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CHANGING TECHNOLOGY AND THE NEED FOR MIGRATORY FARM LABOR

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Statement for Joint Meeting of Working Group, President's
Committee on Migratory Labor and Migrant Ministry, National
Council of Churches, February 19, 1959.

The structure of American agriculture is so varied, so complex, and so interrelated that an attempt to indicate its future course and its demands for migratory workers is a formidable and hazardous undertaking. It involves a wide range of variables with different degrees of predictability. Time allotted does not permit a comprehensive review of the subject. However, I shall attempt to give some clues as to the likely direction and to indicate the magnitude of the change.

I would like to broaden the subject to include seasonal workers. A farm-worker's attachment to any category of worker or even to the farm labor force itself is transitory. Most of these workers are not doing farmwork from choice. Many of them prefer and are actually seeking nonfarm jobs. Often they are qualified to do little other than farmwork. In fact, many persons who are doing seasonal farmwork lack the qualifications for the more responsible farm jobs. An increasing amount of skill and know-how is required to operate the machines found on modern farms.

Before considering the technological changes that will influence the need for seasonal and migratory farmworkers, it may be well to set the stage by indicating the makeup of the farmworking force. In 1958, the number of farmworkers averaged a little over 7.5 million, of which about three-fourths, or 5.6 million, were farm operators and members of their families who worked without wages. Family workers constituted a larger proportion of farm employment during slack periods than during busy seasons. During periods of peak employment, almost a third of the workers were hired workers. Numbers of these workers equaled about 2 million, or approximately a fourth of the average monthly employment last year.

People who work on farms for wages are a diverse group in several respects. Three and a half to four million people did some farm work for wages during each of the last few years. Of these, only about a fifth had 150 days or more of farm employment or were regular hired workers. A smaller percentage had year-round farm work.

Continuity and length of employment of the remaining hired farm working force varied considerably. Around half of them had fewer than 25 days of farm wage work during the year. Many of these people are not in the labor force during the slack season. A large part of these doing only seasonal work are local workers who return home each night.

In 1956, only about a tenth of the people who did farm wage work were migratory workers who moved from place to place in their quest for employment. In terms of the total farm job these workers are not of prime significance but migration introduces many problems that are not easily solved. These problems include those of transportation, housing, and medical care. In addition, families

are often involved. When this occurs it adds problems such as education and child care.

Farm Production

One of the chief considerations in indicating the future need for farmworkers is the level of agricultural production in years to come. Recent projections indicate that the demand for farm products will be 11 percent higher in 1965 and 36 percent higher in 1975 than the 1956 level of production. ^{1/}

Our ability to attain this output is not questioned. It is expected that a surplus of some commodities will be with us for some years to come. Last year, for example, farm output was less than 2 percent below the anticipated need for 1965 - 7 years from now. That is to say, we are now considerably ahead of the rate of increase necessary to reach the projected needs. At the necessary average rate of increase, farm output last year would have been 3 percent above 1956; instead, it was almost 9 percent above the base year. But it should be remembered that in 1958, the weather was exceptional. Although livestock contributed to the increase, most of it came from higher yields of crops.

The projections were based on a set of assumptions that included a population of 230 million by 1975, which would be 37 percent more people than in 1956. Farm production has followed the trend in population in the past and a similar relationship is expected in the future (fig. 1). Other assumptions included farm prices at approximately the 1956 level, a continued high level of economic activity, and no war. The projections indicate a need by 1975 of 28 percent more crop production and some 40 percent more livestock production as compared with 1956.

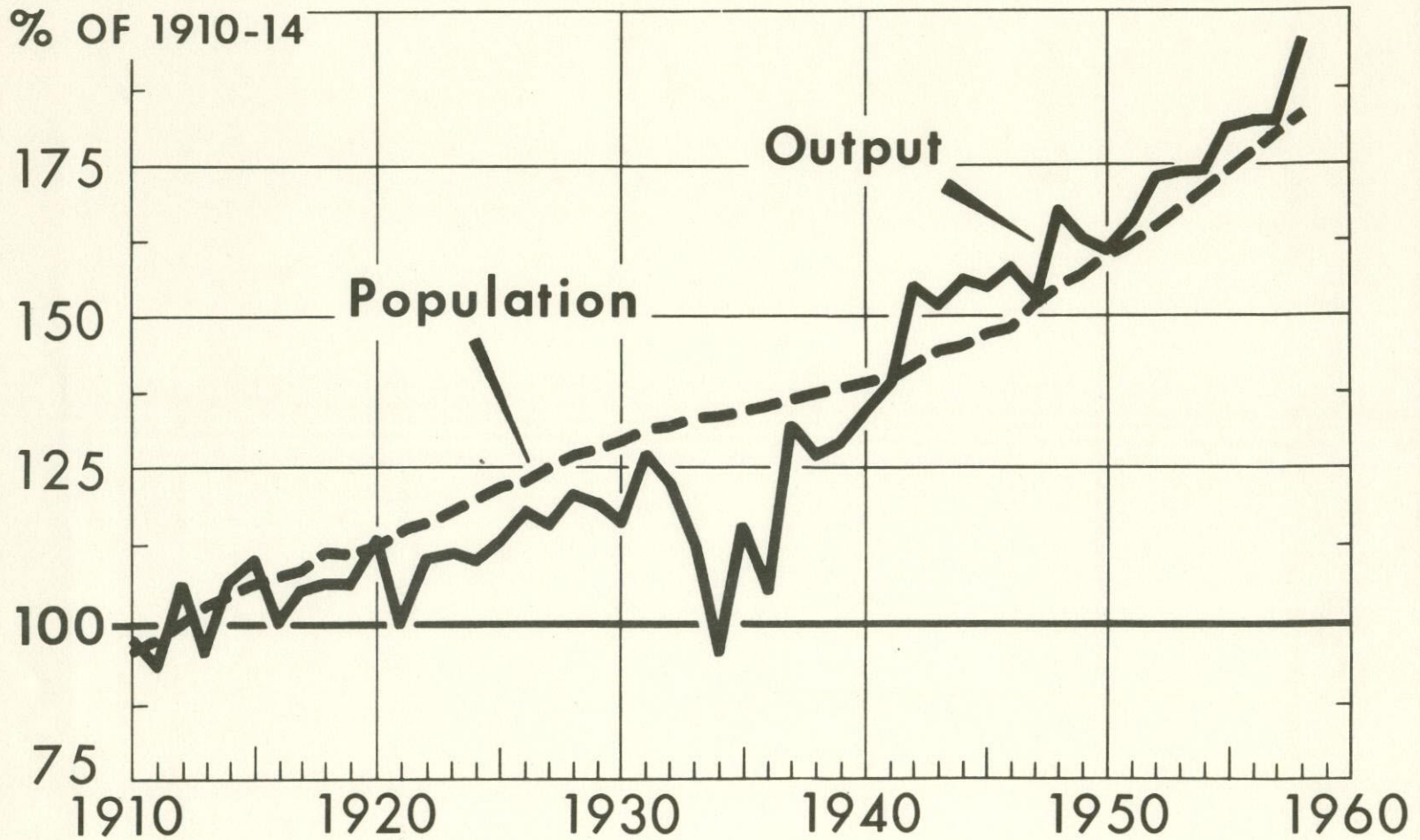
What would this level of production mean to the crops that now require large numbers of seasonal and migratory farmworkers? The projected domestic demand for fruits and vegetables in 1975 is 58 percent above the 1956 level (fig. 2). Appraisal of prospective domestic requirements for cotton is complicated because of the competition of synthetic fibers and other factors, but these requirements are expected to range from 55 to 60 percent above 1956. Production of grain and potatoes is projected at about a fourth above the base year. The increased crop production in total will need to come largely from higher yields as only a small increase in acreage of cropland is anticipated. But there would be considerable adjustment in acreages of certain crops. Acreages of vegetables and fruits, for example, would need to increase.

Changes in Technology

Equally significant to prospective production in indicating the future need for seasonal and migratory labor are the expected advances in mechanization and technology. Reductions in labor owing to these factors have not been distributed evenly throughout the different areas of the country or among the different crops. Despite some mechanization, cotton is outstanding in the magnitude of its demand for seasonal and migratory workers. As compared with spring work, a larger number of workers are used for harvesting even though progress has been made in mechanizing

^{1/} Daly, Rex F., Prospective Domestic Demands for Food and Fiber - published in Policy for Commercial Agriculture--Its Relation to Economic Growth and Stability, Subcommittee on Agricultural Policy, Joint Economic Committee, 85 Congress, 1st Session.

U. S. POPULATION AND FARM OUTPUT



1910-56 POPULATION ESTIMATES FROM CENSUS BUREAU

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Figure 1

this operation. You will recall that cotton farmers began to use mechanical pickers following World War II. The proportion of the national crop picked by machine rose from 4 percent in 1950 to 19 percent in 1957. Even greater progress in mechanizing the harvest was made in the western areas, particularly California. There the practice started early, and 34 percent of the crop was machine-picked in 1950 and 70 percent in 1957. But in the South, mechanical picking developed less rapidly. In Mississippi, for example, it rose only from 3 to 17 percent between 1950 and 1957. This is a slower rate of adoption of mechanical picking than was expected earlier and than is indicated by the number of mechanical cottonpickers on farms. Each year, machines stand idle while cotton is picked by hand. There are several reasons for this lag, particularly in the South, and some of them are beyond the control of growers. Wet weather, high humidity, rank growth of the cotton plant, and weeds are all deterrents to mechanical picking. But a relatively adequate supply of labor at low wages is perhaps the most significant reason. Last fall, the U. S. average picking rate up to November 1 was \$2.65 per 100 pounds of seed cotton, virtually the same as it had been for more than a decade, with minor ups and downs. During the same period, farm wages paid on a time basis, such as per month or per week, went up a fourth or more in the cotton areas.

An additional reason for the slowness of the spread of mechanical picking is the need for workers to do spring work - chopping and hoeing. If these workers cannot obtain employment during the picking season, they may not be available for spring work. But progress is being made on spring mechanization. A recent study of 40 plantations in the Delta Area of Mississippi indicates that the proportion of the acreage planted by hill dropping, which reduced chopping, rose from 10 to 30 percent between 1953 and 1957. ^{2/} In addition, the number of plantations using chemical weed killers more than doubled and the acreage treated increased from 28 to 57 percent. Flame cultivators and aeroplanes for spreading insecticides were also used more widely in 1957.

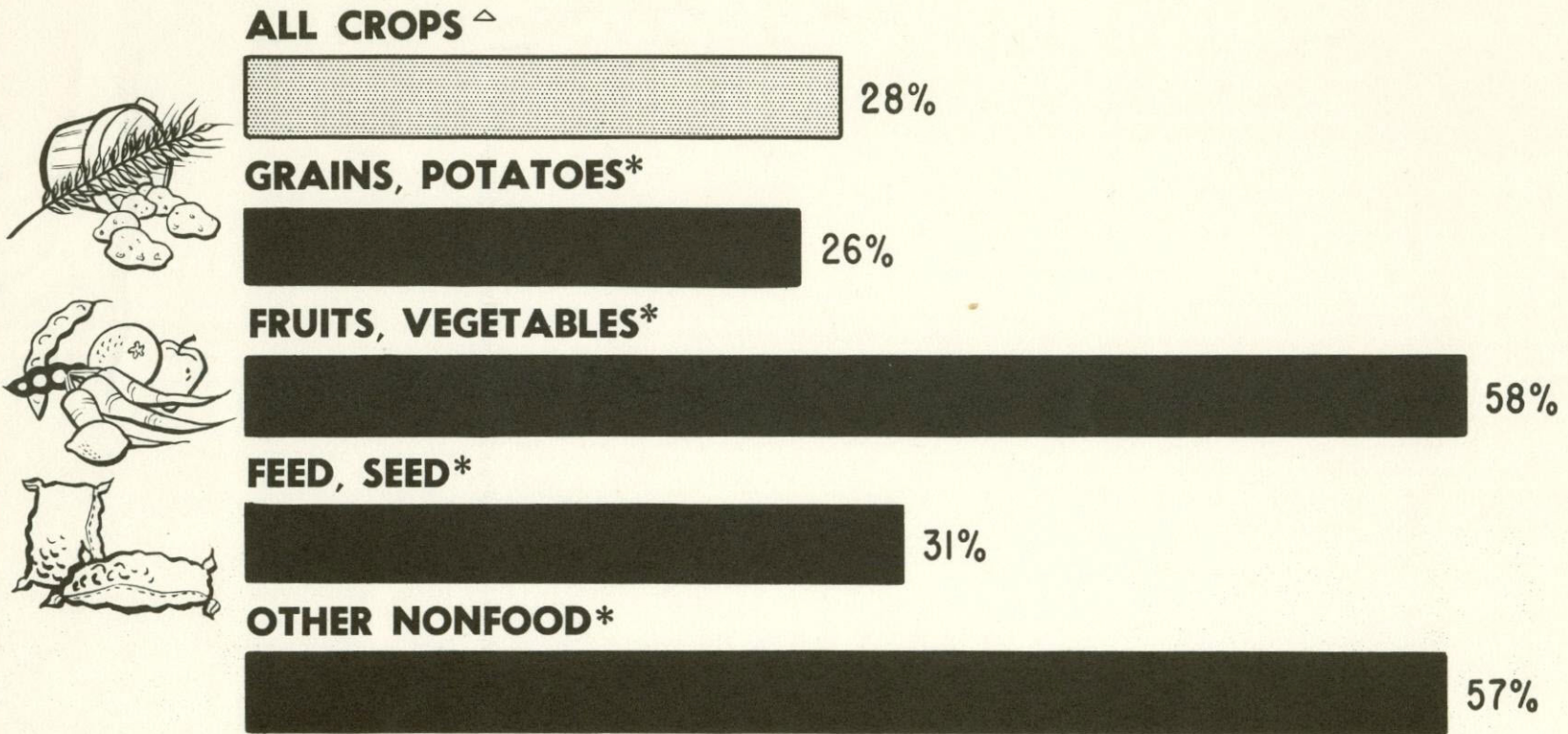
All these practices save labor and their influence should not be minimized. Considerably fewer workers are now used in cotton production than formerly and additional progress is expected. But the future is unknown. Currently, for example, there is considerable speculation regarding the acreage this year under the new provisions in the program, and acreage directly affects the number of workers needed. It is safe to say, however, that with the present wage and cost structure, complete mechanization of cotton production and harvesting cannot be expected. Costwise, there is now little incentive for the grower to shift to more mechanized methods.

Historically, fruits and vegetables have required large numbers of seasonal and migratory workers. In view of the projected additional production, the need is likely to continue. But there are many developments that tend to reduce the labor force needed for these crops. Almost two-thirds of the peaches are now processed, mainly frozen or canned, compared with approximately a third of the crop about 15 years ago. Processed citrus, including concentrated frozen juices, have come even more to the front. Currently, about 60 percent of the snapbeans are processed but only two-fifths of the 1949 crop was so handled.

^{2/} Nelson LeRay, Jr., and Grady B. Crowe, Labor and Technology on Selected Plantations in the Delta Area of Mississippi, 1953-57. A Progress Report (In Press).

DEMAND FOR CROPS

Projected Change, 1956 to 1975



ASSUMING CURRENT PRICES [△] CHANGE IN PRODUCTION NEEDED *DOMESTIC UTILIZATION

SOURCE: AGRICULTURAL MARKETING SERVICE, USDA

Figure 2

As improved methods of preserving including irradiation are developed, we can expect greater quantities of these crops to be processed. As less care is needed in handling produce intended for processing, the trend in that direction cuts labor requirements. Often, the crop can be harvested mechanically and handled in bulk rather than in small containers. Bulk handling is done either directly in trucks or in pallet boxes that can be loaded and unloaded with fork-lift trucks. These boxes and trucks have had wide use in processing plants and in packing sheds and they are being adopted for field use. Palletized tanks of water, for example, have recently been used to assemble sour cherries in the orchard and transport them to the plant. Unloading is accomplished by opening a spigot at the bottom of the tank and letting the cherries and water flow out into flumes.

A recently developed machine that may have a significant impact on the migratory labor force is the snapbean harvester. Last year, more than a half-million tons of snapbeans were produced on almost 300,000 acres and in August more than 100,000 seasonal workers were employed in picking them. A recent study of snapbean harvesters indicates that they cut harvesting costs by about half and eliminate the need for large numbers of workers. ^{3/} Machines were used to harvest about two-thirds of the snapbeans for processing in New York last year, and they have been used successfully on green lima beans also. The present machine damages some beans, but improvements will be made and eventually machines will be used for all kinds of bush beans including those for fresh consumption.

Another type of machine that has substituted for much hand labor and that will continue to reduce the number of workers needed to harvest vegetables is the conveyor-belt field harvester. The essential feature is a mobile conveyor belt extending over several rows. The machine travels parallel with the rows and carries the produce from the hand picker to a receiving vehicle. With some, the hand pickers lie on their stomachs and work from this position. With others, they walk behind or in front of the belt and toss the produce onto it. These field belts vary from simple machines powered by small gasoline engines to cumbersome self-propelled behemoths. The latter is really a harvester-packing shed on wheels. One is widely used in California to gather and field-pack lettuce for vacuum cooling. Another has been developed to harvest and field-pack roasting ears for the fresh market.

A recently developed conveyor-belt field harvester is suspended from a superstructure over a standard tractor by cables. The belt turns parallel to the direction of travel for greater maneuverability at the end of the field and in traveling from field to field or along the road. This belt can be used to harvest cucumbers, sweet corn, cabbage, tomatoes, and several other crops. A machine that uses the conveyor-belt principle for harvesting such small fruits as prunes, plums, and cherries will be available this year. Two catcher-conveyors placed on either side of a tree and joined together around the truck catch fruit that is dislodged by a tractor-mounted mechanical tree-shaker.

Tree shakers have been widely used for several years to dislodge such tree nuts as walnuts. They may be of either the cable or boom type; shaking action in both types is obtained by an eccentric. Damage to the trees and to the produce when used on softer fruits is a drawback to this method of harvest. If damage can be reduced or eliminated, the labor-saving potential of this method of harvest is tremendous. Think of harvesting tree fruits without the arduous and hazardous job of ladder-climbing.

^{3/} How, R. B., Some Economic Aspects of Mechanical Snapbean Harvesting in New York, Cornell University, A.E. - Ext.-1, July 1958 (Processed).

Experimental models of machines for mowing raisin and wine grapes from the vines rather than hand cutting have been developed. This method of grape production will be adopted slowly because it means reworking the vineyard, and growers are reluctant to destroy their investment in established vines. Raisin grapes are now placed on trays between the rows in the vineyard. They must be turned over periodically to promote uniform drying. A machine has been developed to take over this hand job and to elevate the dried raisins to a trailing vehicle.

These are only a few examples of developments on the fruit and vegetable mechanization front. Additional machines are being built or are on drawing boards. Some of them will not be widely adopted by growers. To illustrate, the cucumber pickle harvesting machine developed in Michigan a few years ago and the Maryland tobacco-spearing machine have not replaced hand methods. Growers will need seasonal and migratory workers this year, next year, and for many years to come but in reduced numbers. The changeover to mechanized methods will be evolutionary rather than revolutionary.

Mechanization and technology often aggravate the seasonality of farm work. This has happened in cotton production; the fall harvest has been more completely mechanized than the spring work. It has also happened in sugar beets. Fall harvest of beets has been pretty well mechanized but much stoop labor is required in the spring. This uneven mechanization means that local seasonal workers have less employment and that migratory workers must do more moving between crops and areas in order to get full-season work. Preharvest work on sugar beets is being reduced, however. One major company will release only monogerm seed to its growers this year, unless the grower insists on the older multigerm seed. As the name implies, monogerm seed, in most instances, produces a single beet plant so that little thinning is required. The older seed was really a cluster of seeds. It produced several plants all except one of which had to be pulled or the stand had to be blocked and thinned. Until sugar beet thinners were developed, this job was done by workers on hands and knees or in a stooped position with a short-handled hoe. Machines for thinning beets have been available for a number of years. They are widely used, but usually they are followed by some hand thinning and hoeing. In years past, spring work with hand blocking and thinning took about 35 man-hours per acre. From 12 to 25 hours are required when segmented seed and mechanical thinners are used. It has been estimated that with monogerm seed and improved machines, spring fieldwork can be cut to 2 hours per acre. With adoption of this technology, few seasonal workers will be needed.

Potato combines that dig and deliver the tubers into a receiving vehicle have been used in such areas as Idaho and the Red River Valley for a number of years. Their use is spreading to other areas. For example, in 1958, combines were used in New Jersey to harvest potatoes for the first time. Uneven topography and stony fields will retard their use in such areas as western Pennsylvania, New York, and Aroostook County, Maine. Removing stones by hand is costly but stonpickers have been developed to prepare the land for machine harvesting. Harvesting machines are not used extensively to gather the big California crop of potatoes. As much of the California crop is harvested in the immature stage, it is susceptible to extensive machine damage. But probably labor supply and wages are also significant reasons for not using the labor-saving method. Combining potatoes reduces costs, and it seems likely that growers in all areas must adopt it or lose their position in the potato market unless they have some special advantage.

Other labor-reducing developments are occurring in production and harvesting of fruits, vegetables, and other crops. Although chemical fruit thinning is not entirely satisfactory as yet, it can be done in less than 5 percent of the time required by the hand method. Plant breeders will continue to develop varieties

adapted to mechanized methods. By enhancing yields, these varieties, plus better insecticides, fungicides and herbicides, will reduce labor needs per unit of product.

Plastic blankets containing lawn grass seeds and tapes containing flower and vegetable seeds for the home garden are now available. If cost can be held down, perhaps this technique can be adopted by commercial growers. By promoting uniform germination and exact placement of seeds, thinning work can be reduced. Additional savings would ensue if fertilizer and pesticides could be incorporated into the seed tapes.

Number and Kinds of Farms

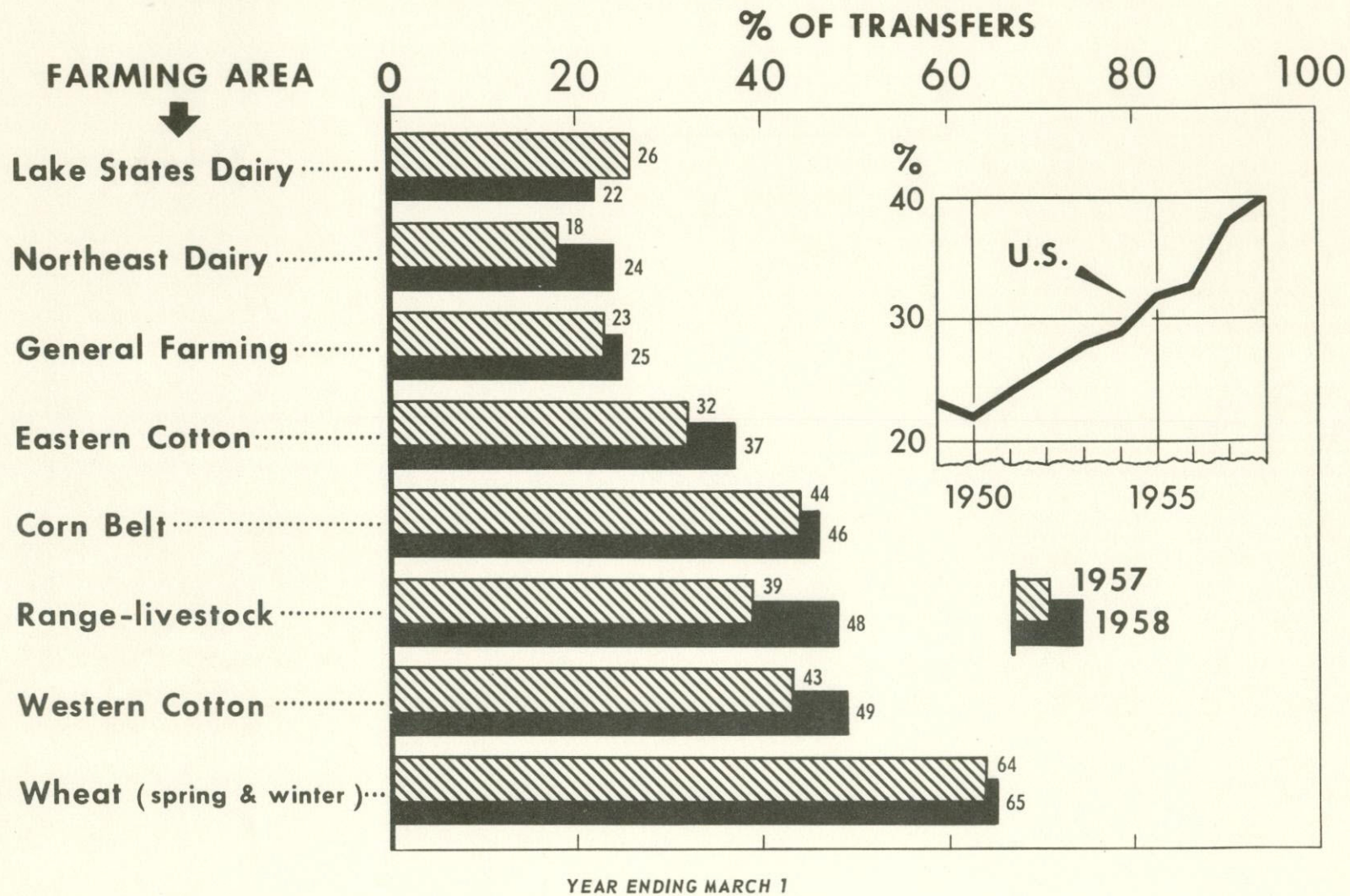
The number of farms in the United States had declined and will continue to do so. The modal organization will still be family farms, but they will be larger, more highly mechanized, and more specialized. During the year ended March 1, 1958, two-fifths of the transfers of farm land were for farm enlargement (fig. 3). Purchases for this purpose constituted an increased proportion of transfers. In 1950, they comprised 20 percent of the purchases. This means fewer but larger farms.

The degree of specialization on farms may be indicated by number of enterprises, such as milk cows, or corn, per farm. Of 20 major enterprises, the average farm had 5.4 in 1940 and 4.7 in 1954 (fig. 4). Specialization has occurred in both the general and the unusual farm enterprises. The number of farms dropped about 10 percent between 1950 and 1954, but according to the census, the number of farms reporting chickens and those having milk cows each fell 19 percent. In the same period, the number of farmers growing snap beans decreased 35 percent; the number producing tomatoes dropped 30 percent; and the number growing sugar beets fell 10 percent. In each of these instances, the average size of the enterprise was greater in the latter year. Specialization in a particular crop will mean that seasonal and migratory workers must move from farm to farm and from area to area rather than work on a succession of crops on a particular farm. Partly offsetting this situation will be the growing of different varieties of a crop with varying maturity dates. For example, maturity periods of different varieties of sweet corn range from 60 to more than 100 days.

Summary and Conclusions

Changes in mechanization and technology and the changing structure of agriculture are closely interrelated. The technological revolution of farming in the last 20 years has affected the structure of agriculture, and the structure of agriculture has influenced the changes made in technology. The net effect of these two forces will be a tendency for farms to become larger, more mechanized, and more specialized. They will still be family farms in the sense of primary dependence on family labor. But prospects are that hired labor will make up a larger proportion of the farm labor force. Trendwise, numbers of both family and hired workers have decreased about in proportion to the number of farms (fig. 5). But in the last few years these relationships changed. Operators and members of their families who do farmwork decreased more rapidly. Last year, the average number of hired workers rose for the first time since 1950. On an annual basis, the number of family workers has not increased since the immediate postwar year, 1946, and the downward trend continued last year. The increase in number of hired workers last year resulted chiefly from significantly higher yields of crops; this is believed to be a temporary change. In future years, numbers of hired workers will go down but less rapidly than the number of family workers.

FARMLAND PURCHASES FOR FARM ENLARGEMENT



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Figure 3

ENTERPRISES PER FARM

1940



5.4

1954



4.7

AVERAGE NUMBER OF 20 MAJOR FARM ENTERPRISES

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Figure 4

FARMS AND FARM WORKERS

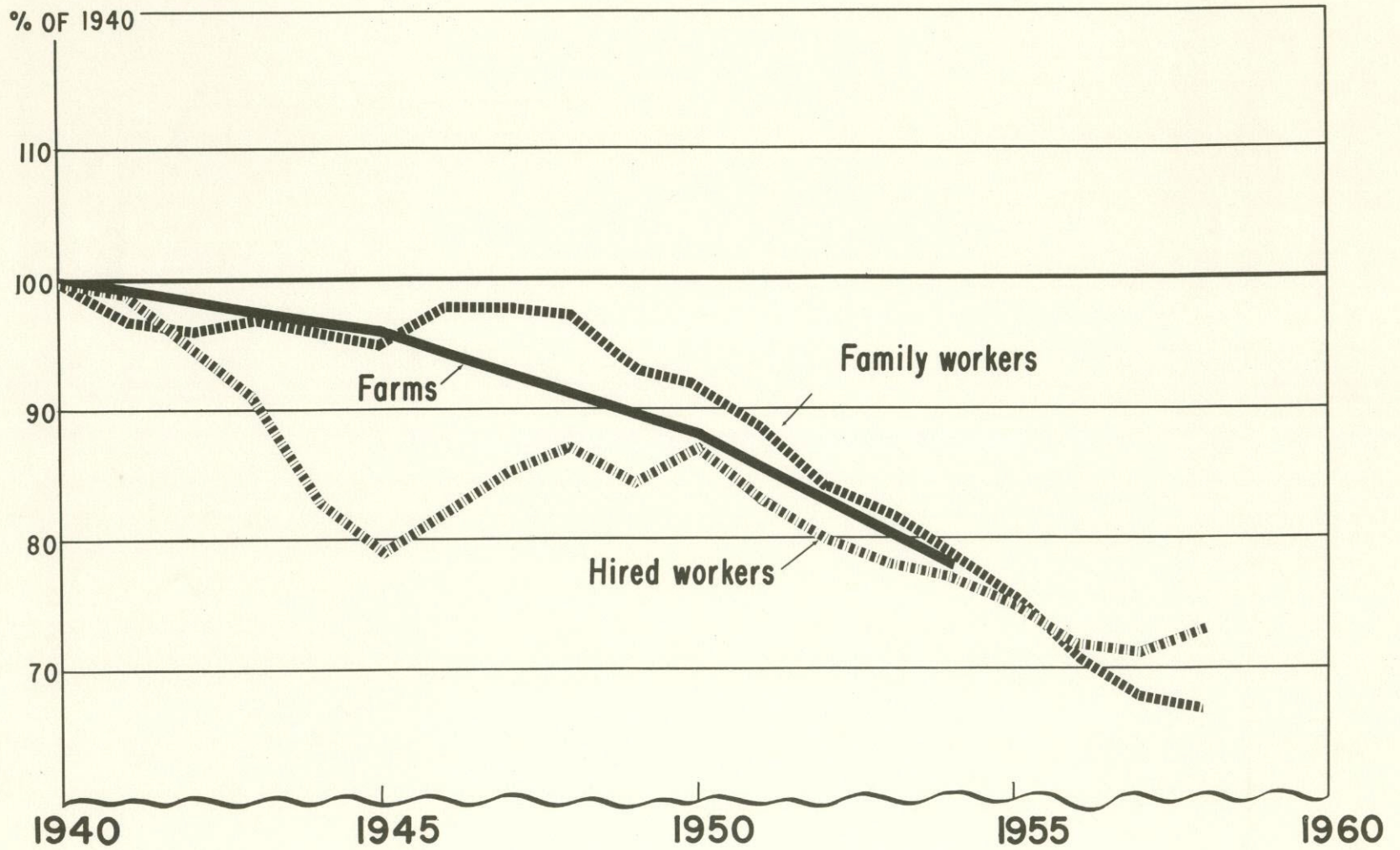
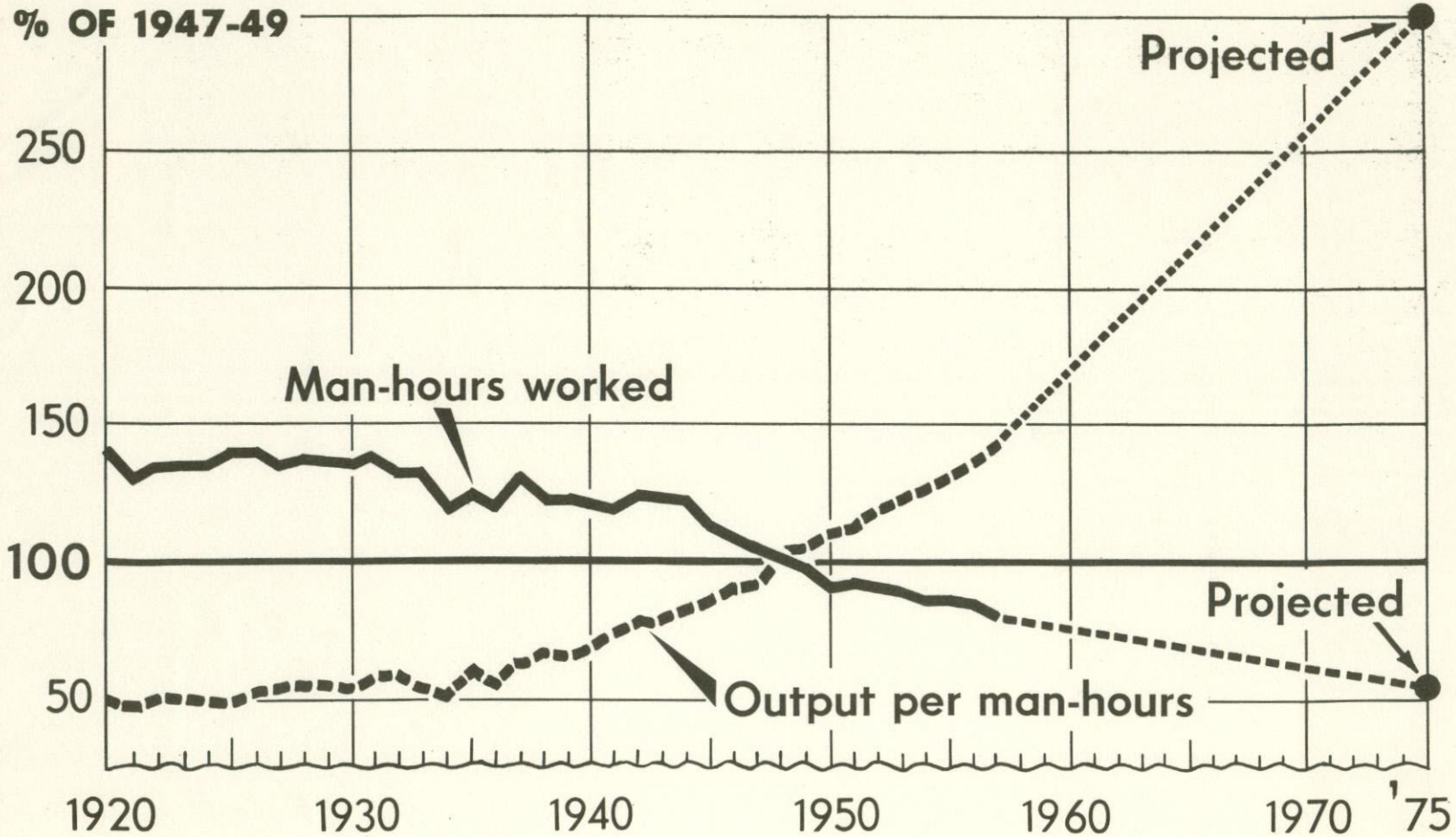


Figure 5

Seasonality will continue to be a characteristic of our agriculture. Technology will tend to reduce labor peaks, but at times it will aggravate them. In some areas during peak periods, the need for seasonal and migratory workers may actually increase.

Prospective higher demand for farm products in years hence, coupled with continued lowering of the farm labor force, means that farm labor productivity will continue its upward climb. By 1975, it will be significantly higher than current levels (fig. 6). One of the main problems will be how to improve the earnings of hired workers, particularly seasonal and migratory workers, commensurate with the items they must buy for an adequate standard of living, and how to insure that they and the farm community will reap the benefits of their increased productivity.

FARM LABOR PRODUCTIVITY



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Figure 6