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PROJECTED ESTIMATES OF MIGRATORY FARM LABOR NEEDS, SOUTHWESTERN MICHIGAN

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by

Joe R. Motheral and Reuben W. Hecht
Agricultural Economists

PRODUCTION ECONOMICS RESEARCH BRANCH
AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

SUMMARY

On August 26, 1954, President Eisenhower appointed an Interdepartmental Committee on Migratory Labor. This Committee was charged " . . . to aid the various Federal agencies in mobilizing and stimulating more effective programs and services for migrants and in providing service to State and local areas through their constituent members." Periodic reports and recommendations were requested by the President. This is one such report projecting estimates of future needs for migratory farm workers in Southwestern Michigan. In conducting this survey, certain basic assumptions were laid down regarding probable trends in the national pattern as they may affect Southwestern Michigan. These are:

1) National economic activity and disposable income will continue at a relatively high level.

2) The national population will increase at the predicted, intermediate rate, while the regional population will increase at a higher rate.

3) Trends in consumer taste will continue as at present.

4) There will be little change in inter-regional competition.

All available sources of secondary information were exhausted for pertinent data regarding crops raised in the area. After summarization of such data, interviews were taken with informed people directly associated with the many facets of the local fruit and vegetable industry. Estimates were obtained from these people and helped to provide the following conclusions:

1) Mechanical devices and related technology now in prospect offer only limited opportunity for reducing per-acre labor requirements for peak seasonal operations in fruit and vegetable production.

2) With a general increase of from 10 to 25 percent in the acreage of strawberries, asparagus, red cherries, peaches, and grapes, coupled with an expected increase in yield of from 10 to 30 percent, seasonal farm labor needs for these crops will be from 10 to 25 percent greater in 1960 than in 1954.

3) A decrease in the production of bush fruits and no significant change in the production of apples, pears, plums, and other truck crops, will have little net effect on the number of migratory workers needed.

4) Increases in asparagus, strawberry, and cherry acreage by 1960 will necessitate a larger force of migratory workers, particularly during the months of June and July. Labor in the other harvest months should not be critical if held at present levels.

5) An average increase in the demand for labor for the entire 1960 season of 10 to 15 percent is probable. A large part of this demand might be met by intensive efforts toward maximum utilization of the labor force currently available during peak seasons.

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Introduction

Purpose of survey

During the last two or three decades, American agriculture has made great strides in efficiency. Technology has raised total production to record levels. For the most part, these gains have been accompanied by substantial savings in human labor through the substitution of machinery and the introduction of improved methods of operation and handling. Savings on labor input, however, have not been evenly distributed throughout the different areas of the country nor among the different crops.

Producers of fruit and vegetable crops in particular are handicapped in applying labor-saving methods to harvest operations. American inventive genius falters before the problem of supplanting human hands and eyes with mechanical devices that can select and pick ripe fruit from the tree, berries from the vine, or vegetables from a row in which plants mature unevenly. Thus with a continuing or rising demand for these foods, seasonal farm-labor needs continue to be high in crop specialty areas. Many such areas lack the resident labor supply required to produce their crops. Migratory farm workers, therefore, are still an essential feature of seasonal crop production in many parts of the United States.

The existence of a sizeable domestic and foreign migratory farm labor force makes possible the supplying of large quantities of food that consumers demand and can afford. Migration, however, introduces certain

problems that are not easily solved. The Federal Government is now engaged in stimulating local and State efforts to find solutions. This undertaking led to a reconnaissance survey in Southeastern Michigan which is the subject of this report.

On August 26, 1954, President Eisenhower appointed an Interdepartmental Committee on Migratory Labor composed of the Secretaries of the Interior; Agriculture; Labor; Health, Education and Welfare; and the Administrator of the Housing and Home Finance Agency. The President expressed the hope that " . . . this Committee will aid the various Federal agencies in mobilizing and stimulating more effective programs and services for migrants and in providing service to State and local areas through their constituent members." Periodic reports and recommendations have been requested by the President's Committee.

Working committees composed of technical personnel of the five-member agencies have been engaged during the last year in drafting statements of policy and in studying such special problems of migratory labor as housing, transportation, health, and education. Some of these proposals call for legislation by the Congress or by State legislatures, others for administrative adjustments in existing programs, and still others for the stimulation of voluntary measures by local agencies or groups.

The assignment of the President's Committee has no specific termination date. Preliminary study suggests that many of the steps deemed necessary to bring about improvement in the migratory labor situation may have to be planned and executed over a period of several years. The working group, therefore, not only is collecting and analyzing current data

about migratory labor problems but also is seeking to develop projections of its appraisals. Basic to this task is the study of probable future changes in the pattern of agricultural production itself, with particular reference to the impact of such changes upon the need for domestic migratory farm workers in the major crops and areas of the country. The Committee requested the assistance of the Production Economics Research Branch of the Agricultural Research Service in developing estimates for this purpose. A five-year projection, until 1960, was desired by the Committee.

Supporting this request was the belief that action to alleviate migratory farm labor problems should be essentially local in character and, therefore, that data should be obtained on a local-area basis. Four farm areas that employ relatively large numbers of migrants were suggested for study. In addition to Southwestern Michigan, the areas proposed were the Columbia Basin of Washington, the San Joaquin Valley of California, and the Mississippi Delta area of Arkansas.

A five-year projection of labor requirements in a specified farm area is a formidable and complex task. It involves a wide range of variables of different degrees of predictability within the area plus a wide sphere of regional and national consideration.[1/] Chiefly, the tools available for making such projections are, first, historical data on trends in production and labor use, and second, the opinions of well-informed specialists and other individuals as to likely future developments. In Southwestern

1/ See "Note on variable factors involved in the calculations," p. 22

Michigan, reliable trend data are relatively abundant, as are thoughtful and knowledgeable persons who are willing to advance judgments with respect to the future. Correlation of findings from such sources provides a sounder basis for planning to meet seasonal farm labor needs five years hence than is possible from mere conjecture.

Description of the area

The eastern shore of Lake Michigan furnishes an exceptional site for the production of vegetables, tree fruits, grapes, berries, and other horticultural specialties. From the southwestern tip of Michigan for some 250 miles northward and for 30 or 40 miles inland, the warm-air masses passing over the lake represent a benign climatic influence of incalculable value as protection against late spring frost damage to plants and trees. Moreover, the area is strategically located from a marketing standpoint. The proximity of large population centers such as Chicago and Detroit is a natural advantage in the competition with many other areas, particularly for fresh commodities. Concentrated production and marketing facilities and modern, high-speed transportation assure generally favorable distribution of most products in most years. Soil resources are not uniformly of high quality, ranging from sandy loams of relatively high productivity to soils low in organic matter and, frequently, of poor moisture-holding or drainage capacity. Low-lying areas, dry sands subject to wind erosion, and second-growth forests are interspersed with well-drained

upland areas that are admirably suited to fruit orchards.2/

Although dairying is important in Southwestern Michigan, fruits and vegetables supply well over 50 percent of the cash-farm income and the percentage is more or less continuously rising. The Benton Harbor Cash Market alone handled more than $9,000,000 worth of fresh fruits and vegetables in 1955. Scores of processing plants, both freezers and canners, operate in the area.

Most farms are small, averaging about 50 acres, and are intensively cultivated. Part-time and residential farms are numerous. Industrial development and recreational uses are placing increasing pressure on some of the better agricultural land. Population growth has been rapid over most of the area; in Berrien County which lies near South Bend, Indiana, for example, population has increased about 30 percent during the last decade.

2/ The area with which this report is concerned is variously defined, depending on the specific purpose. The foregoing description refers in part to type-of-farming areas 3, 4, and 11 (see Special Bulletin 206, "Types of Farming in Michigan," by Elton B. Hill and Russell C. Mawby, Michigan State College, September 1954). Other groupings include: Labor Market Areas 5-23-01 (Benton Harbor) and 5-23-02 (Muskegon) of the Bureau of Employment Security, U. S. Department of Labor, and the Michigan Employment Security Commission; Crop-Reporting Districts 7 and 4 of the Agricultural Marketing Service, U. S. Department of Agriculture; and Economic Areas B, C, 3, 6a and 6b, of the Census.

Method of Survey

Assumptions

Farm production in Southwestern Michigan by 1960 may be affected by a multitude of factors at work both within and outside the area. As an indication of the interdependence of the agriculture of the area with the rest of the economy, 32 States and Canada received fresh fruits and vegetables from Benton Harbor in 1955. Foods grown and processed in the area were distributed to virtually every State. Similarly, California and New Jersey compete with Michigan in the asparagus market, Louisiana in strawberries, Georgia in peaches, and Washington in apples. Inter-regional competition and national purchasing power are only two of the exogenous factors that complicate projections of future production and future needs for seasonal labor in a given area.

In order to simplify the appraisal and to concentrate on problems and relationships within the area, certain basic assumptions were laid down regarding probable trends in the national pattern as they may affect Southwestern Michigan. Briefly stated, these are as follows:

1. National income: Continued high national levels of economic activity and of spendable income. While this assumption implies a continuation of international tensions and defense spending, it also precludes the disruptions of large-scale war.

2. Population growth: Nationally, at predicted, intermediate rates of increase; within the region at rates above the national average. The latter is significant from the standpoint of market advantage.

The region may be roughly defined as the States of Michigan, Indiana, Illinois, Kentucky, Ohio, and Tennessee; in other words, those States within easy trucking distance which together constitute the primary market for fresh fruits and vegetables.

3. Pattern of demand: Continuation of present trends in consumer tastes. Essentially, this means a gradual but steady increase in the per capita consumption of broad categories of fruits and vegetables, both fresh and processed.

4. Inter-regional competition: Minor adjustments in cost-price relationships for individual crops but no overall changes of consequence.

Sources of information

Secondary sources of information used in these projections include the following:

1. U. S. Census of Agriculture.

2. Published and unpublished data of the U. S. Department of Agriculture and the Michigan Department of Agriculture.

3. Published and unpublished data of Michigan State University.

4. Reports of the Bureau of Employment Security, U. S. Department of Labor; of the Michigan Employment Security Commission; and of the Benton Harbor Farm Labor Office.

5. "Summary 1955 of the Benton Harbor Cash Market," Federal-State Market News Service, Fruit and Vegetable Division.

6. "The Eighty-Fifth Annual Report of the State Horticultural Society of Michigan, 1955."

7. "Migrants in Michigan" compiled by the Governor's Commission in Migratory Labor with the assistance of the Inter-Agency Committee on Migratory Labor.

Summarization of data from these sources was followed by personal interviews with agricultural economists, horticulturists, engineers, extension personnel, growers, packers, shippers and processors, farm placement personnel, and various other State and Federal experts.

In the interviews particular emphasis was placed upon crops having high seasonal labor peaks and upon those showing recent marked increases or decreases in production. In the main, the opinions expressed on the outlook for these crops were quite uniform. Where differences occurred, reinterviewing was carried out to explore more fully the bases for the differences, usually with the result that one or the other of the interviewers had overlooked or overweighted some factor in his estimates.

As a final check on the reasonableness of the estimates, selected persons in Michigan and in Washington were asked to review the conclusions in this report.

Past and Prospective Adjustments in Production

Farmers in Southwestern Michigan[3] historically have used large numbers of seasonal farm workers in producing and harvesting a wide variety of fruit and vegetable crops. About half of the farmers in the 7-county area reported expenditures for hired labor in 1954 in the Agricultural Census. These 10 thousand farmers reported the payment of

[3] Except as may be indicated, these comments apply primarily to the labor-market area centered in Benton Harbor and designated as Area 5-23-01 by the Federal Bureau of Employment Security and the Michigan Employment Security Commission. The area includes all of Berrien, Cass, Branch, Van Buren, St. Joseph, and Kalamazoo Counties and part of Allegan County.

over 10 million dollars in wages for hired workers in that year. Most of the seasonal labor force and particularly migratory workers are used in the harvesting operation. Methods of harvesting fruits and vegetables have changed little over the years, which means that the number of workers needed during a season depends primarily on the acreage and production.

Data on acres of the important labor-using crops from 1939 to 1954 are shown in Table 1 and a brief summary of prospective changes in acreage and production of some of them from 1954 to 1960 follows.

Strawberries: About 5,000 acres of this crop were harvested in 1939. Acreage dropped during World War II but plantings increased rapidly after the War and bearing acreage has returned to the pre-war level. Several reasons are advanced for the favorable position of the strawberry enterprise in Southwestern Michigan; (a) proximity to markets; (b) the development of a fast trucking system; (c) the stabilizing effect of an expanding processing industry; and (d) the development of sprinkler irrigation. In addition to assuring the maturing of a crop in dry seasons, sprinkler irrigation has practically eliminated the hazard of a late freeze. It has been found that plants can be protected from freezing during periods of low temperatures ranging a few degrees below 32° F by applying water with a sprinkler irrigating system. 4/

4/For additional information see "Frost Protection With Sprinkler Irrigation," Michigan State University Extension Bulletin 327, April 1955.

Table 1.- Acres of important labor-using crops, Southwestern Michigan, 1939, 1944, 1949, and 1954 1/

Crop	1939	1944	1949	1954
	(Acres)	(Acres)	(Acres)	(Acres)
Strawberries	4,828	2,442	4,238	4,826
Asparagus	1,381		2/ 4,021	6,818
Red cherries	3/ 3,467		2/ 4,532	6,005
Apples	4/ 38,020		2/ 32,065	23,646
Peaches	5/ 15,688		2/ 17,593	10,769
Pears and plums	6/ 6,295		2/ 5,336	5,556
Grapes	7/ 19,515		2/ 15,121	14,464
Truckcrops	8/ 19,419	20,592	15,467	17,206

1/Source: Reports of the U. S. Census.

2/Not available

3/Bearing acreage based on 90 trees per acre.

4/Bearing acreage based on 35 trees per acre.

5/Bearing acreage based on 100 trees per acre.

6/Bearing acreage based on 100 pear or 90 plum trees per acre.

7/Bearing acreage based on 500 vines per acre.

8/Important truck crops include cabbage, celery, sweet corn, cucumbers, onions, tomatoes, and melons.

Additional plantings of strawberries are expected but the magnitude of the increase is uncertain. The lowest estimate of the increase in acreage by 1960 was 10 percent and others were much higher. As irrigation raises average yields as much as 100 percent and about a fourth of the crop is not yet irrigated, the gain in total production may be very substantial. Prospects of higher-bearing varieties, more liberal use of fertilizer, and other improved cultural practices further strengthen the likelihood of higher yields. The combined effect of greater acreage and higher yield may push production and need for pickers by 1960 a third above the 1954 level.

A labor-saving possibility of great promise is the capping machine, a device that may make possible the mechanical removal of the cap or calyx in the packing shed or processing plant. In 1955, strawberry pickers received an average of about 6 cents per quart for uncapped berries and 10 cents per quart for capped berries. If mechanical capping is perfected, the saving in field labor is estimated at about 25 percent on any given acreage. One restraint on heavy expansion of Michigan strawberry production is the dominant competitive position of California producers; this competition may be intensified as a greater proportion of the Michigan crop is processed.

Asparagus: The acreage of this crop has increased steadily from about 1,400 acres in 1939 to almost 7,000 acres in 1954. Like strawberries, asparagus has become an important money crop. It is also a crop that requires a great deal of labor in the harvest, despite the savings that have been effected by snapping instead of cutting the spears. From about 7,000 acres in 1954, many observers expect an increase of approximately 25 percent by 1960.

Farmers in Southwestern Michigan have had an extensive and generally successful experience in growing asparagus and the quality of this product is such that they enjoy a strong competitive position in the frozen-foods market. Some of the other areas that expanded production of asparagus have encountered serious disease problems, a possible threat that concerns Michigan growers today. An unresolved question also is that of snapping versus cutting. The difference in harvest labor is about 50 percent in favor of snapping but some adherents of cutting argue that the added labor costs are more than offset by yield and quality differentials. A return to cutting, which is regarded as doubtful for the area as a whole, added to the labor effects of expanded acreage would raise very substantially present harvest labor needs.

Bush fruits: This category of fruit includes red raspberries, dewberries, currants, black raspberries, gooseberries, and blueberries. From the standpoint of labor, all of these crops are affected by the onerous nature of harvest work and are therefore less attractive to workers than most other crops grown in the area. Production of black raspberries and blueberries has increased during the last several years; all others have declined. In addition to the labor problem, unfavorable prices have contributed to the reduced acreage planted to red raspberries, dewberries, and currants, while dewberry production has suffered further from disease damage. Output of gooseberries has fallen fairly consistently for several reasons, not the least of which is the arduous nature of harvest work. In the aggregate, no increase in these crops is expected and small decreases are probable.

Red cherries: Until 1955, cherry producers benefited from relatively high prices and good net incomes. They responded by stepping up their plantings of new trees to a high annual rate, especially in the central and northern counties along the eastern shore of Lake Michigan. Acres in bearing trees rose from about 3,500 in 1939 to about 6,000 in 1954. According to a survey made in 1955 by the Michigan Cooperative Crop Reporting Service, a sufficient number of young trees had been planted to increase the bearing acreage 25 percent by 1960 in the State as a whole and a little over 30 percent in the southwestern area. This increase assumes a normal removal of older trees.

Opinions differ as to the price effects of the step-up in plantings. Prices in 1955 dropped considerably below the average for postwar years, but national consumption of cherries is reported to be increasing. Furthermore, even at low prices the bulk of the crop will be harvested and the labor required will be proportionate to the size of the crop. Changes in the present upward trend, if they occur, will be in the form of an acceleration of the removal of old trees and a deceleration of new plantings.

Apples: Recent production of apples has been affected mainly by two counteracting factors. The serious freeze in 1950 sharply reduced the number of trees and many of them have not been replaced. This has been partially offset by an increase in yield per tree amounting to about 30 percent and attributable to greater use of fertilizer, improved insecticides, chemical thinning, and related practices. The long-range national outlook for apple consumption is not as promising as for such competitive

fruits as citrus. Such rival producing areas as the Yakima and Wenatchee valleys in Washington enjoy certain natural advantages which the existence of a strong regional market around southwestern Michigan only partly equalizes. The present bearing acreage of almost 24,000 acres may decline, although further improvements in varieties and better practices likely will maintain, and perhaps raise, current production levels.

Peaches: Acreage in bearing peach trees rose from over 15,000 acres in 1939 to more than 17,000 acres in 1949. Peach growers suffered heavy damage in the 1950 freeze and only partial recovery has been achieved. The bearing acreage was down to about 11,000 acres in 1954. Problems connected with suitability of varieties also have been troublesome, although introduction of the Red Haven, Sun Haven, Rich Haven, and several processing varieties promises better and more consistent yields. It is expected that acreage in peaches in southwestern Michigan will be increased about 10 percent in the next 5 years, with an increase in production of about 15 percent.

Pears and plums: Data in table 1 indicate that the bearing acreage of these fruits has been about 6,000 acres since 1939. They are important fruits to many individual producers and in localized sections; but seasonally, their harvest falls between peaches and apples and rarely involves a problem of labor recruitment. Such changes as may occur in the production of pears and plums will not influence materially the need for migratory labor in 1960.

Grapes: Something of a revival of grape production has occurred in recent years. Most of the 14,000 acres in vineyards are located in Berrien

and Van Buren Counties, where additional winery and grape-juice processing plants have been built. Grapes are the last large crop harvested each year and, since most migratory workers have left Michigan by harvest time, some 85 percent of the crop is picked by the farm family and other local workers. For this reason and because the relatively pleasant character of the work is attractive to local labor, few difficulties in obtaining grape harvest workers have been experienced in the past and few are expected in the future.

Truck crops: In addition to asparagus, which has been discussed, a wide variety of other truck crops are produced in the area, both for fresh consumption and for processing. Since 1939 the total acreage of those truck crops has ranged from 15,000 to 20,000 acres (table 1). Truck crops are frequently put in as "catch" crops in years of early frost damage to fruits.

Tomatoes is one of the important truck crops. About 6,000 acres of tomatoes were grown in the area in 1954. About 15 percent of the crop is sold for processing and the balance is consumed fresh. Most of the latter are sold as "pinks" or "green wraps." In general, tomatoes comprise a useful cash alternative that, from the standpoint of labor utilization, fits in well with other crops competing for harvest labor and is not ordinarily regarded as a heavy consumer of migratory labor.

Although southwestern Michigan is not in the main cucumber or pickle producing area in the State, they are an important truck crop in the area from the acreage standpoint. About 3,500 acres of cucumbers were grown there in 1954.

The total acreage of truck crops is not expected to increase significantly in the next five years. Acres of an individual truck crop may increase but generally at the expense of others. The extent of this change in acreage composition will depend on many factors, such as weather, prices, and the current situation in competing areas.

Seasonal Labor

Because of the wide variety of crops with different harvesting periods, there is a succession of jobs for seasonal workers. The main jobs requiring large numbers of seasonal workers start around the first of May with the harvesting of asparagus (Fig. 1). Seasonal work builds up rapidly and reaches a peak in June and July when the strawberry harvest is in full swing. Harvesting of cherries, bush fruits, and truck crops start during the first half of July. Cherry picking lasts a little over a month and berry picking until the end of September. Various truck crops are harvested until the end of October. Picking of early apples starts during the first half of September and continues with later varieties until the middle of November. Grapes are gathered in October.

The Federal Bureau of Employment Security through its affiliated State agencies collects monthly data on the number of seasonal hired workers in many areas throughout the country. These data relate to the normal working day nearest the fifteenth of the month. The number of migratory workers, consisting of domestic intra-State, domestic inter-State, and foreign workers, is shown in Table 2 and Figure 2. Also shown is the projected number of migratory workers in 1960. In the final analysis, use of arbitrary methods in developing estimates for 1960 is unavoidable. For

this and other reasons the results have many limitations. For example, the estimates were made by projecting the number of migratory workers for each crop in direct proportion to the anticipated change in production of the crop. This ignores the factor of labor efficiency, an imponderable which has never received wide and systematic study. 5/

These estimates indicate that about 3,400 more migratory farm workers will be needed in June 1960 than were employed on farms in this area in June 1954. The additional workers will be needed chiefly to harvest larger asparagus and strawberry crops. A modest number of additional workers is indicated for the other months shown, ranging from 600 more in July to 100 more in August and October. Over the entire season an average increase of about 10 to 15 percent is considered probable. In the opinion of several observers, including the local Employment Service representative, it is conceivable that at least part of this need might be met through improved utilization of the labor supply at current levels.

5/ It is recognized that the manner in which a change in production of a crop is achieved has a direct bearing on the change in number of workers needed. For example, additional workers needed to harvest greater production of a crop resulting from more acres with no change in yield would be approximately in direct proportion to the change in production. If, however, increased production resulted from greater yields, the proportionality of the rise in workers would depend on how the higher yield was obtained and how it was gathered. A higher yield of red cherries, for example, is chiefly the result of a greater set of fruit on the trees and all the fruit is picked at one time or as commonly expressed "the tree is stripped." Under these conditions, no difference is involved in such tasks as moving the ladder, and the increase in time and in workers needed would be less than proportional to the rise in production. Yield changes resulting from other combinations of number and size of fruits and of methods of harvesting would result in different relationships between production and workers.

While migratory workers are the chief consideration in this analysis, the supply of local seasonal workers must also be considered. In 1954, local workers constituted around a fourth of the seasonal farm labor force in the area at the height of the season, according to reports of the Bureau of Employment Security. And this group was particularly important at the beginning and end of the season. The estimating procedure used for 1960 assumes that locals will comprise the same percentage of the seasonal work force as in 1954. The supply of local workers, depending as it does on nonfarm employment conditions in the area and other factors, is unpredictable yet significant. If it is other than has been indicated for 1960 the projections of migratory workers must be modified accordingly.

Recommendations for Meeting Future Needs for Migratory Workers

Additional workers, better labor utilization, or both, appear to be needed in southwestern Michigan during the next five years. Appropriate steps will have to be taken to accomplish this purpose, and this presupposes remedial action on problems that presently limit the supply and utilization of migrants. Among these doubtless is a lack of incentives necessary to attract additional workers and to keep them fully employed.

The objective of this report does not extend beyond providing estimates of future labor needs. Meeting these needs is a task for other persons and agencies. In January 1955, the Governor's Study Commission on Migratory Labor in Michigan formulated a series of recommendations aimed at improving the working and living conditions of migratory workers in the State. These cover a wide range of problems -- economic, education, and

Harvest season of selected labor-using crops
Southwestern Michigan

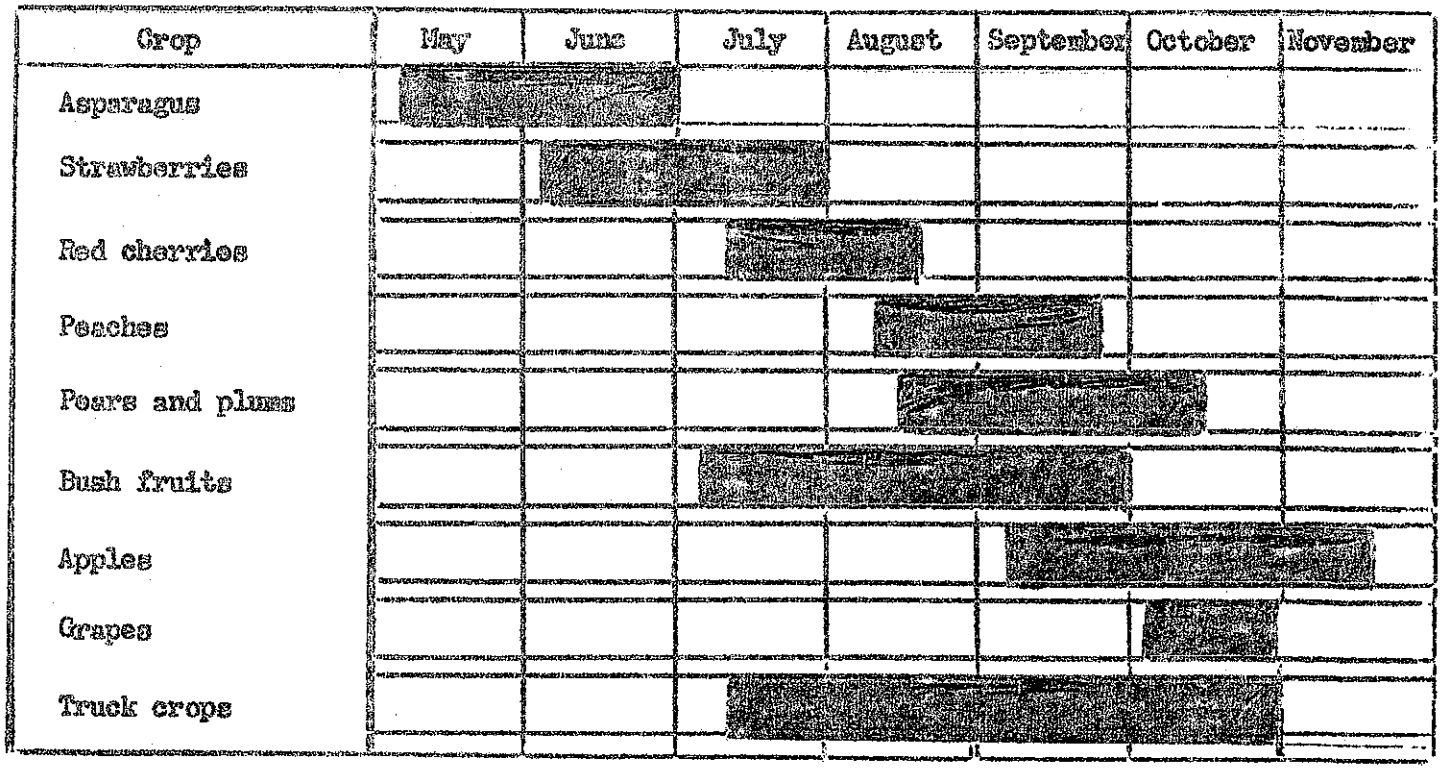

Figure 1
Adapted from publications of the Michigan Employment Security Commission.

Table 2.- Number of migratory farm workers in 1954 and estimated number in 1960, by months, southwestern Michigan.

Month	1954 1/	1960
	1,000	1,000
May	1.3	1.5
June	14.0	17.4
July	13.0	13.6
August	7.0	7.1
September	7.0	7.3
October	3.0	3.1

1/ Source: Employment and Wage Supplement, Farm Labor Market Developments, Bureau of Employment Security, U. S. Department of Labor.

Migratory farm workers in 1954 and estimated number in 1960, Southwestern Michigan

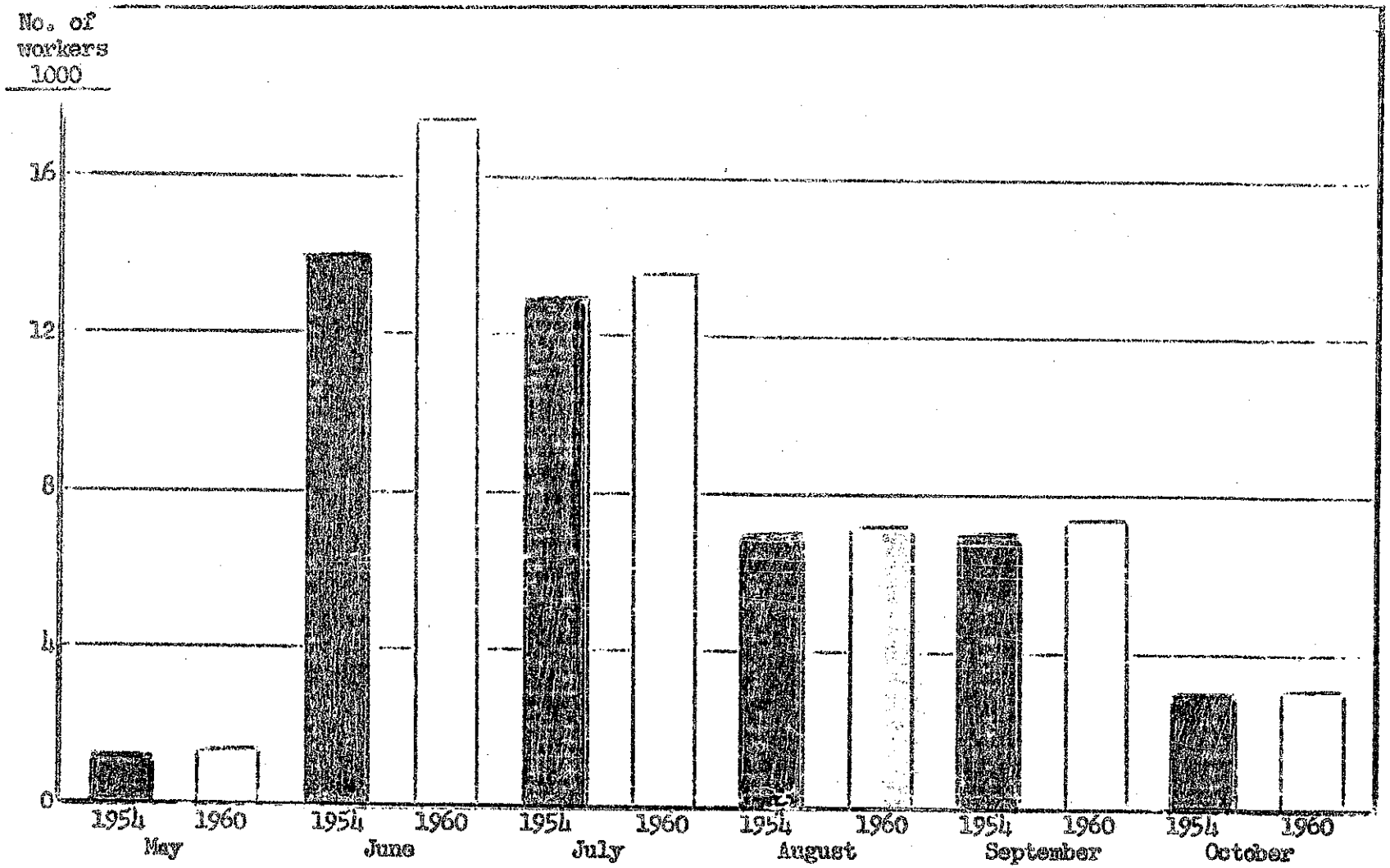

Figure 2

child labor, community relations, health, and welfare. The reader who is concerned with solutions may refer to this comprehensive list of proposals.

Note on Variable Factors Involved in the Calculations

Appraisals of future labor needs such as the above necessarily are subject to a wide margin of error due to the complex of variables that may sharply raise or lower actual versus estimated production. Labor efficiency, as already indicated, is one of many factors that cannot be predicted accurately. A brief review of other major variables may help the reader to substitute his own judgment for that of the authors and thereby arrive at independent conclusions.

First, the status of the national economy as well as that of the southwest Michigan region will be a paramount consideration. Many of the heavy labor-consuming crops grown in the area are luxury or quasi-luxury items that are purchased in volume only by a comparatively fully employed high-income population. As already indicated, the analysis here assumes a continuation of high-level economic activity in the Nation as a whole with a constantly rising gross national product. Likewise relevant is continued industrial prosperity in Michigan and nearby States, particularly in truck and automobile manufacturing and allied industries whose workers represent the core of the primary market for the farm products of southwestern Michigan. Associated with this factor is the question of an extension of differential population growth now favoring the primary market area.

Physical limitations in productive land area, while not of immediate concern, in time may slow an otherwise normal rate of expansion of farm production. Climatic factors largely define the geographic boundaries of

fruit and vegetable enterprises both to the west and the north, while industrial, residential, and recreational uses are making slow but steady incursions into this limited area. It is probable that intensification of many enterprises is proceeding more rapidly than is the diversion of land into nonagricultural uses, but the Lake Michigan strip unquestionably offers many advantages to the nonfarm investor. A related though contrary adjustment toward a larger average operating scale and greater crop specialization appears likely. Such a shift should have the effect of reducing overhead costs per unit of product while simplifying the application by farm operators of improved practices. The presumed net effect would be higher yields for most crops. Since greater labor efficiency can be achieved under conditions of high than low yields, labor needs per acre probably will rise at rates lower than the gain in yields.

Certain rather sweeping advances in technology seem to be in the making, although with the exception of the possible development of a strawberry capping machine there is little prospect of large savings in field labor during the crucial harvest period. Further mechanization of the delivery, handling, and processing operations of many fruits and vegetables doubtless will be accomplished. Irrigation, now practiced mainly in strawberries, may be extended to some of the other crops, with resultant increases in production. Improvement of varieties often has several purposes but higher yields are usually a primary aim and some of the plant breeding work now in progress is certain to increase the average yields of several important crops.

It is also reasonable to expect more extensive and timely use of fertilizers, insecticides, and pesticides to stimulate production per acre. Disease or insect infestations with which farmers are not readily able to cope may always occur, especially in an area of diversified production. Because of modern means for combatting such damage, however, as well as a wider diffusion of technical knowledge among farmers than was true in the past, the probabilities of disastrous crop losses from such causes are comparatively remote and were ignored in the foregoing estimates. The possible influence of adverse weather, particularly in an area as far north as southwestern Michigan, is unpredictable. Tree fruits are especially vulnerable to frost losses, and the trees themselves may be destroyed in large numbers by a late freeze, thus altering production trends over a period of years. It is assumed here that this will not happen; if it does, the entire set of calculations may be rendered invalid.

Responsibility for the conclusions reached in this statement rests with the authors. However, among the many persons contacted the following were particularly helpful in supplying information and opinions:

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District Horticultural Specialist, Michigan State University Agricultural Extension Service, South Haven, Michigan; Donald Hamilton, Manager, Benton Harbor Farm Labor Office, Michigan Employment Security Commission, Benton Harbor, Michigan; Rolland Kelley, Benton Harbor Farm Labor Office, Michigan Employment Security Commission, Benton Harbor, Michigan; Andrew Kramarz, Farm Placement Supervisor, Employment Service Division, Michigan Employment Security Commission, Detroit, Michigan; Max Smith, General Manager, Millburg Growers Exchange, Millburg Station, Benton Harbor, Michigan; G. A. Swanson, Agricultural Statistician, Michigan Cooperative Crop Reporting Service, Lansing, Michigan; J. F. Thaden, Associate Professor of Sociology, Michigan State University, East Lansing, Michigan.