The number of wholesaling firms in the state is expected to drop by one-third by 1980 due principally to integration factors and increasing business failure. The number of certain types of wholesaling operations, on the other hand, will undoubtedly increase.

Number of products handled by wholesalers and retailers in the next 15 years is likely to continue upward. It is estimated that the total number of products handled at one time will increase by 50 percent in the next 15 years, with the average supermarket stocking 11,000 to 12,000 items. New products will be introduced at a much faster rate than in the past and these products will undoubtedly have a shorter market life.

Product specification will receive a great deal of attention in the next 15 years. Integration of the

wholesaling and retailing functions places great emphasis on "buying to sell," which means products of consistently high quality. Food products will have to meet tighter and more specific grade or quality standards if they are to be successfully marketed.

The modern supermarket will stock a wider variety of food products as well as provide more consumer services and expanded service departments. Upgrading the supermarket operation is likely to reintroduce such customer services as order-by-telephone, home delivery and an ever-increasing variety of ready-to-serve foods – to on-premise sale as well as for "take-home" patrons. Retailing margins will continue to rise in supermarkets, providing more product variety and service.

Food discounting is likely to continue to have impact on the food business in this country. Food discounters – offering a limited variety of products and brands, no stamps and limited customer service – will provide customers with a choice on where they spend their food dollars. In most areas of the country, food shoppers will be able to choose between traditional supermarkets featuring wide product selection, quality and service and the discount operation with its lower prices, less service and limited variety. Food discounting will not take over the retail food business, but it will be a significant factor in the overall food distribution system in the United States.

Another concern that change in the next 15 years will necessitate for the food industry is the trend towards automation and advanced technologies. Tremendous increases in capitalization will be required by good organizations and the question of whether present returns to capital will allow for this needed capital expansion will have to be answered.

Food distribution must begin to give more attention to new products – and even more to new equipment and new processes. There is need to closely scrutinize how food products will be received, handled and distributed to retail outlets. Of equal importance is how the consumer will shop for food.

Closer integration and/or cooperation between food distributors, manufacturers, processors and producers is definitely going to be needed.

NURSERY INDUSTRY (18)

The nursery industry is very diversified as it includes wholesale production, landscape construction, retailing (including garden centers), mail order and maintenance. The number of nursery licenses issued by the Plant Industry Division of the Michigan Department of Agriculture doubled between 1940 and 1950 and more than doubled between 1950 and 1960. The Census of Agriculture estimated the wholesale value of Michigan's nursery products to be nearly $8 million in 1964, an increase of 22 percent over the sales in 1959.

Approximately 75 percent of the nursery stock sold at the retail level in Michigan is produced outside of the state. For many species of plants, Michigan growers are finding it more economical to buy them from out-of-state sources because 1. many plants in the juvenile stage grow better under certain climatic and soil conditions not found in Michigan; 2. labor costs are lower in certain states; 3. packaging and shipping methods have improved; 4. the recent rapid increase in landscape construction in the Lake States has depleted the supply of locally produced nursery stock; and 5. there is more progressive management in out-of-state nurseries. This trend is likely to continue, with the net effect that Michigan's share of the total U.S. nursery production will decline, unless freight rates were to increase sharply, interstate wage regulations were to increase or management were to become more progressive in Michigan.

Landscape construction firms have increased in number and size since World War II, closely paralleling the boom in residential construction. They have also been favored by the new trend in industrial landscapes and highway landscaping. Landscape maintenance companies have experienced a similar growth for similar reasons. In addition, Dutch elm disease has expanded the business of custom spraying and tree removal.

The retail phase of the nursery business has also experienced excellent growth, not only as outlets for plants but as garden centers with a complete line of products and services for outdoor living.

Technological improvements will include machines that dig and effectively package plants; palletizing or unitizing of plants for transport, storage and wholesale sale; vacuum cooling of plants; growth regulators; new plants from hybridization; and progress toward control of Dutch elm disease and oak wilt.

It is impossible to project, with any degree of validity, the value of Michigan's nursery industry by 1980. There are at the present time no data as to the past or present value of the landscape construction, retail, mail order or maintenance phases of this industry.

Although income from wholesale production will increase in Michigan, it is not expected that it will increase as rapidly as in some states located more favorably from an ecological position.

Landscape construction and landscape maintenance should experience a substantial increase as a result of the increases in population, leisure time, affluence and educational level of the society in 1980, and due to the great emphasis on natural beauty.

Garden centers should also experience substantial increases in sales. However, they are likely to be of two distinct types. One group would take the form of a franchise-type operation: large, self-service, and dealing in small, packaged units that can be taken from the store in the family car. The other will be much smaller; it will specialize in personal service and carry a more select line of merchandise.

FLORICULTURE (40)

The wholesale value of floriculture crops grown and sold in the state of Michigan increased from $10 million in 1954 to $14 million in 1964, according to the Census of Agriculture. Floriculture in Michigan includes the production of flowering and foliage plants, bedding plants and cut flowers under glass; the production of cut flowers in the field; the production of bulbs, tubers and corms such as tulips, gladioli, dahlias and a few others; also the production of biennials and perennials for sale to home gardeners.

Sales by retail florists in Michigan amounted to $33 million in 1963, some 50 percent over 10 years before. Retail florists in Michigan as well as in other parts of the U.S. have been able to maintain their share of the consumer's purchasing power. In 1954, 1958 and again in 1963, Michigan consumers spent about $2.00 out of every $1,000 of disposable income on the products of retail florists. This augers well for the long term outlook of an industry that has been experiencing about a 5 percent per year growth rate.

Because of more favorable climatic and labor conditions in other areas, and because of greatly improved transportation, Michigan growers have been confronted with increasing competition from other states, particularly California, Florida, Colorado and Arizona. Without question, Michigan will soon be confronted with greatly increased competition from foreign growers. Improved transportation via jet cargo in combination with trans-Atlantic freight rates favoring east to west traffic, low import duties in the U.S. relative to other countries, and low labor costs in foreign countries, intensify foreign competition.

However, there are indications today that were not evident 10 years ago that the midwestern grower may be in a favorable position to supply the eastern and midwestern flower markets in the years to come. For example, California and Florida growers are being forced into higher cost facilities. While growers in these and other states may have many advantages, climatewise, over midwestern growers, effective management coupled with well-organized and expert marketing can make it possible to retain a sizable business in this area.

New technology could also play a vital role — greater use of plastic materials, mechanization in heating, ventilation and watering and complete automation.

There is a distinct indication that the number of small operations will decrease and that the larger ones will grow larger. Larger operators tend to have superior management ability, and are in a better position to obtain financing, purchase modern equipment and hire specialists within their organizations. They are better able to improve marketing techniques.

A key factor in the floriculture outlook in Michigan is labor efficiency.

Chapter III. Natural Resources — Now and in 1980

USE OF LAND AND WATER RESOURCES (6)

Michigan embraces approximately 62 million acres — surface land accounting for 36.5 million acres; area in the Great Lakes amounting to 24.7 million acres; and inland lakes and ponds covering some 0.8 million acres. Michigan has 3,121 miles of shoreline on the Great Lakes and 36,350 miles of inland streams. The state can boast of 35,068 lakes and ponds that cover more than one-tenth of an acre, and 6,516 cover areas of 10 acres or more.

Major changes have taken place in the use of Michigan's land and water resources with the settlement and development of the state. Population increases and economic growth have brought new demands and practices that have caused an ever-changing resource use picture.

Land

Of the total 36.5 million land acres in Michigan, 14.8 million acres were in farms in 1960 compared with 18.0 million in 1940. By 1980, land in farms is expected to decline to about 10.0 million acres. Some of the acreage that will shift out of farms will be used for urban purposes and highways. The bulk of the disappearing farm area, however, will shift to the forest and recreation classes. Forests will claim numerous farm woodlots and, over time, many abandoned farm fields. Much of the remaining land can be viewed as potential recreation holdings with primary values as wildlife and hunting areas and as seasonal headquarters for vacationers and hunters.

Current open space, park, and recreation area programs call for the acquisition and development of numerous rural tracts for these purposes by 1980. Well over a million additional acres will probably be acquired for these public uses. Smaller increases may be expected for the areas incorporated in state and federal forests and in public wildlife areas. Increases might also be expected in the area of privately owned forest and recreation land. Many of the areas reported as private forest lands in the past, however, may well shift to classification as private recreation holdings.

A net decline is expected in the area of other rural land uses. Highway department plans call for expansion of the areas occupied by highways and roads from 872,000 acres in 1960 to 1,007,000 acres in 1980. A more modest increase may be expected in the acreage required for rural industrial and service areas. The increases will be more than offset by a substantial reduction in the residual acreage of miscellaneous and idle lands.

Most of Michigan's population now live and work in metropolitan communities. But while a great majority of our people are tied to urban sources of income, the travel constraints that once tended to keep cities small and compact in area have been broken. Higher worker incomes, widespread ownership of automobiles, the construction of all-weather roads, and the lure of suburban living have made it both practical and pleasing for workers to live miles from their places of employment. Thousands have joined in the suburbanization movement, and in the process much of our rural landscape has given way to patterns of urban sprawl and scatteration. The shift to urban land has accelerated in recent years.

As of 1961, about 1.7 million acres were classified as urban and suburban lands. If recent trends continue, as much as 4 million acres could come under this classification by 1980. However, much of the 1.7 million acres in urban and suburban land in 1961 was being held for speculation and not really needed at the time. A substantial part of the emerging demand can be met by these lands. Even so, significant additional acres will shift from agriculture to an urban classification during the next 15 years.

The total area that will be used for urban and suburban purposes by 1980 can be as low as 2 million acres if zoning, subdivision regulations, and other public policies are used to discourage the movement of additional areas to this use. On the other hand, with no restrictive policies, the continued outward sprawl of our cities can require as much as 3.5 million acres for urban and suburban use. A conservative middle-ground approach suggests that around 2.5 million acres of urban and suburban lands can be expected by 1980.

An overall view of Michigan's land use situation in 1950, 1960 and projected to 1980 is presented in Fig. 30, and in Table 9 in the Appendix.

Water

Michigan has a bountiful water resource base, but population growth plus rising per capita and industrial demands for water will create water shortage problems in many areas within the next quarter of a century. These shortages will necessitate the expansion of municipal water systems and more cities will lay water supply conduits to the Great Lakes. Other

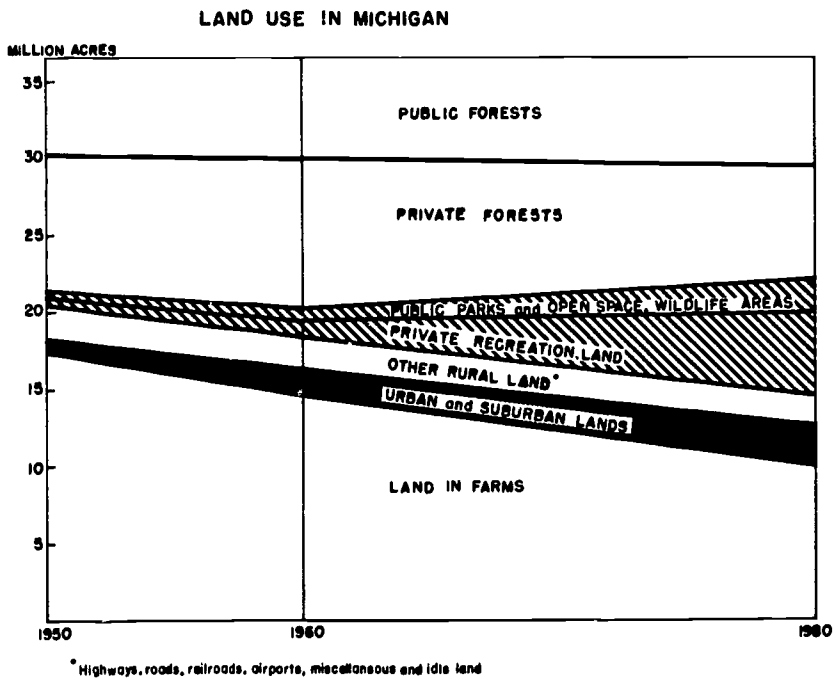

Fig. 30. Land use in Michigan, 1950, 1960 and projected to 1980.

aspects of water shortage problems will appear with low lake and stream levels; losses of recreation, navigation, and power values; shortages of water for irrigation; and inadequate supplies for the dilution of sewerage effluents.

Supply problems can be expected to contribute to higher water supply costs. Stream impoundments will be used to augment low flows. The problem of low water levels on the Great Lakes may be handled in part by the diversion of Canadian streams into Lake Huron. Questions of legal rights to the use of limited water supplies will test our concept of riparian rights and may prompt adoption of a permit or license system.

Pollution and waste disposal practices will be subject to tighter controls. Technical improvements can be expected in the handling of wastes. Treated waste waters will by cycled for re-use in many industries and cities.

Public interest in water problems will expand and the state can be expected to assert increasing powers over water use. These powers will apply not only to securing adequate supplies of potable water and to minimizing pollution but also to safeguarding recreational, wildlife and esthetic values.

OUTDOOR RECREATION AND TOURISM (51)

Michigan is recognized widely as a leader in outdoor recreation and tourism. Its role in this rapidly growing industry is being affected by a pronounced shift in clientele – from the traditional elite vacationers and North Woods outdoorsmen to predominantly urban middle-class families. While Michigan's location and resources provide many comparative advantages toward attracting visitors, there are significant natural disadvantages and repositories of older facilites and attitudes inappropriate for modern market conditions.

About half to two-thirds of Michigan's tourist market is composed of residents of the state. The remainder of the market is almost entirely from the immediately surrounding states and Ontario. The East and mid-South offer important competition for this regional market. With proper quality of development, Michigan may well be able to lure cross-country travelers.

Of the factors influencing the future of this industry, the population of the prime market area is the most important. The population of the East North Central states as well as Michigan is expected to increase 25 percent between 1965 and 1980. Adding on the effect of increased income, leisure time and mobility, an optimistic projection would be that future demand for visits to Michigan's recreation areas would triple by 1980. At the other extreme, the expansion may not be much greater than the growth in population as indicated in one of the projections made by the authoritative Outdoor Recreation Resources Review Commission (ORRRC). An alternative projection by ORRRC indicates a possible growth in visitor days of 58 to 71 percent and in visitor expenditures of 84 to 110 percent, provided Michigan maintains its share of the national market.

The greatest shifts in land use are likely to be in areas relatively accessible to the metropolitan populations. The total adjustment in land use, though massive absolutely, generally need not involve critical adjustment problems. Much larger shifts are foreseen with regard to private recreation lands, which may grow from the presently estimated 1 million acres to 5 million acres by 1980.

The public sector can most strongly influence the future pattern of development in Michigan's outdoor recreation and tourism in two major ways: *indirectly* through regulation of activities, such as careful zoning, and *directly* via public development of scenic roads, parks, regional interpretive complexes, etc., that complement nearby private developments. Above all, the quality revolution in facilities that is already upon us will reward far more massive and creative endeavors than have been traditional in the state. Following the lead of places like Colonial Williamsburg, impressive tourist complexes are being built with public and private funds in the East, South and West, as well as overseas. Imaginative programs appear crucial if Michigan is to maintain or expand its share of Upper Great Lakes tourism and outdoor recreation.

MICHIGAN TIMBER PRODUCTION AND INDUSTRY

Timber Production (34)

The prospects for Michigan timber production will be tied to the national trends presented in Chapter I, but certain features of Michigan will cause some differences in growth patterns. The prospects for major types of forest products have been analyzed (including maple syrup) and the results summarized in the following text and in Table 11 in the Appendix.

Sawlogs

Michigan lumber production has declined steadily since 1889 and in 1962 the output amounted to 319 million board feet, 1 percent of the nation's output. Until World War II, much of the decline can be ascribed to rapid forest destruction. But since World War II, the sawtimber inventory has improved and can sustain a much greater level of output than is actually being cut.

Extensive softwood plantations in Michigan are now reaching merchantable sizes. An increasing surplus of softwood sawtimber will become available over the next few decades in Michigan in contrast to a tightening of the softwood sawtimber supply nationally. For this reason, Michigan's share of the national output should increase slightly, and Michigan's output should increase by about 65 percent between 1962 and 1980.

Michigan's share of the hardwood lumber production has been declining and will continue to decline, slowly, in the next 15 years. But even so the actual output could well increase by 15 percent. Total soft wood and hardwood lumber output would thereby increase by a fourth in Michigan between 1962 and 1980 (Fig. 31).

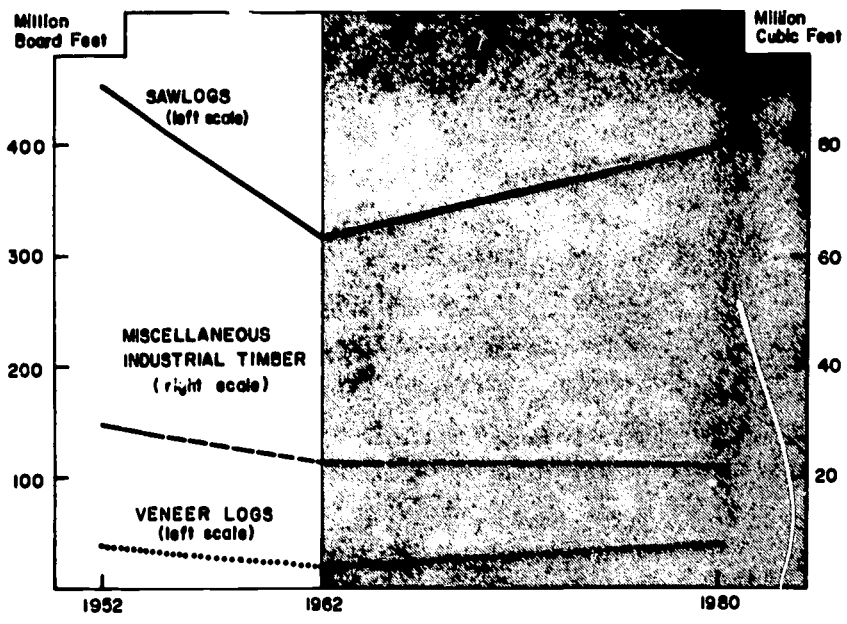

Fig. 31. Production of sawlogs, veneer logs and miscellaneous industrial timber in Michigan, 1952, 1962 and projected to 1980.

Plywood and Veneer

Production of hardwood plywood and veneer logs dropped sharply in Michigan in the postwar period. This reflected a scarcity of high quality logs, although comparative efficiencies in manufacturing units may have also contributed to the closing of Michigan veneer and plywood mills. If Michigan can maintain its share of the U.S. output, a doubling of production is possible by 1980. This would bring Michigan output back up to the 1952 level.

Pulpwood

Softwood pulpwood production in Michigan declined sharply right after World War II but increased in the past decade. With Michigan's softwood inventory expected to increase at a faster rate than nationally, and with softwoods generally preferred in the pulp industry, Michigan is expected to increase its share of the U.S. output by 1980. This would mean about 75 percent increase in softwood pulpwood output between 1962 and 1980.

Michigan pulpwood production from hardwood has increased rapidly in recent years along with the U.S. Michigan is expected to gain slightly on the U.S. in the next 15 years and expand output by three times the 1962 level. Total pulpwood production, both softwood and hardwood, would then be expected to increase by two to three times in the next 15 years (Fig. 32).

Nearly half of Michigan's pulpwood production moved out of the state in 1963, mostly to Wisconsin. Some pulpwood was imported from Canada. It is expected that imports will decline and that movement out of Michigan will increase, but will represent a smaller share of the total output.

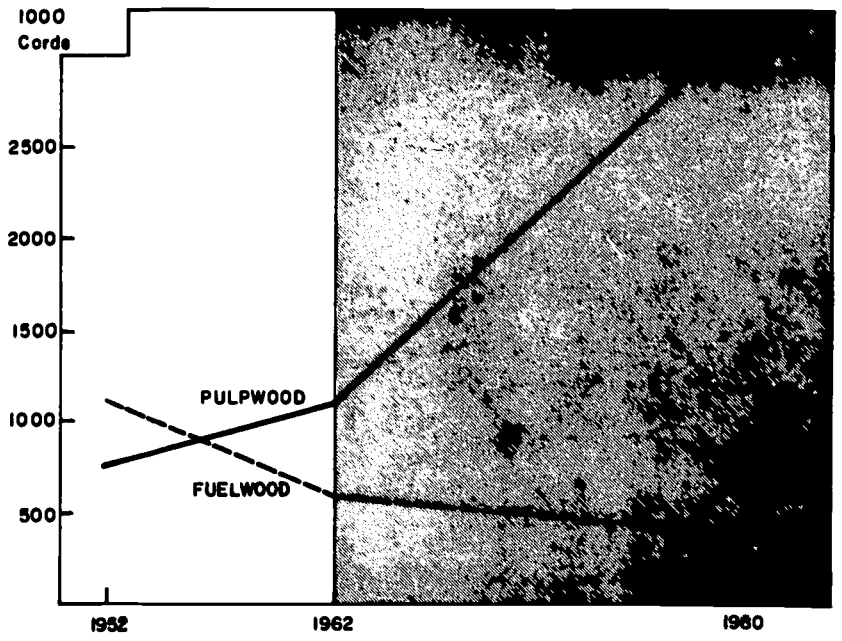

Fig. 32. Production of pulpwood and fuelwood in Michigan, 1952, 1962 and projected to 1980.

Another trend under way in pulp production is the increased use of chipped residues as raw material. This trend is expected to continue.

Miscellaneous Industrial Timber Products

Michigan's output of such products as piling, poles, posts, mine timber, excelsior wood, chemical wood, hewn ties, and turnery products is expected to be about the same in 1980, in the aggregate, as in recent years.

Fuelwood

Declining production of fuelwood is anticipated for 1980, but the rate of decline should be less than in recent years due to increased use in fireplaces.

Maple Syrup

Maple syrup production has declined in Michigan in the past decade. Only a small increase is forecast for 1980.

Christmas Trees

Michigan is probably the leading state in Christmas tree production, with nearly 10 percent of the U.S. output. Michigan is moving increasingly into the national market. The existence of extensive plantations in all size classes up to mature stands ensures the potential for considerable expansion in the number of trees moved out of the state. An increase to 12 percent of the national output by 1980 would mean a doubling in Michigan's Christmas tree production.

Value of Michigan's Timber Production and Manufactures

The value of raw forest products in Michigan would reach about $112 million by 1980 compared with $66 million in 1962, if the above projections are correct. This represents nearly a doubling in the value not including the effect of general inflation. In all likelihood, the value added by manufacturing will increase by an even larger percentage.

Employment

Employment in logging operations has declined by 50 percent in the past decade, but is expected to increase 20 percent by 1980. Worker productivity increased dramatically in the 1950s when the chain saw came into general use, but such gains are not anticipated in the next 15 years. Employment in forest management and protection will continue to increase. Employment in wood manufacturing industries is expected to increase by more than 25 percent in the next 15 years.

Timber Industry (89)

Wood products industries of Michigan are similar, in general, to national industries in the same categories. There are many dissimilarities, however, influenced or brought about by raw material, product, or market variances.

Generally, the lumber manufacturing firms in Michigan are quite small compared with those in the West and South. The raw material base, although extensive in Michigan, does not lend itself to conversion and utilization in the same manner that the softwoods do in the West and South. Employment and production in sawmills have declined to a low point, although an upward climb appears to be starting owing to the renewal of resource and the increasing demand for hardwood species available. Demand is strong for furniture, pallets, and industrial lumber. Michigan uses 10 times more softwood lumber than is produced in the state. Current production and marketing methods carried on by many small firms can be improved by assistance in technology and management.

The furniture industry has declined in importance in Michigan by comparison with its growth in other parts of the country, and employment in this industry accounts for a declining share of total state employment. The industry, with concentration in Grand Rapids, enjoys some benefits from the high quality products, but has some disadvantages. There is no evidence of improvement in employment and production in relation to national growth expected. The furniture industry operates under certain handicaps, such as inadequate production facilities, inefficiencies in marketing, and overdependence on individually operated lumber conversion operations.

The veneer and plywood industry has declined as the raw material base of old growth hardwoods has been reduced and the pressures of imports have increased. Michigan producers could improve their competitive position, however, by making greater uses of second growth timber in processes designed to take advantage of more efficient machinery and handling equipment. This industry also needs assistance in production technology and management and in marketing. The demand for products will grow as construction and remodeling requirements increase.

The pulp and paper industry has modified its operations and has added capacity to accommodate changes in the availability of raw material and increases in demand for paper and paperboard production. This industry has prospects for continued rapid growth. Raw material is available, but there are problems of developing more complete use of residue chips, of providing better control of raw material flow and of stabilizing employment in procurement.

Composition board manufacture is relatively new in Michigan. This industry should grow because of nearness to markets, increases in demand and availability of raw material. There is greater promise of growth in particle boards due to wider range of use that is yet to be developed and the lesser degree of competition locally and from abroad. Wooden pallets are in increasing demand and there is ample raw material for expansion in Michigan of this industry. Producers in Michigan have moved forward in production and in technology and management. However, there are major problems of low production and marketing efficiencies in many small firms. Growth of the industry is expected and this may be within larger, more efficient firms, in part.

Many other manufacturers of wood products in Michigan are included in mill-work, wooden containers, log cabins, and other product groups. Collectively, these manufacturers are of considerable importance as consumers of wood materials, employers, and producers of a wide variety of products. Although their total importance in the economy of the state is not well known and tends to be overlooked, there is growth potential for many of these wood products industries.

Wood products industries are closely related to construction. There are opportunities for developing greater markets in construction for wood products of Michigan. In order to develop market opportunities, work is needed on fastening methods, design of components, structural systems, and production and assembly methods leading to greater use of hardwood materials. Intensive research and development coupled with marketing efforts can lead to greatly expanded use of available wood material in construction.

COMMERCIAL FISHERIES (59)

The demand for food fish in the U.S. has followed population trends as the annual per capita consumption has remained at about 10.5 pounds. This was true even during World War II when red meat was rationed. Production of food fish in the U.S. over recorded history also generally followed population trends until about 1950, when it began to decrease. At that time imports began to increase markedly.

In the future, demands for variety in meat consumption could benefit fish consumption, and merchandising will have an important influence on trends in consumption. Many consumers believe that fish varies greatly in quality at the retail level. A uniform high quality product could capture part of the beef market and increase fish consumption. This increased demand may well be for fresh and frozen rather than canned fish. However, per capita consumption and prices are projected at current levels.

In the Great Lakes region there has been a slow but steady decline in fish production since 1890, from in excess of 110 million pounds to 70 million pounds in recent years. The reasons for the decline are economic since the total poundage of fish in the lakes is estimated to be considerably higher than in earlier years. Such familiar species as ocean perch, cod, whiting and pollock are caught in New England for from 3 to 5 cents per pound to the fishermen, are processed and transported to the Great Lakes area to compete successfully with locally caught fish. Canada also ships large quantities of fresh and frozen fish into the area. Industrial fish caught in both the Atlantic and Pacific Oceans and sold as animal foods, oils, fertilizers, etc., also provide serious competition to Great Lakes species used for industrial purposes.

Michigan's catch from the Great Lakes has been fairly constant in terms of pounds in the past 15 years, but the dollar value of the catch has decreased approximately 40 percent from 1948 to 1961. This decrease is largely due to a change in the composition of the catch; smelt, chubs and carp have tended to replace some of the higher valued species such as lake trout and whitefish. The problem the industry faces in the next 15 years is to reverse the trend to lower values of catch, or to lower the cost of production to a competitive level.

There are a few bright spots in the picture. Progress has been made in sea lamprey control and in the rehabilitation of the lake trout. Whitefish stocks also appear to be recovering. But these developments will not give quick relief to a weakened industry. Of immediate importance is the need for harvesting and processing the alewife – a species not considered suitable for human consumption but probably the most abundant fish in Lakes Huron and Michigan. The rapidly expanding pet food industry would absorb much of the increase in production.

In lowering costs, some possibilities exist in using otter trawls, although certain modifications will be necessary. Other innovations are available but have not been adopted.

Processing and storage facilities to help equate seasonal production and fairly constant consumption would assist the industry. But because of the nature of the industry in Michigan, it is more difficult to organize to coordinate marketing efforts than among the more concentrated coastal fisheries. However, it would be feasible to establish 4 or 5 processing and storage facilities in the state. At these locations, decisions could be made whether to ship the fresh fish, freeze or store them, or process and store them.

FUR BEARING ANIMALS (60)

A rising population and trend toward a more affluent society should expand the market for mink substantially, although this market is somewhat capricious – typical of fashions in women's clothes. The market has been kept vigorous by the introduction of new color phases when demand appeared to reach saturation for a particular color. In recent years, much mink has been used by the trimming trade for collars, cuffs, etc., as well as for coats, neck pieces, capes, stoles and jackets.

Some 5,700 U.S. ranchers (about half near the Great Lakes) produced 7.5 million kits in 1964, more than double the output 10 years before. Most of these ranches have fewer than 1,000 females; about a dozen have more than 3,000; and some have 20,000 or more. Wild mink trappings have stabilized at a little over 300,000 per year. Increased imports from Scandinavia have threatened the price structure on mink in the U.S. sufficiently to cause the industry to seek import controls.

Mink ranching has been a substantial industry in Michigan for many years because climate is favorable and food relatively inexpensive. Although Michigan's mink industry has not expanded as rapidly as in other areas in recent years, it should be able to compete. In 1980, it is assumed that the Great Lakes will continue to supply fish for mink food and that low value meat from meat and poultry processors will be available. More cereals and their byproducts will be used in future mink rations. Michigan has a substantial cereal industry that can supply any such demand.

Chapter IV.
Rural People and Rural Living—Now and in 1980

RURAL FAMILY LIVING (24)

The rural family, just as the products and services of the rural economy, will be making a number of adjustments in the next 15 years. Two important adjustments will be the increasing number of families in rural Michigan and the shift of families from farm to nonfarm employment.

The size of both farm and rural nonfarm families averaged about 3.83 persons in 1960. In the past, large farm families were the rule as the children were valuable members of the labor force. This is less true at the present time.

Incomes of farm families from farm and nonfarm sources combined will increase sharply. It is possible that farm families will average about $8,000 of disposable personal income per family by 1980, including off-farm income. Incomes of rural nonfarm families would be projected to about $9,000 on the basis of recent trends.

The economic and social differences between the farm, the rural nonfarm and the urban populations will wane. One of the reasons will be improved transportation and communications. Networks of excellent superhighways and modern all-weather roads have dramatically reduced the driving time from one part of the state to another. Practically all Michigan farms are within one mile of an improved road. Nearly all farm families own automobiles, trucks or both.

Advancements in transportation will continue to bring improvements in health care; in recreational, shopping and educational facilities; in economic opportunities; and in opportunities for social interchange. Radio and television have also contributed to the merging of rural and urban living patterns. This has been demonstrated in trends in food consumption, clothing and housing.

Clothing

Rural families, as others, will find an increasing range of clothing choices available to them by 1980. Textile research will center increasingly on the functional and aesthetic improvement of existing fibers, and less on the development of new ones. More products and processes for wearing apparel will be developed with a specific end use in mind, and desired characteristics will be increasingly built into fabrics.

As has been true throughout history, fashion plays an important role in clothing selection. Now, however, the trend is away from rigid fashion dictates that must be blindly followed toward the upgrading of individual taste. There are signs that the influence of Paris couture is lessening, and that we may increasingly rely on New York, California and Texas as fashion sources.

Housing

During the next 15 years, rural families will continue to live primarily in single family houses situated on their own tract of land. Urban families will be shifting more to high-rise and medium-rise apartments or to clustered houses with shared park areas. Land use is becoming increasingly intensive, and in time, land will become so scarce and so expensive that high density use will be inevitable.

The farm homestead will ultimately, though perhaps not by 1980, be replaced by some sort of manufactured house that can be assembled on the site. This will become necessary because local people are fast losing their technical skills, and urban builders prefer not to go into outlying areas to build. Mobile homes will come into greater use both for young couples wishing to live near their parents on the farm and for hired labor.

Houses on commercial farms will show continued improvement and very few will be without running water, indoor plumbing facilities and modern household equipment by 1980. The booming trend in expenditures for additions and alterations is likely to continue.

Trends in new homes in rural Michigan will follow those elsewhere – more prefabrication, shorter life expectancy, more electric heating, balanced temperature-humidity systems, plastic piping, custom-made packaged kitchens, and landscaping, and more attention to aesthetics and individual taste. Many household devices now in the experimental or limited use stage will be commonplace by 1980 – electronic ranges, thermo-electric refrigeration, ultrasonic equipment for cleaning dishes, and so on.

CHANGING ROLES OF FAMILY MEMBERS (13)

The family will continue to exist as the most primary group within society. Its stability, nevertheless, will depend even more than now upon the strength of its interpersonal bonds, rather than upon kinship loyalty or social pressures from without. Stability will also depend on how well the family

performs the personality functions still left to it. Though less reliant upon kinship, the family will be even more dependent than now on community supports and services.

Marriage, divorce and remarriage rates will remain high, as at present, but birth and death rates will both be lower. With increased leisure, earlier retirement, and an even longer life span, husband and wife will have more time together, especially after the children have left home.

Based on trends, sex norms by 1980 will be even further removed from the Judeo-Christian tradition than they are today.

The woman's position of power within the family will have further increased. Viewed generally, the family will be more equalitarian, with more decisions on a democratic basis. Not only will there be greater equality among family members, but fewer differences from one family to the next.

The urban family changed first and has moved the farthest; yet more recently the rural family has changed at a faster pace converging upon the urban family. By 1980, there will be even less difference than now between the rural and urban cultures.

RURAL YOUTH (7)

Change is the most important single word to identify rural youth today and in the future. Among the changes facing rural youth will be education, position in society, value systems, and patterns of leadership necessary to help youth adjust to their new environment.

All youth will be required to have a much higher level of general education. Much of the vocational training, both formal and informal, will likely be delayed until after secondary education is completed. Formal education will need to accept the theory that all people can be taught to function adequately in our society as far as basic skills are concerned. It must be designed to teach people to be flexible in their career choices and to live with change. If youth are to find their place in society, it will be necessary to develop real life learning experiences where they will develop a commitment for action in accepting commensurate responsibility in line with opportunities and privileges assumed. They should be given opportunity to make decisions for their common welfare within a community, therefore making it possible for them to participate rather than protest.

If these opportunities are not made available, then their status uncertainty, their exploitation by commercial interests, the revolution in communications, our reluctance to give them positions of real responsibility, and the growing importance of higher education for career success, will tend to crystalize their sense of common grievance by 1980. We are very likely to have more and more cohesion among youth in both the university and the high school. Student youth movements will intensify.

We now think of rural youth as being contained within the family, within the community, within the church, and perhaps in some farm organizations. For the rural youth of the future there is strong indication that no one of these institutions will monopolize their significant life experiences. At an early age many young people will detach themselves from traditional conventional patterns because they no longer express their value orientation toward the world. To the extent that the institutions share a youth orientation, they will share it with youth who are not as rural as they are. They will be drawn into other patterns of experience in which their ruralness is not as significant.

Unless the community is organized to let youth make important decisions and help plan and conduct activity to meet their needs and interests, then it is questionable that it will remain a continuing viable factor in the life of rural youth. Rural youth will attach themselves to those who share similar life styles, educational values, and levels of experience; and these associations will be across larger physical geographical areas.

Political attitudes of young people are also going to undergo change, not only because of an enlargement of social experience, but also because of a recognition of the complex interdependency of the world of which they are a part. The philosophy of rural, rugged individual independence will be replaced by one in which the rural and agricultural life is interdependently interwoven into the total patterns of our society. Young people are very much concerned about each other's interests and needs. Never before were they as much concerned about the welfare of those who are disadvantaged. Given an opportunity, youth groups will make it possible for "all" young people to join, whatever be their socio-economic level, educational level, race or creed.

The formal and informal education systems working with youth will need to work more closely together to coordinate their efforts to assure supplementation rather than duplication in programs offered. Everything that all organizations can do will not be enough to meet the demand for youth growth and development for the future.

Nonformal systems of youth education, such as scouts, 4-H, Hi-Y, etc., have relied heavily on nonpaid, "voluntary" leaders, the majority being women. Unless there is a reawakening to the responsibility of community service by men as well as women, the

evolving social and economic patterns of the future will likely place voluntary leadership in the role of a policy-setting board, with programs executed by "paid" youth workers.

Youth leaders of the future will demand more specificity in role definition and will expect to work in concert with several other people in building a total experience for youth. New techniques for methods of transfer of subject matter to youth will be employed.

The emphasis for the future will be to help young people learn and develop through real life experiences (project programs), program concepts including at least the following:

1. Technology (information and skill development)
2. Family relationships
3. Citizenship
4. Value systems
5. Leadership
6. Management
7. Career exploration
8. Leisure time
9. Life-long learning
10. Peer group influence

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APPENDIX

Table 1—Population of Michigan, 1960, and projections to 1965, 1970, 1975, and 1980, by counties, according to University of Michigan Population Studies Center, as of January, 1964

County	Population 1960	Projections 1964	1970	1975	1980
Alcona	6,352	6,400	6,100	6,400	6,500
Alger	9,250	8,600	7,800	7,700	7,700
Allegan	57,729	61,300	64,000	67,000	70,900
Alpena	28,556	31,300	33,400	35,600	38,200
Antrim	10,373	9,900	9,200	9,000	9,100
Arenac	9,860	9,600	9,200	9,100	9,300
Baraga	7,151	6,500	5,800	5,600	5,500
Barry	31,738	33,600	35,100	36,700	30,000
Bay	107,042	113,500	118,100	123,500	130,600
Benzie	7,834	7,400	6,800	6,600	6,600
Berrien	149,865	164,400	176,900	188,300	202,500
Branch	34,903	36,100	36,800	38,200	39,700
Calhoun	138,858	143,400	145,400	150,100	156,700
Cass	36,932	40,700	44,100	47,000	50,700
Charlevoix	13,421	12,900	12,200	12,200	12,200
Cheboygan	14,550	14,400	14,100	14,200	14,700
Chippewa	32,655	33,200	33,300	34,200	35,400
Clare	11,647	11,900	12,100	12,400	13,000
Clinton	37,969	40,300	42,100	44,100	46,700
Crawford	4,971	5,300	5,400	5,600	5,900
Delta	34,298	33,600	32,500	32,800	33,600
Dickinson	23,917	22,600	21,100	20,900	21,000
Eaton	49,684	53,300	56,200	59,100	63,000
Emmet	15,904	14,900	14,100	13,800	13,900
Genesee	374,313	413,400	450,800	494,600	540,000
Gladwin	10,769	11,100	11,200	11,600	11,900
Gogebic	24,370	22,300	20,000	19,600	19,300
Grand Traverse	33,490	34,800	35,700	37,000	38,900
Gratiot	37,012	37,500	37,300	38,200	39,500
Hillsdale	34,742	34,900	34,500	35,100	36,200
Houghton	35,664	32,400	29,200	28,600	28,100
Huron	34,006	33,200	31,800	32,000	32,400
Ingham	211,296	238,000	267,000	298,600	331,900
Ionia	43,132	44,200	44,400	45,700	47,400
Iosco	16,505	19,500	22,800	25,300	28,400
Iron	17,184	16,300	15,200	15,200	15,200
Isabella	35,348	37,700	39,300	41,200	43,600
Jackson	131,994	140,700	147,100	154,200	163,500
Kalamazoo	169,712	189,200	207,100	216,000	234,400
Kalkaska	4,382	4,100	3,700	3,700	3,700
Kent	363,187	392,700	416,900	440,500	470,500
Keweenaw	2,417	2,200	1,800	1,700	1,700
Lake	5,338	5,200	4,900	4,900	5,000
Lapeer	41,926	43,700	44,700	46,400	48,700
Leelanau	9,321	9,300	9,100	9,200	9,500
Lenawee	77,789	82,200	85,300	89,100	94,000
Livingston	38,233	44,100	50,000	54,600	60,200
Luce	7,827	7,400	6,800	6,800	6,800
Mackinac	10,853	11,300	11,600	12,000	12,600
Macomb	405,804	532,100	669,300	829,800	1,003,900
Manistee	19,042	18,600	17,800	17,900	18,300
Marquette	56,154	58,700	60,300	62,700	65,800
Mason	21,929	21,800	21,300	21,600	22,200
Mecosta	21,051	21,400	21,200	21,700	22,400
Menominee	24,685	23,600	22,000	21,800	22,000
Midland	51,450	59,500	67,700	74,100	82,000
Missaukee	6,784	6,100	5,600	5,600	5,400
Monroe	101,120	112,500	123,100	132,100	143,300
Montcalm	35,795	37,100	37,700	39,100	40,700
Montmorency	4,424	4,400	4,400	4,500	4,600
Muskegon	149,943	160,400	168,700	177,300	188,400
Newaygo	24,160	24,700	24,600	25,300	26,300
Oakland	690,259	808,208	905,500	1,014,100	1,132,000
Oceana	16,547	16,200	15,500	15,600	15,800
Ogemaw	9,680	9,600	9,200	9,200	9,400
Ontonagon	10,584	10,300	9,900	9,900	10,100
Osceola	13,595	13,000	12,300	12,200	12,200
Oscoda	3,447	3,500	3,500	3,500	3,700
Otsego	7,545	7,900	8,100	8,400	8,800
Ottawa	98,719	110,000	120,500	129,200	140,300
Presque Isle	13,117	13,200	13,200	13,500	13,900
Roscommon	7,200	7,700	8,000	8,400	8,900
Saginaw	190,752	204,800	216,000	228,500	244,400
St. Clair	107,201	111,600	114,200	118,500	124,300
St. Joseph	42,332	44,900	46,600	48,700	51,500
Sanilac	32,314	31,800	30,900	31,100	31,800
Schoolcraft	8,953	8,600	8,000	8,100	8,000
Shiawassee	53,446	55,400	56,700	58,600	61,400
Tuscola	43,305	44,500	44,700	46,000	47,900
Van Buren	48,395	51,900	54,500	57,300	60,900
Washtenaw	172,440	196,200	227,600	261,400	292,200
Wayne	2,666,297	2,716,600	2,755,800	2,819,800	2,908,800
Wexford	18,466	17,700	16,600	16,600	16,700
MICHIGAN	7,823,194	8,387,000	8,891,000	9,494,000	10,204,000

Table 2—Urban, rural nonfarm and rural farm population of Michigan in 1950, 1960, 1965 and projected to 1980[1]

	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Percent change
	1950		1960		1965		1980		1960 to 1980
Urban	4,503,084	70.7	5,739,132	73.4	6,023,000	73.7	7,677,000	75.2	+33.8
Rural nonfarm	1,173,940	18.4	1,643,125	21.0	1,794,000	22.0	2,360,000	23.1	+43.6
Rural farm	694,742	10.9	440,937	5.6	353,000	4.3	167,000	1.7	−62.1
Total	6,371,766	100.0	7,823,194	100.0	8,170,000	100.0	10,204,000	100.0	+30.4

(1) Based on the analysis of John F. Thaden, Institute for Community Development, MSU.

Table 3—U.S. per capita consumption, net exports and total U.S. production of food, 1959-63 and projected to 1980[1]/

Item	Consumption		(Exports +) (Imports −) Net Exports		Total U.S. Production	
	1959-63 lb.	1980 lb.	1959-63 bil. lb.	1980 bil. lb.	1959-63 bil. lb.	1980 bil. lb.
Red meat (carcass weight)	163	189	−1.18	−2.90	28.8	43.1
Steer and heifer beef	65	95			12.1	21.9
Cow, bull beef	22	25			3.0	4.2
Veal	6	3			1.02	.74
Pork	65	61			11.9	15.2
Lamb and mutton	5	5			.78	1.06
Chicken (ready-to-cook)	30	38			5.6	9.6
Turkey (ready-to-cook)	7	11			1.3	2.7
Fish (edible weight)	10	10			6.4	8.6
Eggs, farm weight	43	34			8.4	8.9
Dairy products (milk equivalent)	645	560	+1.03	+1.50	124.2	138.7
Fluid milk and cream (fat solids basis	306	260			53.4	63.7
Evaporated, condensed	13	8			2.6	2.1
Cheese	9	10			1.52	2.45
Ice cream (net milk equivalent)	52	58			9.5	14.2
Butter	7	5			1.45	1.31
Fats and oils (excluding butter)	39	47	+4.00	+7.00	8.2	12.5
Vegetables (farm weight)	204	206			38.5	51.9
Fresh	104	100			22.6	29.3
Processed (fresh equivalent)	100	106			15.9	22.6
Melons	25	20			4.4	4.7
Potatoes, white (fresh equivalent)	110	105			26.8	34.5
Strawberries	3	3			.50	.74
Fruits (farm weight)	198	211			36.0 [2]/	51.7 [2]/
Citrus, fresh	32	17			5.7 [2]/	4.2 [2]/
Apples, fresh	20	16			3.7 [2]/	3.9 [2]/
Other, fresh	43	34			7.8 [2]/	8.5 [2]/
Citrus, processed	51	75			9.3 [2]/	18.4 [2]/
Other, processed	41	60			7.4 [2]/	14.5 [2]/
Dried fruit	11	9			2.0 [2]/	2.2 [2]/
Cereals (grain equivalent)	233	212				
Wheat and flour	163	143	+40.6	+60.0	71.4	95.0
Soft wheat	47	45	+10.7	+12.0	20.7	25.5
Eastern	41	42	+ 4.1	+ 4.2	13.3	16.6
Pacific Northwest	6	4	+ 6.7	+ 7.8	7.4	8.9
Hard wheat and other	116	98			50.9	69.5
Corn	49	52				
Dry edible beans (farm weight)	8.8	6.8	+.300	+.600	1.93	2.32
White	3.7	3.8			.90	1.38
Navies	2.6	2.8			.66	1.08
Other	1.1	1.0			.24	.30
Colored	5.1	3.0			1.03	.94
Other	12.0	10.0				
Sugar, raw value	104	102			8.15	13.4
Coffee	16	17				
Feed grain (mil. tons, corn equiv.)			15	30	144	200
Soybeans (mil. bushels)			158	500	627	1,500

(1) Based on the analysis of Lester Manderscheid and Lawrence Witt of the Department of Agricultural Economics, Mich. State Univ.
(2) Total U.S. consumption.

Table 4—Production of major livestock and crop enterprises in Michigan, 1949-1953, 1959-1963, 1964, 1965, and projected to 1980

Item	Unit	1949-53[1]/	1959-63[1]/	1964[1]/	1965[1]/	1980	% Percent Change 1959-63 to 1980
Milk	mil. lbs.	5,395	5,521	5,797	5,672	6,000	+ 9
Cattle on farms Jan. 1							
Cattle on feed	1000 head	93	131	160[2]/	162[3]/	400	+205
Other cattle for slaughter	1000 head	124	229	258[2]/	237[3]/	300	+ 31
Total cattle (and calves) for slaughter	1000 head	217	360	418[2]/	399[3]/	700	+ 94
Beef cows	1000 head	54	114	125[2]/	124[3]/	350	+207
Hogs marketed	1000 head	1,146	1,101	1,118	896	1,272	+ 16
Sheep and lambs							
Ewes, 1 year +	1000 head	274	215	217[2]/	210[3]/	200	— 7
Feeders shpd. into state	1000 head	26	28	50	26	50	+ 79
Horses	1000 head	97	38			50	+ 32
Poultry							
Eggs	mil.	1,570	1,395	1,316	1,372	1,560	+ 12
Turkeys	1000 lbs.	17,114	23,532	20,931	21,074	42,546	+ 81
Broilers	1000 birds	2,944	3,125	2,579	2,166		
Cash crops							
Wheat	1000 bu.	35,042	35,893	39,273	27,588	31,200	— 13
Dry beans	1000 bags	4,012	7,201	7,585	5,562	12,600	+ 76
Soybeans	1000 bu.	1,998	6,488	7,546	10,120	17,400	+168
Sugar beets	1000 tons	693	1,135	1,386	1,133	1,500	+ 32
Potatoes	1000 cwt.	7,873	8,056	7,950	9,494	24,000	+198
Buckwheat	1000 bu.	228	121	180		149	+ 23
Peppermint	1000 lbs.	196	53				
Spearmint	1000 lbs.	184	117				
Feed grain							
Corn	1000 bu.	60,873	96,644	101,804	98,766	135,000	+ 40
Oats	1000 bu.	48,500	37,104	31,878	26,215	32,400	— 13
Barley	1000 bu.	3,039	2,437	1,591	1,248	3,100	+ 27
Rye	1000 bu.	771	861	1,040	1,056	1,320	+ 53
Forage crops							
Corn silage	1000 tons	2,257	3,314	3,685	3,411	8,512	+157
Hay	1000 tons	3,535	3,282	3,503	3,253	2,800	— 15
Fruit crops							
Apples	1000 bu.	8,887	13,160	16,500	16,000	29,000	+120
Pears	1000 bu.	972	1,400	1,900	1,100	3,000	+114
Peaches	1000 bu.	3,095	2,770	2,900	3,000	6,000	+117
Sweet cherries	tons	8,140	13,600	22,000	23,000	42,600	+209
Tart cherries	tons	76,700	81,900	190,000	120,000	125,000	+ 53
Plums	tons	6,560	7,340	11,500	8,500	17,500	+138
Grapes	tons	34,600	51,200	70,000	72,000	95,000	+ 86
Strawberries	1000 lbs.	33,372	37,200	40,480	39,100	50,000	+ 34
Blueberries	mil. lbs.		18.0[4]/			27	+ 50
Respberries	mil. lbs.		9.1[4]/			5-10	— 18
Vegetable crops							
Processing	1000 tons	171	298			553	+ 86
Fresh	1000 cwt.	6,723[5]/	6,240			8,740	+ 40

(1)Source: Michigan Crop Reporting Service. (2)January 1, 1965. (3)January 1, 1966. (4)Estimate. (5)Includes some processed vegetables.

Table 5—Crop acreages in Michigan, 1949-53, 1959-63, 1964, and projected to 1980

Item	Harvested Acreage (thousands) 1949-53	1959-63	1964	1965	1980
Cash crops					
Wheat	1,323	1,055	1,007	836	600
Dry beans	404	544	602	632	700
Soybeans	99	285	343	460	600
Sugar beets	65	72	85	69	75
Potatoes	73	48	45	50	80
Buckwheat	15	8	10		8
Peppermint	9	2	2		2
Spearmint	6	4	2		2
Feed grain					
Corn	1,338	1,572	1,642	1,593	1,500
Oats	1,366	785	644	535	450
Barley	99	66	37	32	50
Rye	54	40	40	44	40
Forage crops					
Corn silage	272	325	335	379	500
Grass silage					
Hay	2,388	1,786	1,773	1,759	800
Fruit (bearing)	180	193			212
Vegetables	125	112	107		111
Processing	75	60	56		
Fresh	50	52	51		
Total of above crops	7,815	6,889	6,860 /		5,727

	1950	1959	1964	1980
Total cropland harvested	7,798	7,155	6,738	5,800
Cropland not harvested	1,263	1,404	1,569	800
Total cropland	9,061	8,559	8,307	6,600

1/ Estimate.

Table 6—Numbers of livestock and poultry on Michigan farms, 1949-53, 1959-63, 1964, 1965, and projected to 1980

Item	Unit	Numbers on Farms 1949-53	1959-63	1964	1965	1980
Milk cows	1000	848	639	620	640	450
Litters farrowed	1000	207.0	173.5	151.0	130.0	159.0
Number of hens	1000	8,525	6,500	5,875	6,126	5,874

Table 7—Production rates on major livestock and crop enterprises in Michigan, 1949-53, 1959-63, 1964, 1965, and projected to 1980

Item	Unit	1949-53	1959-63	1964	1965	1980
Milk production per cow	lbs.	6,358	8,394	9,350	9,390	13,000
Calf crop as percent of beef cows	%					80
Pigs saved per litter	no.	6.92	7.25	7.50	7.52	8.00
Lambs saved per ewe	no.	1.02	1.04	1.07	1.04	1.08
Eggs per layer	no.	184	213	224	224	265
Cash crop yields/acre						
Wheat	bu.	26.4	34.0	39.0	33.0	52.0
Dry beans (uncleaned)	lbs.	995	1,320	1,260	880	1,800
Soybeans	bu.	20.3	22.8	22.0	22.0	29.0
Sugar beets	tons	10.8	15.8	16.3	16.4	20.0
Potatoes	cwt.	108	170	177	188	300
Buckwheat	bu.		15.4		18.0	18.6
Peppermint	lbs.		27.0			
Spearmint	lbs.		28.0			
Feed grain yields/acre						
Corn	bu.	44.9	61.8	62.0	62.0	90.0
Oats	bu.	35.5	47.5	49.5	49.2	72.0
Barley	bu.	30.5	37.3	43.0	39.0	62.0
Rye	bu.	14.3	21.5	26.0	24.0	33.0
Forage crop yields/acre						
Corn silage	tons	8.3	10.2	11.0	9.0	17.0
Hay	tons	1.48	1.84	1.98	1.85	3.50
Fruit crop yields/acre						
Apples	bu.		218			400
Pears	bu.		143			287
Peaches	bu.		141			300
Sweet cherries	tons		2.06			4.5
Tart cherries	tons		1.97			3.5
Plums	tons		2.22			3.5
Grapes	tons		2.28			4.0
Strawberries	lbs.		3,780			8,000
Blueberries	lbs.					
Raspberries	lbs.					
Honey, yield/colony	lbs.		76.0			76.0

Table 8—Michigan farms by economic class: number and percent of total, 1959, 1964, and projections to 1980

Economic Class (Sales per farm)	Number of Farms			Percent of all Farms			Percent of Total Sales		
	1959	1964	1980[1]	1959	1964	1980[1]	1959	1964[2]	1980[1]
Commercial farms									
I $40,000 and over	1,068	2,413	7,000	.9	2.6	15.6	11.9	23.5	41.6
II $20,000-$39,999	3,823	7,023	15,000	3.4	7.5	33.3	15.7	24.1	40.0
III $10,000-$19,999	12,779	13,374	10,000	11.4	14.3	22.2	28.0	24.3	14.1
Total I-III	17,670	22,810	32,000	15.7	24.4	71.1	55.6	71.9	95.7
IV $5,000-$9,999	19,363	15,298	4,000	17.3	16.4	8.9	22.4	14.6	3.0
V $2,500-$4,999	21,647	15,848	1,000	19.4	17.0	2.2	12.8	7.8	.4
VI $50-$2,499	6,362	6,231	0	5.7	6.6	.0	1.5	1.2	.0
Total Commercial	65,042	60,187	37,000	58.1	64.4	82.2	92.3	95.5	99.1
Other farms									
VII Part-time	34,149	23,683	5,000	30.6	25.3	11.1	5.4	3.1	.6
VIII Part-retirement	12,511	9,603	3,000	11.2	10.3	6.7	2.1	1.3	.3
IX Abnormal	63	31	0	.1	.0	.0	.2	.1	.0
Total other	46,765	33,317	8,000	41.9	35.6	17.8	7.7	4.5	.9
Grand total	111,765	93,504	45,000	100.0	100.0	100.0	100.0	100.0	100.0

(1) Projected.
(2) Estimated.
Source: Census Reports, for 1959 and 1964 data analyzed by Karl Wright, Development of Agricultural Economics, MSU.

Table 9—Land use in Michigan, 1950 and 1960, with a projection to 1980[1]

Type of land use	1950	1960	1980
	(thousands of acres)		
Urban and suburban lands	930	1,600	2,500
Land in farms	17,270	14,783	10,000
Cropland harvested	7,798	7,155	5,800
Cropland not harvested	1,263	1,404	700
Pasture and grazing land	3,084	1,991	1,700
Woodland in farms	3,721	2,844	1,100
Farmsteads and service areas	418	344	250
Miscellaneous and idle	986	1,045	450
Forests and recreation lands not in farms	16,127	18,031	22,000
Public forests	6,238	6,517	6,900
Private forests	8,890	9,760	7,500
Public parks and open space	279	422	1,750
Wildlife areas	220	332	350
Private recreation lands	500	1,000	5,500
Other rural lands	2,165	2,078	1,992
Highways and roads	810	872	1,007
Railroad rights of way and rural airports	43	42	40
National defense areas	42	29	30
Industrial and service areas	109	47	60
Miscellaneous and idle	1,161	1,088	855
Total land area of Michigan	36,492	36,492	36,492

(1) Based on the analysis of Raleigh Barlowe, Chairman of Resource Development, MSU.

Table 10—Summary of projected demand for timber products in the United States, 1962-1980

Item	1962	1970	1980
Sawlogs (million bd. ft.)	37,300	39,700	43,400
Veneer logs (million bd. ft.) (1)	6,776	10,300	12,500
Pulpwood (million cords) (2)	52.9	67.5	88.5
Misc. industrial wood (million cu. ft.)	505	500	500
Fuelwood (million cords) (3)	26.9	22.0	18.0

(1) Includes equivalent log volumes of imported veneer and plywood.
(2) Includes equivalent log volumes of imported pulp, paper and board, plus plant by-products.
(3) Includes equivalent log volumes of plant by-products.
Source: U. S. Forest Service, Department of Agriculture.

Table 11—Output of forest products in Michigan, 1952, 1962, and projected to 1980(1)

		Production			
Item	Unit	1952	1962	1980	Percent Change 1962 to 1980
Pulpwood	1000 cords	762	1,223	3,180	+160
Sawlogs	mil. bd. ft.	456	319	400	+ 25
Veneer logs	mil. bd. ft.	40	21	41	+ 95
Misc. industrial timber	mil. cu. ft.	30	23	23	no change
Total industrial timber	mil. cu. ft.	174	178	348	+ 96
Fuelwood	1000 cords	1,155	600	396	— 44
Maple syrup	1000 gal.	98	73	82	+ 12
Christmas trees	1000 trees	1,500	3,200	6,200	+ 94

(1) Based on the analysis of Lee James, Department of Forestry, in consulation with Aubrey Wylie, Department of Forest Products, Mich. State Univ.

PUBLICATIONS ON PROJECT '80

All these publications are in the Research Report Series, and bear the overall heading of "Project '80 — Rural Michigan Now and in 1980." Each publication has an additional title which indicates specific subject matter. These publications have been produced and are available from the Bulletin Office, Michigan State University, Box 231, East Lansing, Michigan or from your county Cooperative Extension Office.

RR-37 Highlights and Summary of Project '80

RR-38 Michigan Timber Production and Industry

RR-39 Rural Family Living — Rural Youth

RR-40 Food Wholesaling and Retailing

RR-41 Commercial Fisheries and Fur Bearing Animals

RR-42 Michigan's Outdoor Recreation and Tourism

RR-43 The Nursery Industry and Floriculture

RR-44 Field Crops, Market Firms and Farm Supply

RR-45 The Dairy Industry

RR-46 Financing Michigan Farms

RR-47 Economic Prospects of Farmers

RR-48 Farm Machinery and Farm Labor

RR-49 The Fruit and Vegetable Industries. Bees and Pollination

RR-50 Livestock and Meat

RR-51 Eggs and Poultry

RR-52 Land and Water Resources

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INGHAM
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Courthouse, Crystal Falls
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49221

LIVINGSTON
Courthouse Annex, Howell
48843

LUCE
Community Bldg.,
Newberry 49868

MACKINAC
Courthouse, St. Ignace
49781

MACOMB
115 Groesbeck Hwy.,
Co. Engr. Bldg.,
Mt. Clemens 48043

MANISTEE
P.O. Box 11,
Old High School Bldg.,
Kaleva 49645

MARQUETTE
Courthouse, Marquette
49855

MASON
State Sav. Bank Bldg.,
Scottville 49454

MECOSTA
Courthouse, Big Rapids
49307

MENOMINEE
Courthouse, Menominee
49858

MIDLAND
Federal Bldg., Midland
48640

MISSAUKEE-ROSCOMMON
County Bldg., Lake City
49651

MONROE
Courthouse, Monroe
48161

MONTCALM
117 West Main St.,
Stanton 48888

MONTMORENCY-OTSEGO
Courthouse, Gaylord
49735

MUSKEGON
County Bldg., Muskegon
49440

NEWAYGO
Community Bldg.,
Fremont 49412

OAKLAND
155 N. Saginaw St.,
Pontiac 48058

OCEANA
Federal Bldg., Hart
49420

OGEMAW
116 South 3rd Street,
West Branch 48661

ONTONAGON
Bank Bldg., Ewen
49925

OSCEOLA
Courthouse, Reed City
49677

OSCODA-CRAWFORD
Courthouse, Mio
48647

OTSEGO-MONTMORENCY
Courthouse, Gaylord
49735

OTTAWA
Courthouse, Grand Haven
49417

PRESQUE ISLE
Federal Bldg., Rogers City
49779

ROSCOMMON-MISSAUKEE
County Bldg., Lake City
49651

SAGINAW
Courthouse, Saginaw, W.S.
48601

ST. CLAIR
Federal Bldg., Port Huron
48060

ST. JOSEPH
Courthouse Annex
Centreville 49032

SANILAC
Federal Bldg., Sandusky
48471

SCHOOLCRAFT
Federal Bldg., Manistique
49854

SHIAWASSEE
Co. Rd. Comm. Bldg.,
Corunna 48817

TUSCOLA
Courthouse, Caro
48723

VAN BUREN
Federal Bldg., Paw Paw
49079

WASHTENAW
County Bldg., Ann Arbor
48108

WAYNE
3930 Newberry St.,
P. O. Box 550, Wayne
48184

WEXFORD
Courthouse, Cadillac
49601

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