

Some Geographical Factors in a Quarter Century of Indiana Harvests 1926-50

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This paper discusses how certain geographical factors directed, hindered or helped Indiana agriculture during the period 1926-50.

Soil, geomatical position and other "attributes of place" will be touched upon. The two aspects to receive most attention are weather and economic geography.

Weather is so prominent because it early became an objective. There is also another reason: Weather records and crop reports supply basic cause-and-effect data.

Economic geography is the confluence of two major activities of the region, agriculture and commerce. Further, Indiana farms now produce more raw materials for industry than they did a quarter century ago.

Graphs of harvested acreage will be used to isolate trends in the major crops. Topical graphs will further pinpoint and develop the data.

The top line of Figure 1 represents the total acres of field crops harvested in each year of the quarter century 1926 through 1950. Tree fruits and small fruits are excluded.

Hoosier farmers sometimes decided not to plant a portion of their lands. At the low points in the graph, potential cropland has been idle or in pasture. The spread between the extremes equals about 10% of the potential cropland.

The lower line is the corresponding data for corn. On the average, four out of ten acres of Indiana cropland were in corn. In general, there is a direct correlation between the two lines. Since 1941, the spread between the curves has widened. Corn is still king, but he is sharing his throne with another crop.

Figure 2 shows the acreage trends in the harvests of four other major Indiana crops. The curves have been slightly smoothed. It is interesting to note the relative position of each to the 2-million-acre line.

Wheat acreage had its major swings. The difference between the 1937 peak and the 1943 valley was close to 1 million acres. The notch at 1928 is due to winter-kill the preceding winter.

Oats declined until 1939. Since 1943, it has fairly well levelled out at about two-thirds of a million acres less than in the late 1920's.

Soybeans were unimportant until the end of the depression. The steady upward climb of soybean acreage reached a plateau in 1943. From that date until 1950, the annual average was just under 1½ million acres. As you may have guessed, soybeans now share the crop throne with corn.

Hay acreage has shown the least variation of any major crop. The slight downward trend after 1940 was due to increased production per acre.

Rye, barley and buckwheat are so minor that we will quickly dispose of them. From 1926 to 1940, these three grains together averaged about one-eighth of the wheat acreage. Thereafter they declined 50 per cent.

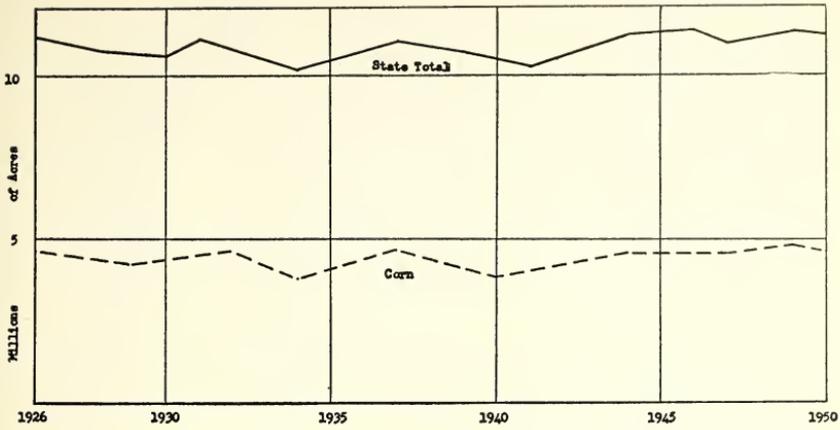


Fig. 1. Indiana harvests, 1926-50, excluding fruits.

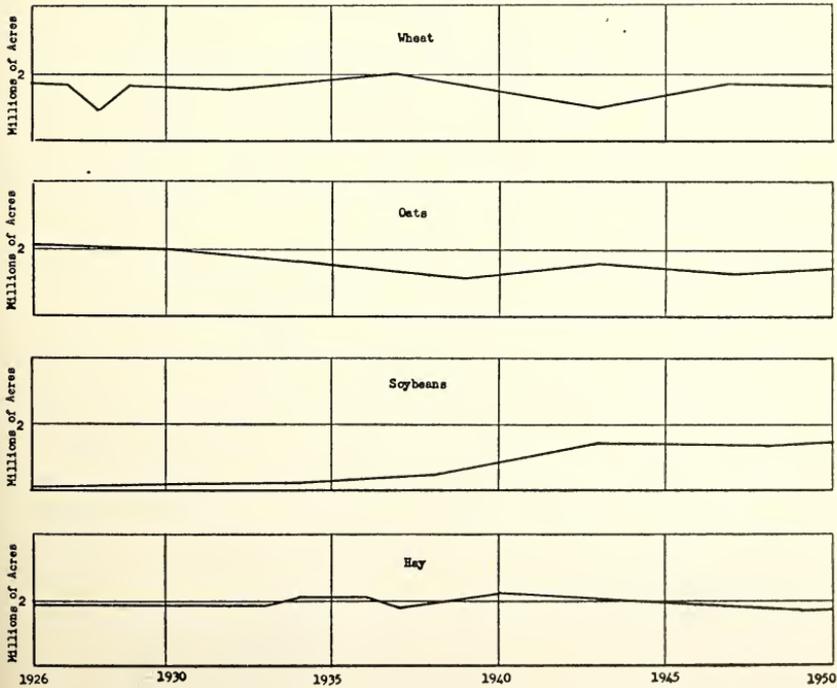


Fig. 2. Four major crops of Indiana harvests, 1926-50.

Let us now turn from the dominant field crops of the state to the special crops. Until we see them catalogued, few of us realize the scope of these special crops.

For our quick survey, we shall subdivide them into two groups. The first group covers crops grown for processing, such as tomatoes, sweet corn, cucumbers for pickles, mint and sorghum. The second group consists of tobacco, popcorn, market garden vegetables and melon crops.

Indiana's special crops are largely confined to certain sections of the state by latitude, lay of the land, type of soil, or the presence of processing or marketing facilities. On an area basis, only 2% to 3% of the state cropland is devoted to all these special crops. Because they are a form of intensive agriculture, such crops have recently produced from one-seventh to one-fifth of the total cash-crop revenue. Those special crops which are processed within the state add diversity and stability to the state's industry.

The dominant special crop for processing is tomatoes (Figure 3), which generally accounts for nearly one-third of the special crop acreage. Sweetcorn is next in importance. We have included mint with the processing crops because it has to be distilled.

Peak years for corn and tomato acreage result in an increased ratio within the normal supply area. The perimeter of the supply area may also expand as the processors' price rises.

Hauling, now done almost exclusively by motor trucks, is rapid, cheap and easy where geographic barriers are few and minor as in Indiana.

The mucklands of northern Indiana have a natural monopoly in the growing of spearmint and peppermint. Mint crops are subject to an unusual hazard of Indiana weather, wind. Plants flattened by wind are difficult to harvest. The oil yield is reduced, too, when that volatile substance escapes through breaks in the leaves.

Sorghum is of little commercial importance. In recent years, the reason has been economic. Hand labor is required to strip the leaves and cut the stalks.

On Figure 4 is the second division of special crops. Perhaps you are surprised at the potato acreage Indiana once maintained. Subsidy payments and changing food habits are responsible for the drop.

In years of state-wide drought, truck crops in the spongy lacustrine soils of the northern districts have suffered little. Conversely, excessive spring rainfall and subnormal temperatures delay plantings in such soils. With the advent of seasonable weather, their crops grow profusely. If the frost date is normal or later, production is high despite the slow start.

Capitalizing on latitude and soil, certain sections of southern and southwestern Indiana grow melons. The light soils desirable for this culture warm up rapidly as summer insolation increases. Drought is a major peril. Good markets await in metropolitan areas only hours away by modern transportation.

In both a geographic and an economic sense, a considerable portion of Indiana's tobacco land is marginal. Started by hotbed methods, tobacco is very sensitive to extremes of weather for several days after transplanting.

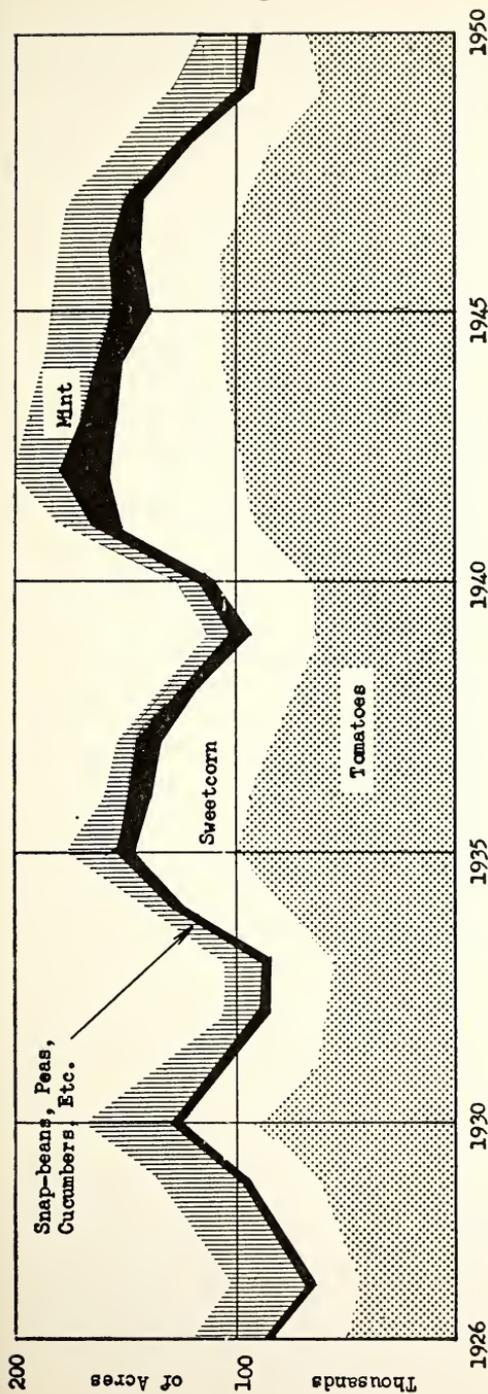


Fig. 3. Special crops for processing.

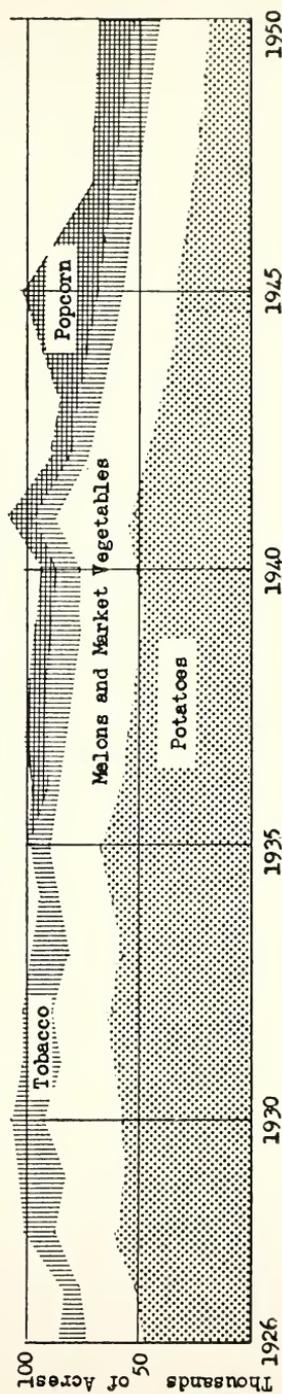


Fig. 4. Other special crops.

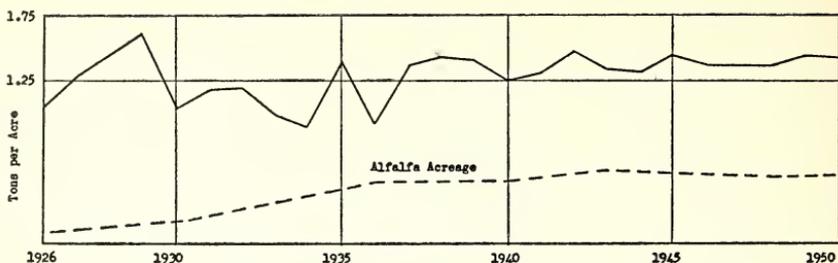


Fig. 5. Alfalfa acreage.

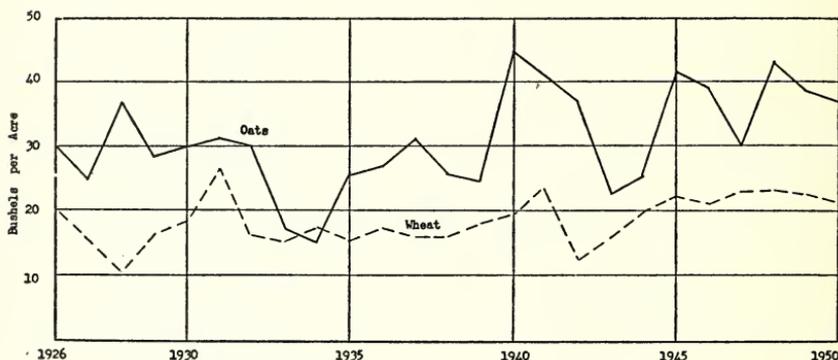


Fig. 6. Average yield per acre of oats and wheat.

Prior to 1935, popcorn was not considered worth reporting. In 1945, this crop was worth 2½ million dollars, twice the value of that year's rye harvest.

Having briefly considered some of Indiana's special crops, let us now go back to its prosaic crops.

It will be helpful if we remember the time element in the crop production cycle. For example, only four or five months may elapse between the time cornland is plowed and the grain is put in the crib. On the other hand, the wheat cycle is about twice as long, and encompasses more hazards.

Hay is affected by weather to an unusual extent. Once seeded, hay cannot be cultivated like field crops planted anew each year. Low winter temperatures, insufficient snow cover and drying winds kill hay. Alternative freezing and thawing at the break of winter uproots shallow-rooted hays like clover and timothy.

If the summer drought is moderate, the plants may be too short to reach the cutting blades on the mowing machine. A season of above-normal rainfall produces abundant forage, but frequently brings with it the problem of harvesting and curing. Optimum growing conditions are of little economic importance without several bright days at harvest-time.

A good year for hay seeds is one of moderate rainfall, well-spaced and slackening to dryness as the seeds mature. In 1940, the banner seed year of the quarter century, the hay seed crop was worth about 3½ million dollars.

The six years from 1930 to 1936 (Figure 5) were distinguished by the steady growth of alfalfa acreage. The superior qualities of alfalfa under conditions of sub-normal rainfall were effectively demonstrated during these years, especially in 1934 and 1936.

Clover and timothy, those traditional favorites, succumbed to drought in the springs of 1938 and 1939. Dramatic was the contrast between green alfalfa patches and brown clover and timothy fields. When summer weather met its requirements, alfalfa produced a high yield. As the alfalfa acreage curve has risen, the hay production curve has stabilized at a high level.

Starting in the mid-1940's there was a decline in the practice of cutting soybeans green for hay. Alfalfa had by that time proven its productivity, and it became profitable to let soybeans mature for grain.

We touched briefly on rye in our general discussion of trends. Although grown a little almost everywhere in Indiana, rye is concentrated in the three northern crop districts adjoining Michigan. The pronounced glacial topography of this section provides soils well-adapted to it.

Rye is sometimes used as an emergency crop. In 1931, for example, a cold dry spring discouraged some corn planting. Thus farmers turned to rye because it grows fast, and can be pastured, cut green for hay, or harvested as grain.

The average yield per acre of rye harvested in 1931 was low, for the expanded acreage had pushed rye onto unsuitable soils.

Early in this discussion, we noted the general definite decline in oats acreage. Heaviest north of Indianapolis, oats plantings increase in intensity toward the cool, moist Lake Michigan region.

Figure 6 shows a number of facts, the most obvious of which is the erratic yield of oats. Wheat has been rather consistent, and in the mid-1940's stabilized at a high level.

On a state-wide basis, the chart is also a comparison of how each fared. In 1928 and 1942 the relationship was inverse. However, the excellent wheat years of 1931, 1941 and 1948 were likewise good oats years.

Much of the land left idle by wheat killed in the 1927-28 winter was sowed to oats as an emergency crop in the spring of 1928. Not until 1940 was this year's yield surpassed.

The growing season of 1933 was hot and dry. The spring of 1934 was cold and dry; one-sixth of the oats acreage was abandoned. In 1935, oats headed poorly because wet weather encouraged plant growth rather than grain.

April, 1939, was wet and cold, followed by early growing-season drought. Abandonments reached 21% of seeded acreage, compared to about 5% normally. In addition, the Federal Government's A.A.A. branded oats a soil-depleting crop and threw its weight behind soybeans.

It is paradoxical that the best oats crop of the quarter century fell the next year. Seven years of the 1940-50 decade equalled or surpassed the 1928 high mark. Factors responsible included moist, temperate growing seasons, ideal harvest seasons and improved varieties.

The lowest point between 1935 and 1950 fell at 1943. The reason is

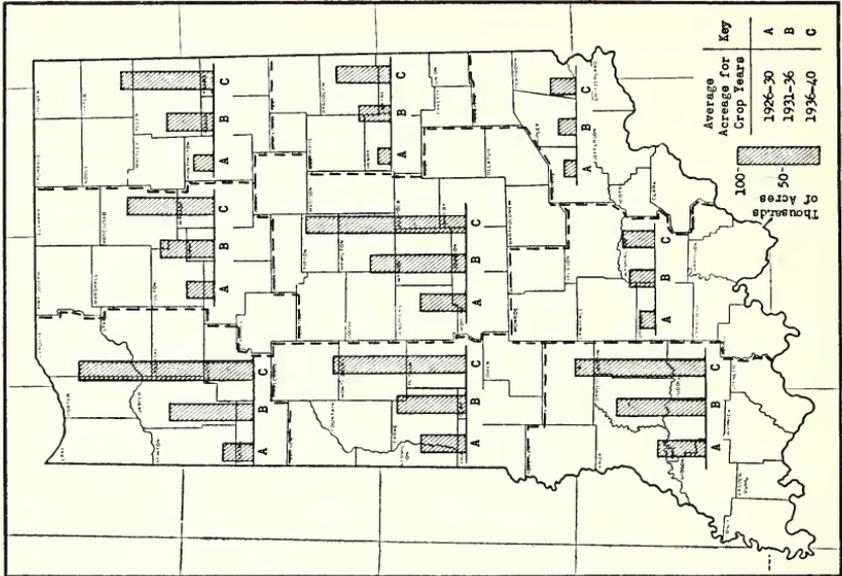


Fig. 7. Soybean acreage by crop districts.

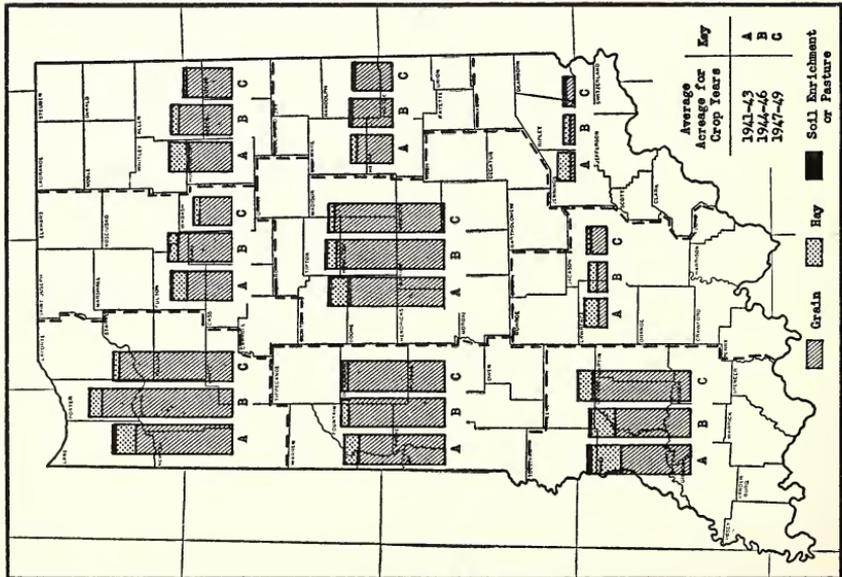


Fig. 8. Soybean use by crop districts.

geographical and most unusual. A great deal of corn was planted late that year. When the first brood of corn borers emerged, they had no corn to bore on. So in their emergency, they worked on oats.

While wheat is grown to some extent all over the state, the acreage is heaviest in the mid-central and southwestern sections. The dominant type is winter wheat. Like all crops planted so far in advance of harvest, winter wheat is subject to many vicissitudes of weather. The amount of snow cover affects the rate of survival in our state. Snow blankets the grain from killing, drying winds, and also assures a good supply of moisture once the growing season opens up.

Two of the most conspicuous valleys in wheat harvests are 1928 and 1942-43. So much wheat was killed by the winter of 1927-28 that 50% of the planted acreage was abandoned in the spring. The surviving wheat was thin, but made considerable recovery in May and June.

Both acreage and yield were down in 1942 and 1943. Drought and subnormal temperatures gave the crop a poor start in September and October of the preceding years. Many farmers withheld their normal plantings because they felt the seed wheat would not germinate.

Certain peaks stand out. The first of these is 1926, followed by 1931, 1941 and the uniformly high level prevailing from 1944 through 1950. The pattern is: A fall of favorable growing weather. Little winter kill. Precipitation below normal during winter and spring. May temperatures ideal for heavy stooling and heavy heading. Dry weather near maturity to hold down the spread of rust.

Wheat acreage in the period 1947-50 was higher than in the preceding decade, and above that of the war years. This increment took place across the northern two-thirds of the state, as improved varieties pushed the wheat frontier poleward.

All together, the most pronounced change in Indiana Harvests in the quarter century was the increase in soybeans. It is reported that United States production increased seven times from 1936 to 1948. In the same 12-year span, Indiana boosted its acreage about 30-fold (Figure 2), concurrent with 50% more average yield per acre (Figure 9).

Soybeans do well in the same situations as corn, and are ideally adapted to mechanized farming. By fitting nicely into a program of crop rotation, soybeans encourage sound land management policies. They are also more adaptable than corn to soil conservation measures like contour seeding.

The growth of soybean acreage by crop districts for the period 1926-40 is shown on Figure 7. It will be noted that the western one-third of the state and the mid-central district reflect the greatest increase.

Beginning with 1940 data as shown in Figure 8, more information is available on the three main farm uses for soybeans—grain, cut green for hay, and plowed under for soil enrichment. Two uses are dropping off: hay and soil enrichment. We have already seen that alfalfa has minimized the need for other hay. Further, soybeans fix nitrogen into the soil while they mature as grain.

It will be noted on Figure 9 that there is substantial agreement between soybean and corn production. Notches appear in both graphs at

1930, 1936 and 1940. Drought was responsible for 1930 and 1936. The spring of 1940 was cold and wet; the summer was hot and dry until well along. Soybeans this year suffered from drought at blooming time.

In 1938, wet weather delayed corn planting. Having a shorter growing season, soybeans came through all right. The 1949 yield per acre was high in the northern one-third and mid-central districts of the state. The full influence of hybrids was felt this year, giving soybeans an advantage in a mediocre corn season.

As we focus our attention on corn yield alone, at least three facts stand out. 1) The sawtooth profile, 2) the definite upward trend beginning with 1937, and 3) the few times in which there have been two good corn years in succession.

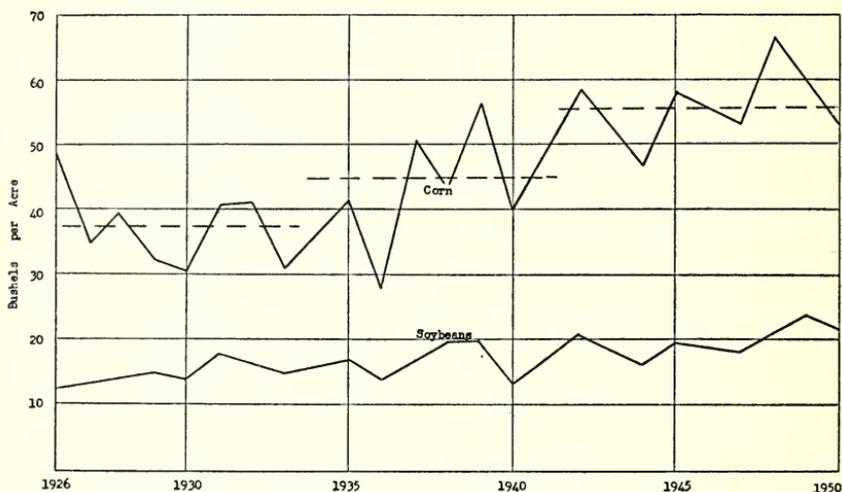


Fig. 9. Yields per acre of corn and soybeans.

The step average basis seemed most suitable for the purpose of summarizing annual corn yields. The steps (dotted lines, Figure 9) are averages of these inclusive periods: 1926-33, 1934-41 and 1942-50. The average yields per acre are 37.2, 44.7 and 55.5, respectively. The last figure is $1\frac{1}{2}$ times as large as the first one.

Suppose we convert the difference in bushels per acre into acres of cropland. At the level of production prevailing from 1926 to 1933, our 1942-50 corn crop would have required about 2 million more acres of farmland. Improved farm technology and the use of hybrid varieties have made the difference.

The practice of planting hybrids gained momentum in the early 1930's, culminating in the 1937 upsurge. In effect, hybrids promote intensive agriculture yet are adapted to extensive methods.

Summary

During the quarter century 1926-50, Indiana agriculture was greatly helped by mechanization, generally helped but frequently hindered by cyclonic weather, and directly oriented by improved varieties.

Indiana agriculture benefited immeasurably because the terrain of the state is adapted to mechanized field operations. Perishable special crops also profited from the greater ease and speed with which metropolitan markets could be reached by motor transport. There was a substantial increase in the use of farm products as raw materials for industry.

Cyclonic weather dominates the complex of Indiana crop productivity. However, its relative weight declined in the quarter century as mechanization and hybrid varieties minimized its impact. Mechanization makes possible a great deal of essential farm work between changes in cyclonic weather. Fast-growing hybrids can redeem a late season or a short one.

Finally, the control of latitude over crops was reduced as the application of technology shifted crop frontiers.

Literature Cited

A detailed bibliography is not listed here but constant reference was made to some 200 separate crop summary reports and assessors' enumerations published by Purdue University in cooperation with the U. S. Department of Agriculture.