CHANGE IN THE CORN BELT*

JOHN FRASER HART

ABSTRACT. *New agricultural technology has transformed the Corn Belt from a mixed crop-and-livestock-farming area to a highly specialized cash-grain-farming area. The rural landscape has been greatly modified, but the family farm remains the norm. Its acreage has doubled, but the size of farms still reflects the size of parcels purchased by original settlers from the federal government. Increased farm production requires an export outlet, but global recession and a strong dollar have reduced exports, depressed prices below costs of production, and created serious problems even for the very best farm managers.*

THE Corn Belt is in turmoil. Its traditional system of mixed farming, which had flourished for almost 150 years, has been replaced since World War II by highly specialized types of agriculture. The rural landscape has been modified accordingly. Mixed farming is based on an ecologically sound integration of crops and livestock and should not be confused with "general farming," which is a bureaucratic euphemism for a catchall category of miscellaneous types of farming that are too difficult to classify. A farmer who practices mixed farming may sell some of his crops for cash, but he feeds most of them to fattening animals or to workstock on the farm, and he returns manure from the animals to the soil to maintain its fertility for crop production.

The concept of mixed farming was part of the agricultural revolution in Europe. German-speaking farmers brought the concept to southeastern Pennsylvania long before the Revolutionary War, and in the early 1800s their descendants transplanted it to the Miami valley of southwestern Ohio, which was the seedbed of the Corn Belt. The farming system that developed in the Miami valley was based on a three-year rotation of corn, a small grain (either wheat or oats), and hay. Farmers on better ground might extend that rotation to more than three years by growing two or more crops of corn before they planted their small grain, and cultivators on steep or hilly land might leave their fields in hay for several years before plowing them to plant corn. Nevertheless, the basic rotation of corn, small grains, and hay was the key to the cropping system in the Corn Belt.

A farmer normally sold his wheat for cash, and he fed his oats and hay to livestock. He had a welcome option in marketing his corn. He could sell it for cash if the price of corn was high, or he could use it as a concentrated feed to fatten hogs and cattle. He was carefully attuned to fluctuations in

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the corn/hog ratio (between the price of corn and the price of hogs), but he generally preferred to sell his corn on the hoof, because this practice used his labor efficiently during the winter months when no crops were in the ground.

Livestock operations varied within the Corn Belt. The areas that were settled later had larger farms, and a farmer's livestock options varied with the size of his farm. Farms were smaller in Ohio and Indiana than in the rest of the region, and in these states farmers fed most of their corn to hogs, which require but repay lots of attention. Farms in Iowa were half again as large as those in the eastern part of the Corn Belt, and Iowa farmers enjoyed the option of fattening lean feeder cattle from ranching areas in the West for urban markets in the East.

The largest farms in the Corn Belt were on the western and northern fringes in Nebraska and Minnesota, which were the only parts that were not occupied when the Homestead Act was passed in 1862, and on the Grand Prairie of east-central Illinois, which was settled late because it was difficult to drain. The farms on the Grand Prairie were so large that farmers had little time for livestock. They were fully occupied with their grain crops, which they sold directly off the farm, and thus they were known as cash-grain farmers.

Farmsteads and field patterns reflected differences in farm operation.[1] Every farmstead had a wooden corncrib with slatted sides through which air could pass to keep the corn from molding, and every farmstead had a barn for hay, work animals, machinery and equipment, the family milk cow, and general-purpose storage. Cattle-feeding farms in the western Corn Belt usually had a second barn to shelter cattle; this barn was next to the feedlot, which was securely enclosed by a heavy board fence.

Efficient crop rotation required that the fields of a farm should be as nearly identical as possible, because each field was used for each crop at some time during the rotation cycle. In livestock areas each field had to have a stout fence of hogproof woven wire, because in any given year the animals might be turned into the field to "hog down" the crop to save the expense of picking it or to glean what the pickers had missed.[2] Livestock areas had interchangeable square fields of ten to twenty acres enclosed by woven wire fences, but cash-grain-farming areas needed no fences because they had no livestock, and their fields were long and narrow to reduce the cost of turning machinery at the ends of rows.[3]

THE TRANSFORMATION

The transformation of the Corn Belt began in 1933 when hybrid seed corn was introduced, but it did not really take off until after World War II.

[1] John Fraser Hart, The Middle West, *Annals of the Association of American Geographers* 62 (1972): 265–271.

[2] Eugene Cotton Mather and John Fraser Hart, Fences and Farms, *Geographical Review* 44 (1954): 201–223.

[3] John Fraser Hart, Field Patterns in Indiana, *Geographical Review* 58 (1968): 450–471.

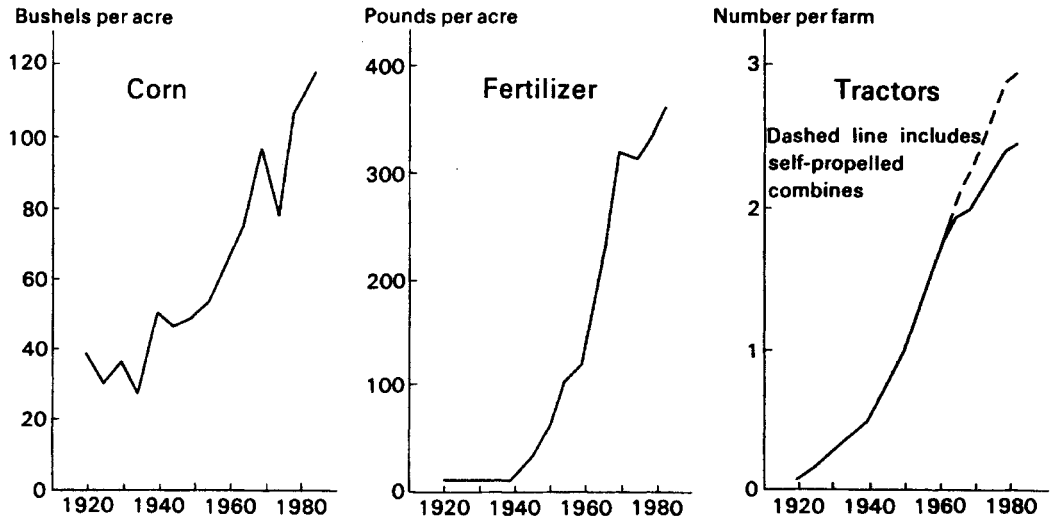

FIG. 1—Change in corn yields per acre, pounds of fertilizer per acre, and number of tractors per farm in Iowa, Illinois, Indiana, and Ohio 1919-1982.

Corn yields remained below forty bushels an acre before 1940, rose to approximately fifty bushels during the war, and then soared (Fig. 1). In 1950 farmers in the Corn Belt were wondering if they would ever live to see yields of 100 bushels an acre, but by 1985 they were feeling sorry for themselves if they failed to get at least 125.

Hybrid corn enabled them to double and even triple their yields, but it also forced them to start using a whole arsenal of agricultural chemicals. Before World War II they had been able to maintain acceptable levels of productivity with no more than barnyard manure, and they had scoffed at cotton, tobacco, and truck farmers in the South who relied so heavily on commercial fertilizer. Between 1949 and 1969 Corn Belt farmers increased their own use of fertilizer sixfold to take full advantage of the potential productivity of hybrid corn. Batteries of gleaming white tanks of anhydrous ammonia—a lethal gas that is a superb source of nitrogen if it is injected into the soil properly—have become a common sight in dealers' yards at the edge of almost every small town in the Corn Belt.

In 1939, for example, farmers in Iowa bought less than 0.2 percent of all the commercial fertilizer that was sold in the United States, but by 1982 their share had risen to 7.3 percent. Farmers in the Corn Belt also began to use a variety of other agricultural chemicals. They used pesticides to control insects and diseases, and they used herbicides to control weeds instead of cultivating between the rows as they previously had done.

Higher yields and greater use of chemicals forced Corn Belt farmers to turn to larger, more sophisticated, and more expensive machinery. In 1985 the list price of a combine was more than $100,000, a new tractor cost $35,000 to $50,000, and an electronic monitor for a corn planter was more expensive than the price of equipping an entire farm in 1950. As late as 1950 some people were still wondering whether tractors would ever completely replace

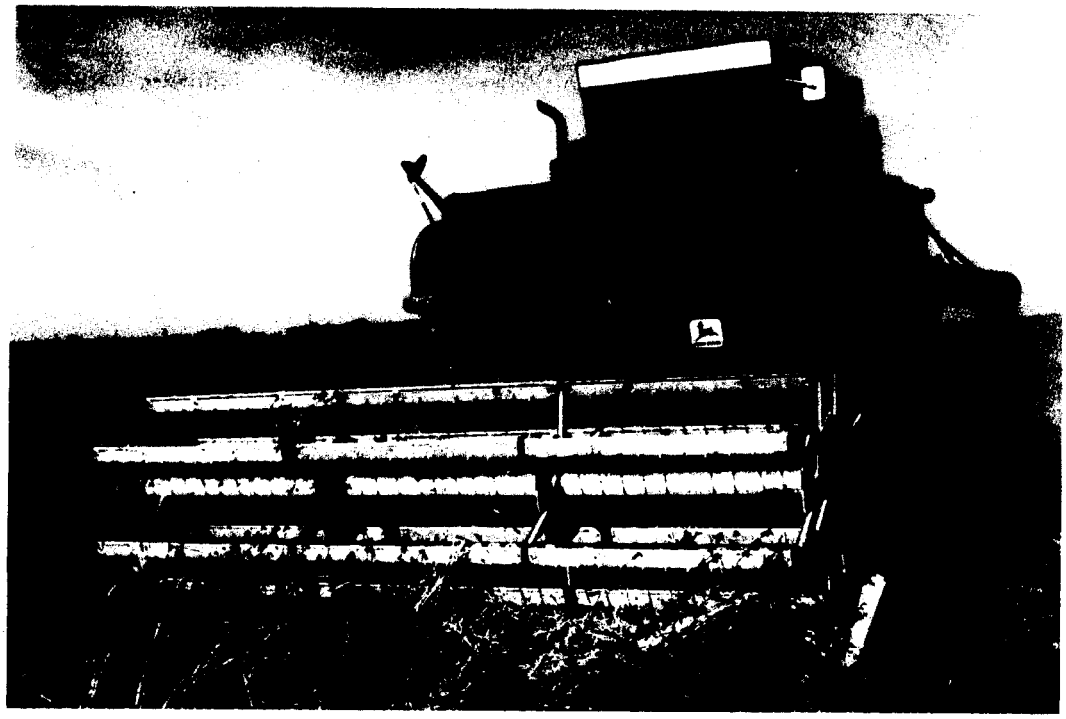

FIG. 2—A combine with a reel-type head for harvesting soybeans. This head is interchangeable with a prong-type head for harvesting corn.

horses, but the average Corn Belt farmer in 1985 would not have had the foggiest clue about how to go about hitching a team of work horses.[4]

The average Corn Belt farmer in 1949 had only a single tractor, but by 1964 he had two (Fig. 1). The rate of increase in the number of tractors per farm seemed to slack somewhat after 1964, but this slackening is misleading, because since 1964 one tractor has been replaced by a self-propelled combine harvester, which incorporates both motive power and harvester in a single massive machine. The combine has two separate harvesting heads that can be changed in half an hour or so. The farmer harvests his soybeans and small grain with the reel-type head, and then he replaces it with the corn head, which has large blunt metal prongs that nose between the rows of corn (Fig. 2).

Some old-timers can remember the days of forty-bushel corn, when they picked the crop by hand, and husky young farm boys boasted about having picked a hundred bushels in a day, but it was a long, hard day. One- and two-row mechanical pickers had almost replaced handpicking by the end of World War II, but pickers still took the entire ear from the stalk, and the kernels had to be shelled from the ear after the corn had been picked. The combine harvester both picked and shelled four or more rows of corn in a single operation, and it could harvest one hundred bushels of corn in ten

[4] Herrell DeGraff and Ladd Haystead, The Business of Farming (Norman: University of Oklahoma Press, 1948), 72–83.

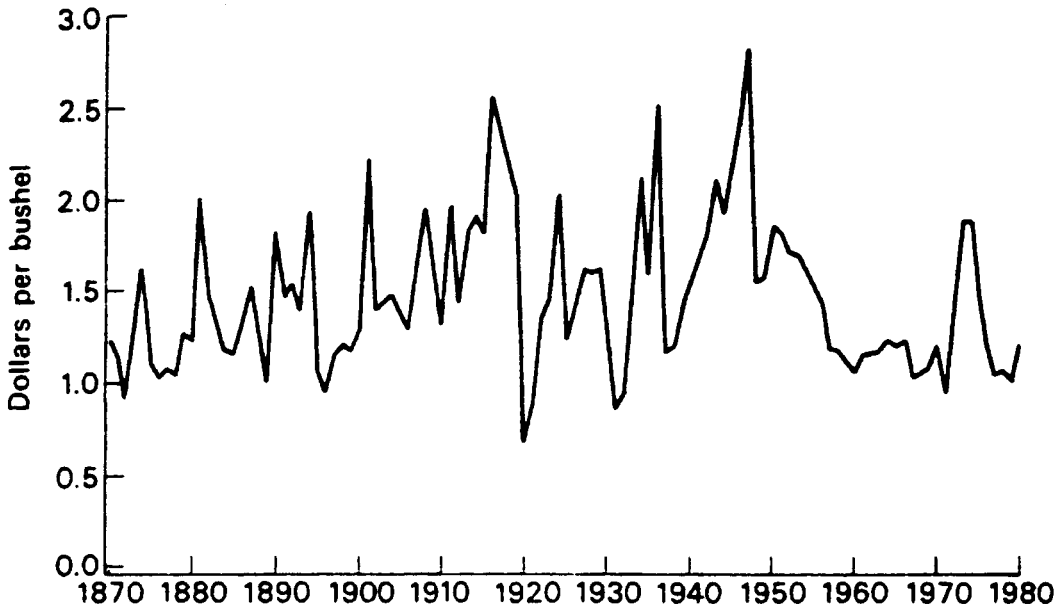

FIG. 3—Corn prices received by farmers, converted to 1967 dollars by dividing actual price by U.S. wholesale price index (1967 = 100). *Source:* Reproduced from D. Gale Johnson, World Food and Agriculture, *in* The Resourceful Earth (Oxford: Basil Blackwell, 1985), 81, with permission of publisher.

minutes. The combine forced the farmer to invest in new cylindrical storage bins of gleaming, corrugated metal, because the corn coming from the fields as loose grain could not be stored in traditional wooden cribs with slatted sides.

SIZE OF FARMS

One of the few things that has hardly changed in the Corn Belt since World War II has been the price the farmer has received for his crops. The price of corn in real dollars, for example, has remained as low as it has been at any time since the Civil War, except for a brief but spectacular upsurge in the early 1970s (Fig. 3). The cost of growing corn has continued to rise, and the farmer's profit on each bushel of corn, or on each unit of anything else he produces, has been steadily reduced as the gap has narrowed between rising costs and stable or falling prices.

He has had to compensate for his low profit per unit by producing more units, which is another way of saying that he has had to increase his volume of production to remain in business. The new technology has enabled him to produce more units from each acre of his land, but he has also had to increase his acreage. The catchword of the Corn Belt since World War II has been "Get Bigger or Go Under." Between 1949 and 1982 the average size of farms in each of the four Corn Belt states nearly doubled, although it had hardly changed between 1889 and 1939 (Fig. 4).

In 1982 the largest Corn Belt farms were in South Dakota and Nebraska, and the smallest farms were in Ohio and Indiana (Fig. 5). At first glance

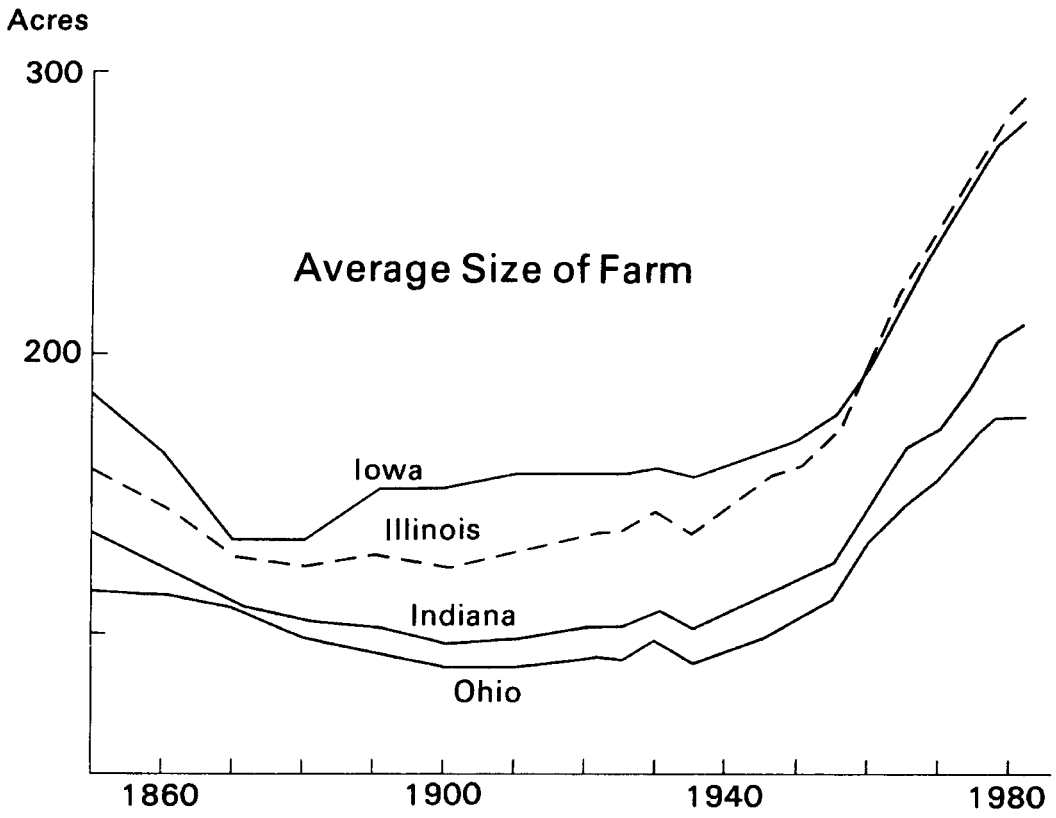

FIG. 4—Change in average size of a farm in Iowa, Illinois, Indiana, and Ohio 1850–1982.

this broad pattern might seem to suggest that farm size is related to precipitation, but such a glib environmental explanation is too simplistic to account for the complex patterns in Iowa and Illinois or even for the high values in central Ohio. A more plausible explanation is suggested by the remarkable relative stability of farm size. All farms have become bigger, but the areas that once had the smallest farms still have the smallest farms, and the areas that once had the largest farms still have the largest farms. There is good reason to suspect that the size of contemporary farms is strongly influenced, if not actually determined, by the amount of land that the first settlers originally bought from the federal government. Farms are smallest in the areas that were settled first, when available technology limited the amount of land a family could handle, and largest in the areas that were settled last, when improved technology had increased the realistic size of a family farm.

I tested this notion by exploring the relationship between the average size of farms in Corn Belt counties in 1982 and the average size of farms in earlier years.[5] The coefficient of correlation (r) for 1939 was so high (0.94)

[5] The Corn Belt, as defined in Generalized Types of Farming in the United States, Including a List of Counties in Type-of-Farming Regions and Subregions, *Agriculture Information Bulletin No. 3* (Washington: U.S. Department of Agriculture, 1950), comprised 494 counties in 11 states. I used this definition for the maps in this article, but data only for the states of Iowa, Illinois, Indiana, and Ohio on the time-series graphs.

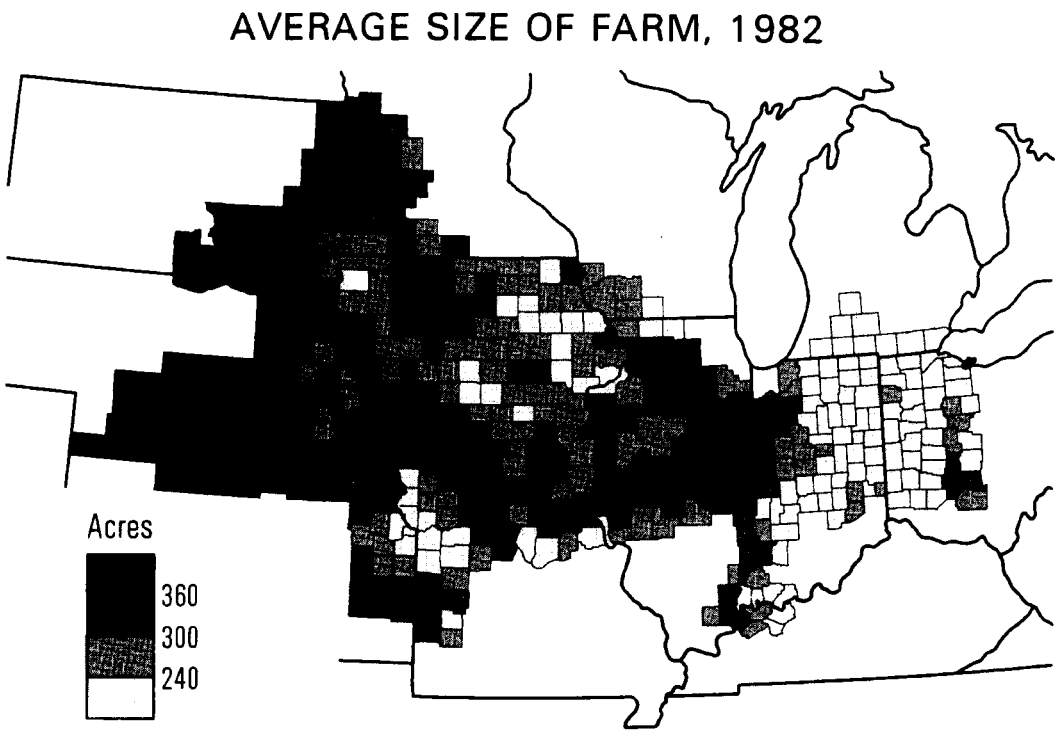

FIG. 5—Average size of farms in the Corn Belt 1982.

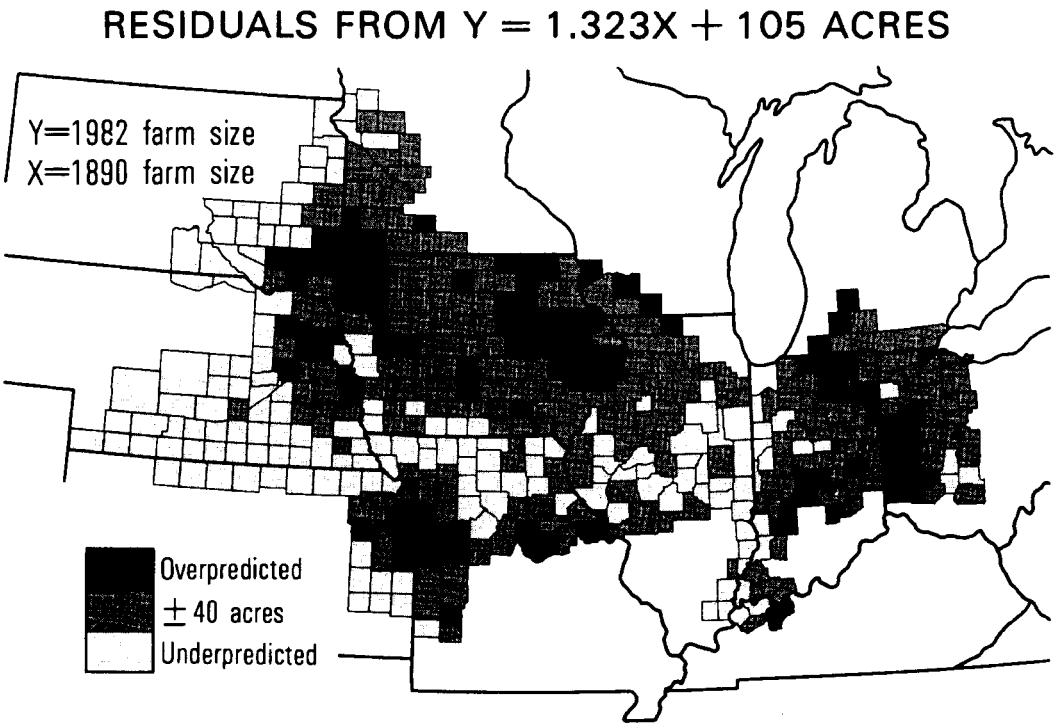

FIG. 6—Average size of farm in 1982 (Y) had a coefficient of correlation (r) of 0.61 with the average size of farm in 1889 (X) in 372 Corn Belt counties east of South Dakota, Nebraska, and Kansas.

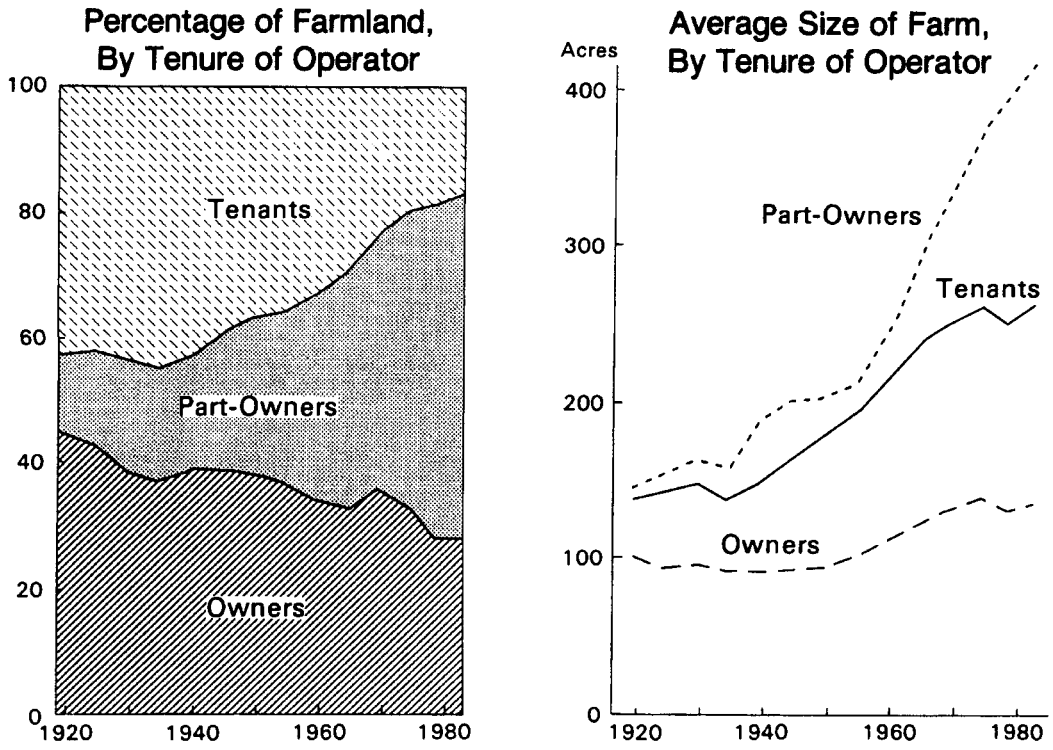

FIG. 7—Percentage of farmland operated by part-owners in Iowa, Illinois, Indiana, and Ohio has increased steadily at the expense both of tenants and of individuals who own all the land they farm.

that I went back even earlier, and discovered that farm size in 1982 had a coefficient of correlation of 0.61 with farm size in 1889 in the eastern Corn Belt (excluding South Dakota, Nebraska, and Kansas). These high values reinforced the idea that the geography of farm size in the Corn Belt has remained remarkably stable for the last century or more. Farms have been enlarged in all parts of the Corn Belt, but the relative size of farms in the different parts of the region has not changed substantially.

I used the regression equation $Y = 1.323X + 105$ acres (when X is the average size of farm in a given county in 1889) to "predict" Y, which is the average size of farm in that same county in 1982. The size of farm 93 years earlier "predicted" the size of farm in 1982 to within twenty acres in 30 percent (114 of 372) of the counties, and to within forty acres in 55 percent (204 of 372). The map of residuals from regression indicates that the predicted values were too high in areas of small farms in 1982 and too low in areas where farms were large. It seems obvious that the size of farms in 1982 was predetermined by the size of the parcels that the very first settlers originally purchased from the federal government (Fig. 6).

Recently available statistics indicate that farmers have expanded their operations by renting land rather than by buying it, and the size of ownership units has changed far less than the size of operating units. The demand for farmland has driven its price to such unprecedented heights that

few farmers have been able to buy as much as they have needed. Part-ownership has been the customary strategy for farm enlargement.[6]

A part-owner farmer is one who owns part of the land he farms and rents the rest from his neighbors. The proportion of farmland in the Corn Belt operated by part-owners increased from less than a quarter in 1949 to well over half in 1982, and the average size of part-owner operations increased from 205 acres to 417 acres (Fig. 7). The average size of tenant-operated farms rose much more slowly, and the size of farms operated by full owners was almost stable. In 1978, for the first time, the federal census of agriculture published a breakdown of owned and rented land in part-owner operations. The average acreage that was actually owned by part-owners, as opposed to the acreage that they operated, was close enough to the average acreage owned by full owners to support the ideas that renting land from neighbors has been the principal strategy for expanding farm operations in the Corn Belt, that relatively few farmers have actually bought much land, and that the size of properties continues to reflect the size of the parcels of land originally purchased by the first settlers.

SPECIALIZATION

The family farm remains alive and well in the Corn Belt, as in many other parts of the United States, despite the recent rapid increase in farm size and capitalization. It has been transformed into a highly specialized business operation, just as the family grocery store on the corner has been transformed into the supermarket. Estate-tax laws have encouraged or even forced some family farms to incorporate to facilitate the intergenerational transfer of assets, but the new family-held corporations are merely family farms in a slightly different legal guise.

The transformation of the family farm apparently has confused some observers, and an enormous amount of sentimental twaddle about the family farm has been perpetrated by ideologues and Luddites whose fundamental confusion is revealed by their inability or failure even to define what they mean by the term.[7] A family farm is defined by its people, not by its acreage; it is an operation that provides an adequate level of living for a father and son and their families, with a hired hand at those stages of the demographic cycle when the son is too young to be of much help, or when the father is too old.

Good hired hands are hard to find nowadays, while mechanization has reduced the need for brute strength and increased the importance of intelligence and skill. On many farms the role of the hired hand has been taken

[6] Everett G. Smith Jr., Fragmented Farms in the United States, *Annals of the Association of American Geographers* 65 (1975): 58–70; Michael D. Sublett, Farmers on the Road: Interfarm Migration and the Farming of Non-Contiguous Land in Three Midwestern Townships, 1939–1969, *University of Chicago, Department of Geography, Research Paper No. 168*, Chicago, 1975.

[7] Ingolf Vogeler, The Myth of the Family Farm: Agribusiness Dominance of U.S. Agriculture (Boulder, Colo.: Westview Press, 1981).

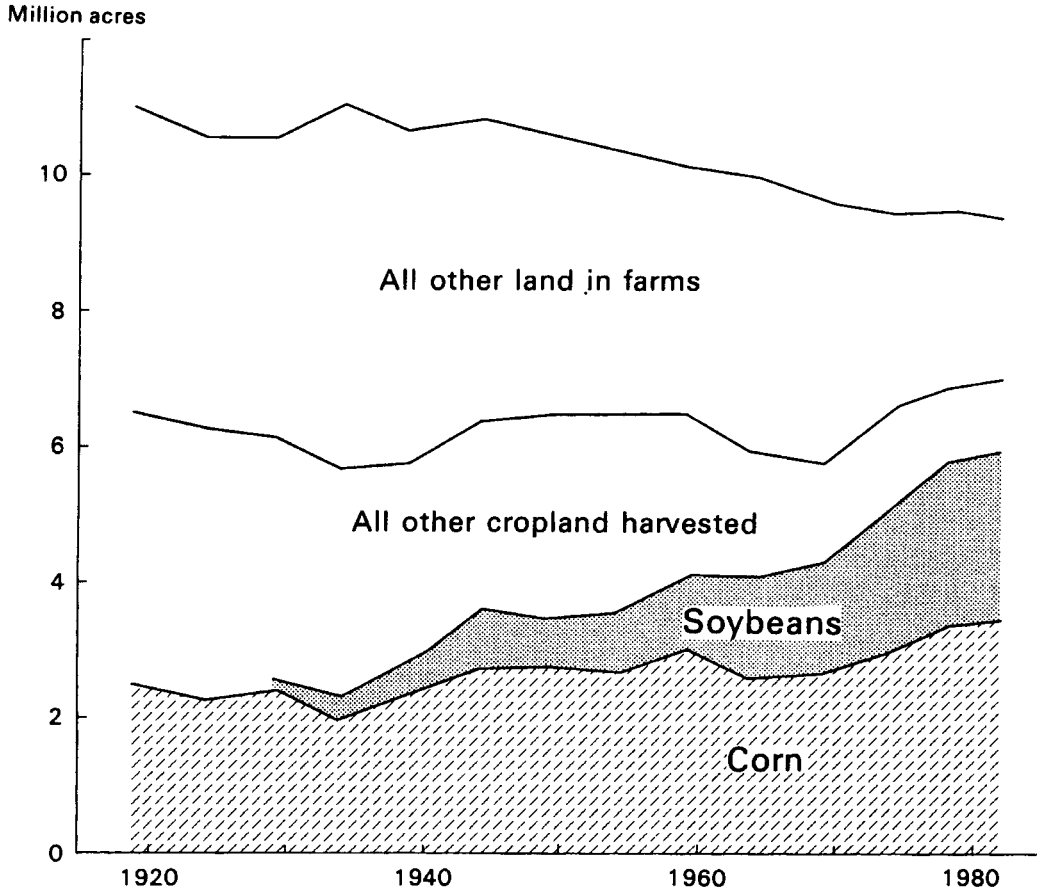

FIG. 8—Total farm area in Iowa, Illinois, Indiana, and Ohio has been steadily decreasing at a rate of approximately 0.38 million acres a year. Area of harvested cropland has been increasing at a rate of approximately 0.15 million acres a year. Area under corn has been increasing at a rate of approximately 0.19 million acres a year, and that under soybeans at a rate of approximately 0.45 million acres a year.

over by that unsung heroine, the farm wife. Traditionally she has "only" had to manage the household, raise the family, milk the cow, feed the chickens, tend the garden, and keep the books, but to an increasing degree she has been pressed into service as an unpaid field hand. She has had to become a jack-of-all-trades who can handle any job that needs to be done on the farm. She goes about her work with quiet and self-effacing efficiency, and it is all too easy to underestimate her contribution, but on most modern family farms she is a true working partner in the operator of the farm business.

A modern farm is a business, and it must be operated on the same principles as any other business if it is to be successful. A farmer cannot hope to succeed by doing many things more or less adequately. He must do one or two things extremely well, and he must ruthlessly eliminate the less profitable aspects of his operation. Progressive farmers are and long have been participants in farm-management programs, one of many valuable services provided by the agricultural extension services of the various

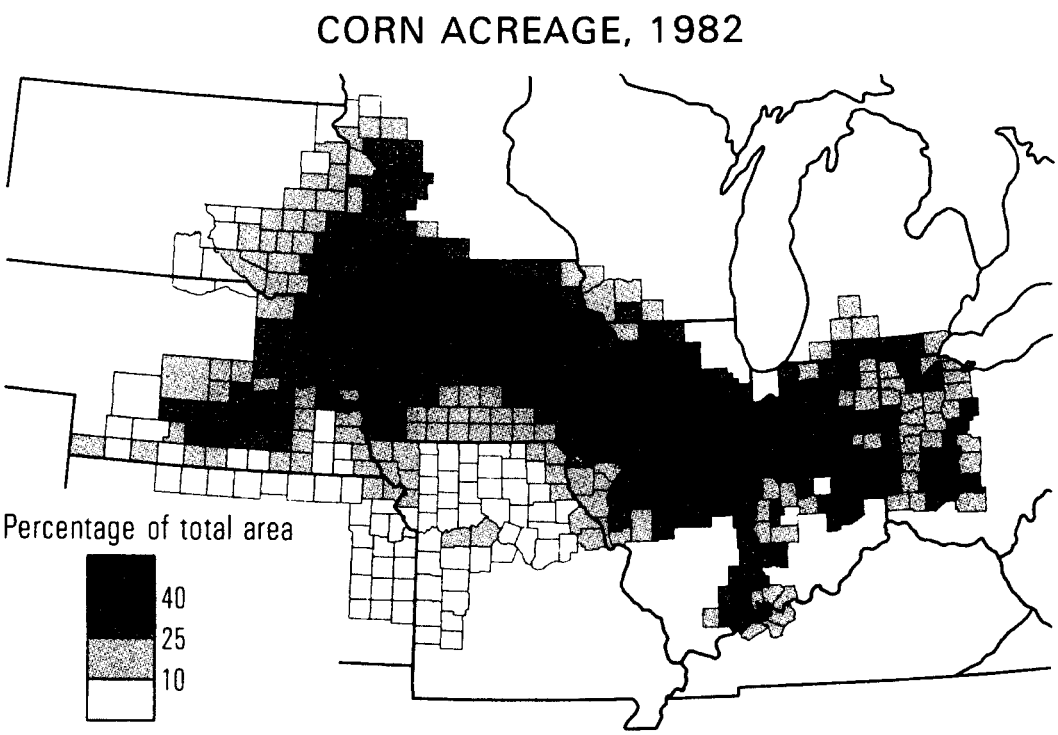

FIG. 9—Corn acreage in 1982. The most important corn-producing area lies diagonally across Iowa and Illinois.

states.[8] The cooperating farmer reports every expenditure and every item of income, and in return he receives regular computerized summaries for his own farm, with comparable data for all farms in his area and for all farms of his type in the entire state. These summaries enable him to identify the most and least profitable aspects of his operation, to eliminate those that are least profitable, and to specialize on those that will earn the most money.

Some Corn Belt farmers, electing to concentrate on livestock production, have invested considerable sums of money in facilities for breeding hogs and for feeding hogs and cattle, but the great majority has elected to specialize in producing crops for direct cash sale. Commercial fertilizers have reduced their need for barnyard manure and leguminous hay crops, and they have changed from the traditional three-year rotation of corn, small grains, and hay to a new cash-grain rotation of corn and soybeans.

In 1920 only two-fifths of the cropland in four Corn Belt states was used for corn, and few farmers even knew about soybeans. By 1982 more than half the cropland was used for corn, more than a third for soybeans, and less than one acre in seven for all other crops combined (Fig. 8). In 1982 corn was grown on more than a quarter of the total area—not just the cropland or the farmland, but the total area—from southwestern Minnesota and central Nebraska to western Ohio; more than 40 percent of the total

[8] 1983 (59th Annual) Summary of Illinois Farm Business Record, *Circular 1229*, University of Illinois, Cooperative Extension Service, Urbana, 1984.

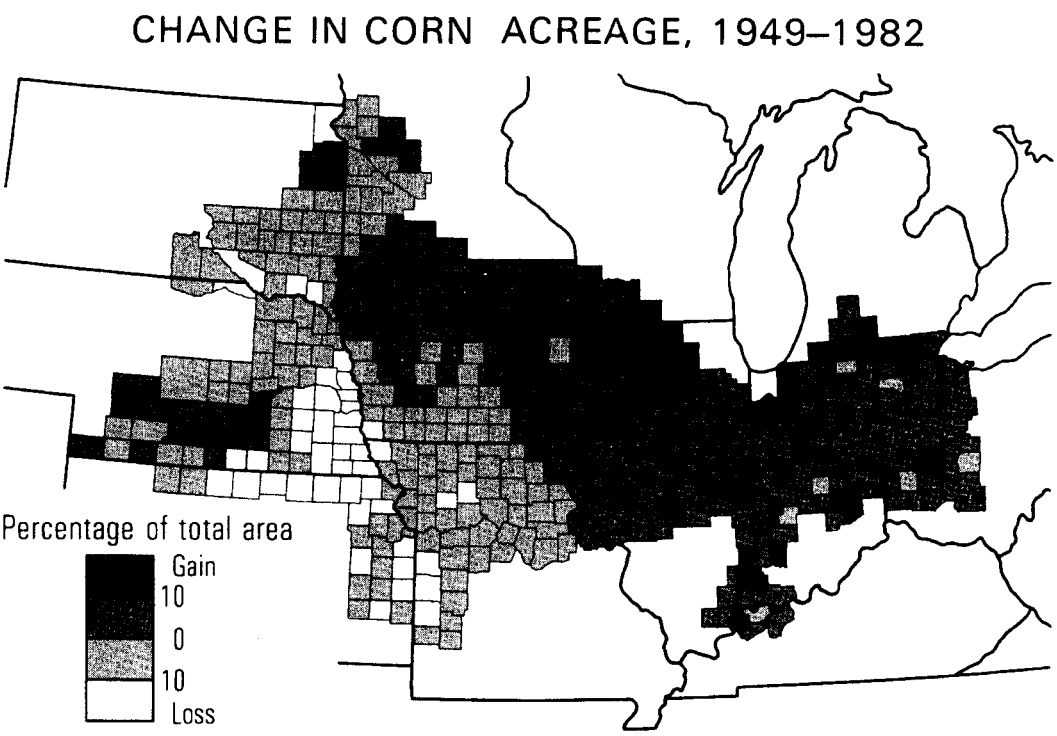

FIG. 10—Change in corn acreage 1949–1982. The eastern Corn Belt gained, but Minnesota, Missouri, and the western portion of the belt lost, except for the irrigated areas along the Platte River valley in Nebraska.

area of northern Iowa and northern Illinois was under corn (Fig. 9). One must wonder, however, whether eastern Kansas and northern Missouri should still be considered part of the Corn Belt. Between 1949 and 1982 the acreage of corn increased in the eastern Corn Belt, but it decreased in the west except for the irrigated areas along the Platte River valley (Fig. 10). Eastern Iowa, northwestern Illinois, and scattered counties in the east had the greatest increases, and eastern Nebraska had the greatest losses.

Soybeans have been the wonder crop of the Corn Belt. The federal census of agriculture did not publish data on soybean acreage until 1929, and before World II much of the crop was cut green for hay instead of being harvested for beans. As late as 1949 only a handful of counties, mainly in cash-grain-farming areas such as the Grand Prairie of east-central Illinois, had as much as 10 percent of the land in soybeans. Some farmers scoffed that a man who planted soybeans must be in desperate need of cash and probably was on the way to the poorhouse (Fig. 11). By 1982 soybeans had become the only other crop in the Corn Belt, and in some counties it even ranked ahead of corn. The greatest concentrations of soybeans in 1982 were on level areas such as the young glacial till plains of south-central Minnesota and north-central Iowa, the Grand Prairie, the glaciolacustrine plain of northwestern Ohio, and the alluvial bottomlands and terraces of the Missouri and Wabash river valleys (Fig. 12).

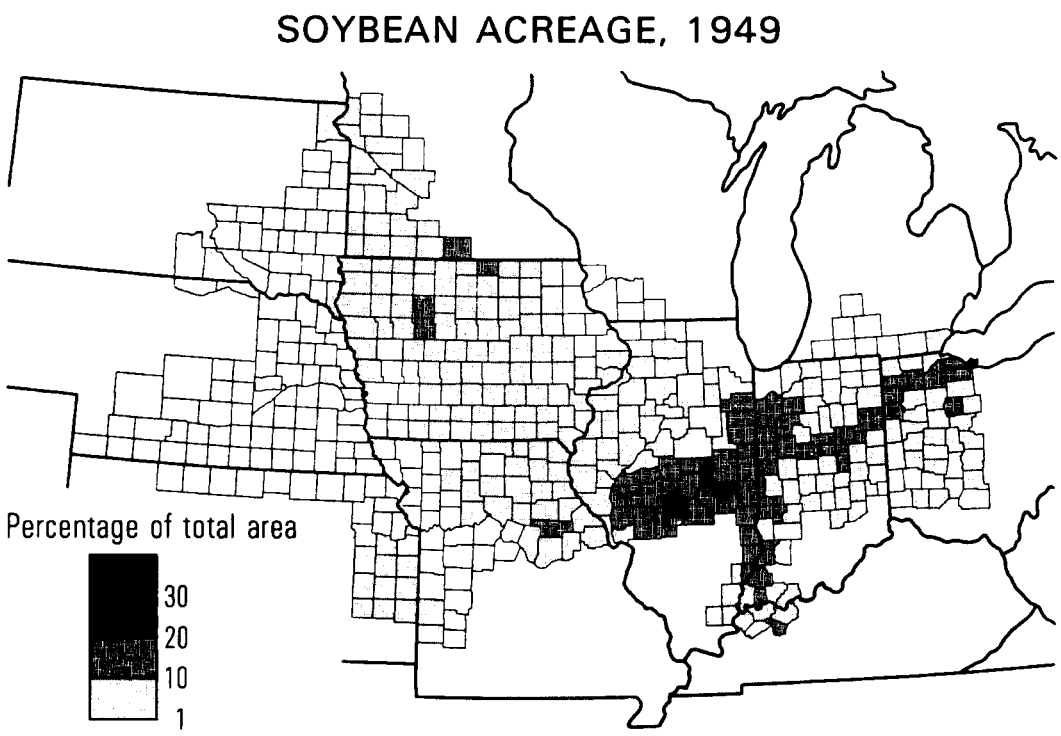

FIG. 11—Soybean acreage 1949. Soybeans were a significant crop only in the southern part of the Grand Prairie, in the Wabash valley, and on the Maumee plain.

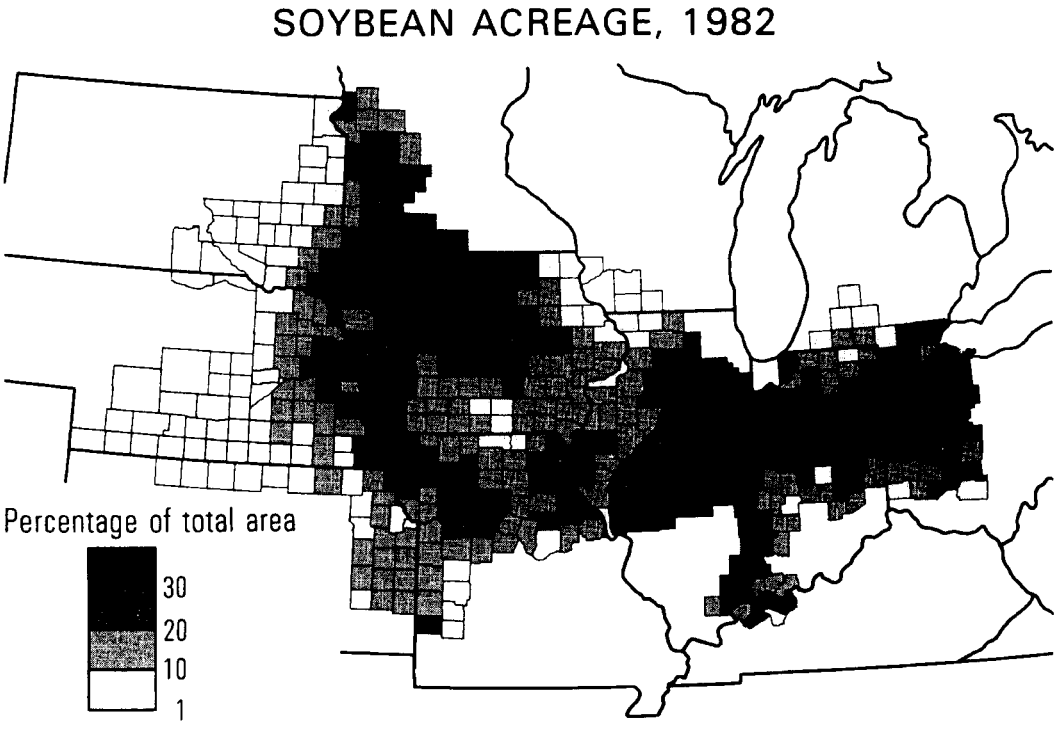

FIG. 12—Soybean acreage 1982. Soybeans had become the second crop of the Corn Belt, and they covered more than 30 percent of the total area of many counties in north-central Iowa, on the Grand Prairie, and on the Maumee plain.

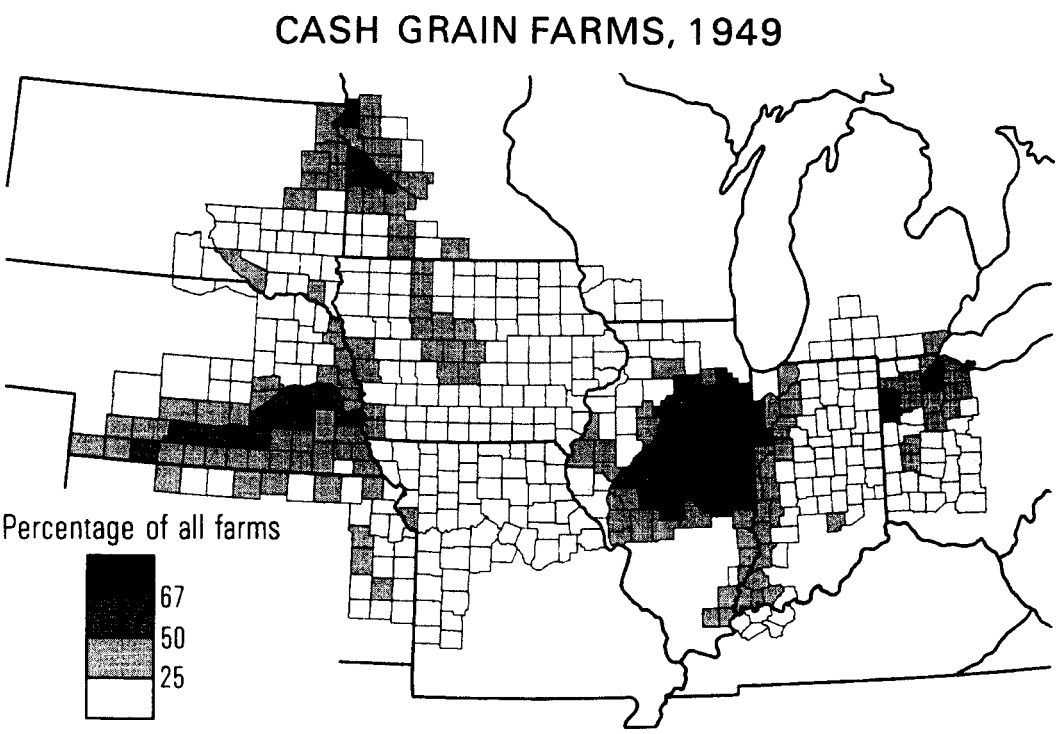

FIG. 13—Cash-grain farms 1949. Principal cash-grain-farming areas in 1949 were the Grand Prairie and the Maumee plain, where soybeans had started to replace oats as the second cash crop. Wheat was more important than oats at the western edge of the Corn Belt.

The shift to soybeans was part of the shift to cash-grain farming. Most Corn Belt farmers in 1949 fed their crops to livestock on their own farms. The only real concentration of cash-grain farms was on the Grand Prairie, although lesser concentrations existed on level areas where soybeans were to become most important (Fig. 13). By 1982 the pattern had changed completely. Livestock farms predominated in only a handful of counties, mainly around the margins of the Corn Belt. The region had become a cash-grain-farming area that produced corn and soybeans for direct cash sale (Fig. 14).

THE LANDSCAPE

The farmsteads, fields, and small towns of the Corn Belt all reflect the new agricultural technology (Fig. 15). The big general-purpose barns, once the most imposing structures on many farmsteads, became obsolescent when tractors replaced horses. Some of these barns are used to store junk, and others have been altered to shelter combines and other large machines. The solid construction of the old barns makes them difficult to convert. Many have been razed and replaced by rectangular metal sheds with open interiors that can be used for machine storage or almost anything else.

The wooden corncribs with open slatted sides, which once were ubiquitous, also are rapidly vanishing from the scene, because they will not hold loose, shelled corn or soybeans. The widespread adoption of the combine

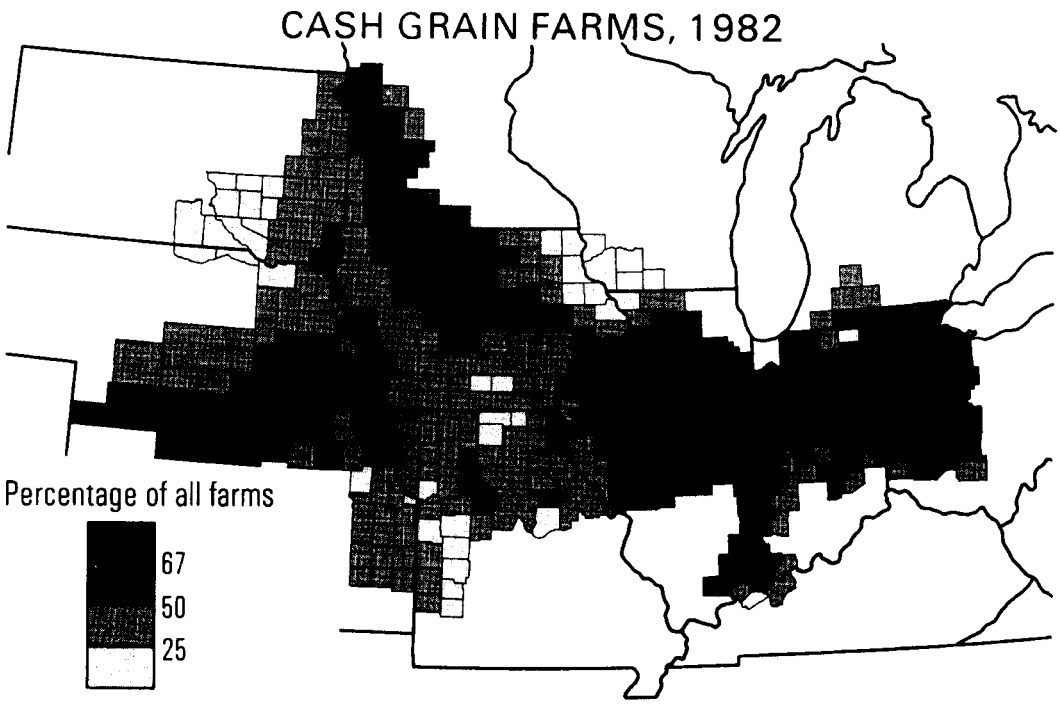

FIG. 14—Cash-grain farms 1982. Entire Corn Belt had become a cash-grain-farming area, specializing in corn and soybeans. High percentages of cash-grain farms were in areas of level land that were well suited to large-scale operations.

harvester has made the corncribs obsolete, and they have been replaced by new cylindrical bins of shiny, corrugated metal. Production of corn and soybeans has increased so rapidly that many farmsteads need several bins. Clusters of bins often are laced together by a spidery, aerial network of six-inch metal tubes through which grain can be moved from one bin to another. A tall metal "leg" at the center of a cluster houses a bucket elevator that lifts loose grain to a distributor head at the top, where the grain is directed into the tube that leads to the desired bin (Fig. 16).

Ears of corn were dried naturally by the air that passed through the slatted sides of the old, wooden cribs, but shelled corn in an enclosed bin must be dried artificially. Most bins have some kind of drying system. Some Corn Belt farmers have invested in towering, blue metal, glass-lined, gas-tight silos that can store crops in the condition in which they were harvested. The big blue silos were first used in areas with short growing seasons, where the threat of early frost sometimes forces farmers to harvest corn when it still has a high moisture content. These silos have become common on farms where farmers feed their grain to cattle and hogs. High-moisture corn spoils quickly after it has been removed from the silo and must be fed on the farm where it has been stored.

Corn Belt farmers who have chosen to produce livestock also have had to make other major investments in their farmsteads. The farmers who breed and fatten hogs must have highly specialized buildings that may cost one-

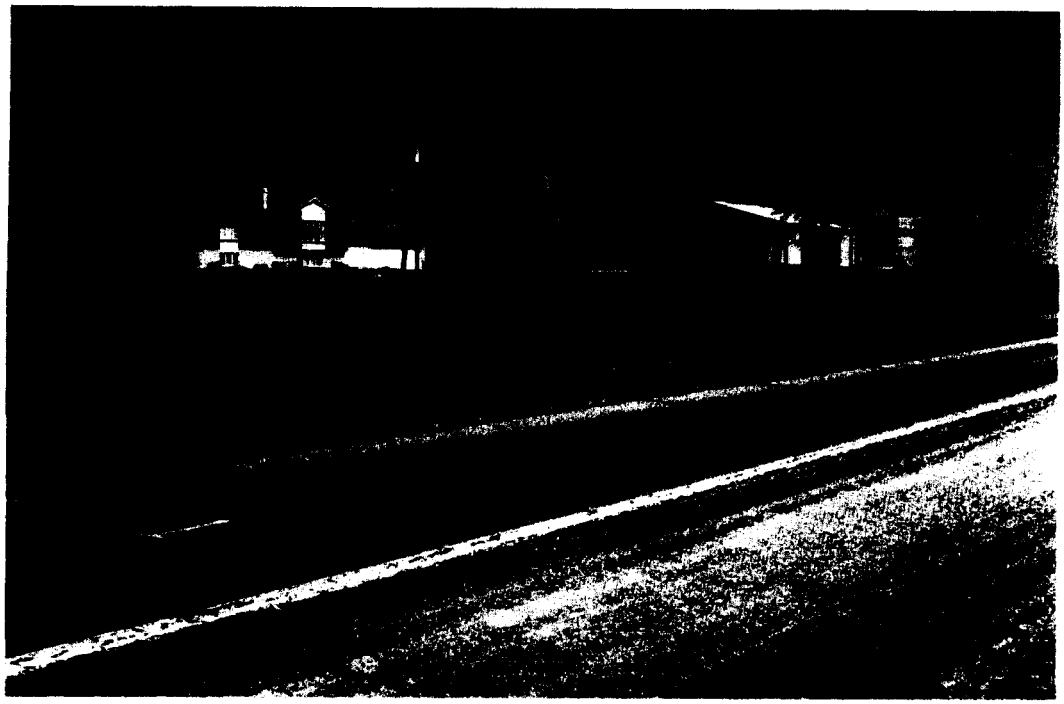

FIG. 15—A contemporary Corn Belt farmstead consists of little more than a house, a rectangular metal machine shed-workshop, and cylindrical grain bins.

half million or more dollars. Farmers who fatten cattle can obtain a profit only by spreading overhead costs over thousands of animals rather than hundreds as in the past. They must enlarge their feedlots and feed-storage facilities accordingly.

The new buildings on farmsteads reflect changes in the agricultural system, and the number and spacing of farmsteads are a general indicator of farm size. The number of active working farmsteads has decreased because of the increased size of farms (Fig. 17). Some farmsteads have been abandoned, the buildings torn down, and the site is marked only by a windbreak of trees planted as shelter against wintry winds. More common is a partially occupied farmstead. The house may be rented to a nonfarm family, or it may still be occupied by a former farmer who has rented his land to a neighbor and now commutes to a nonfarm job. Even the presence of machinery and livestock is no sure sign that the farmstead is occupied by a farm family, because some part-owner farmers continue to use the farmstead on a distant piece of rented land as a convenient storage place to save themselves the long trip back and forth from the main farmstead.

The farmer who travels from one piece of ground to another sees signs of the new technology in the fields as well as in the farmsteads. Fences are disappearing. They are no longer necessary on cash-grain farms that have no livestock, and local highway departments have "encouraged" farmers to remove roadside fences that beget road-blocking snowdrifts. Farmers have also removed fences to enlarge their fields and thus reduce the time and

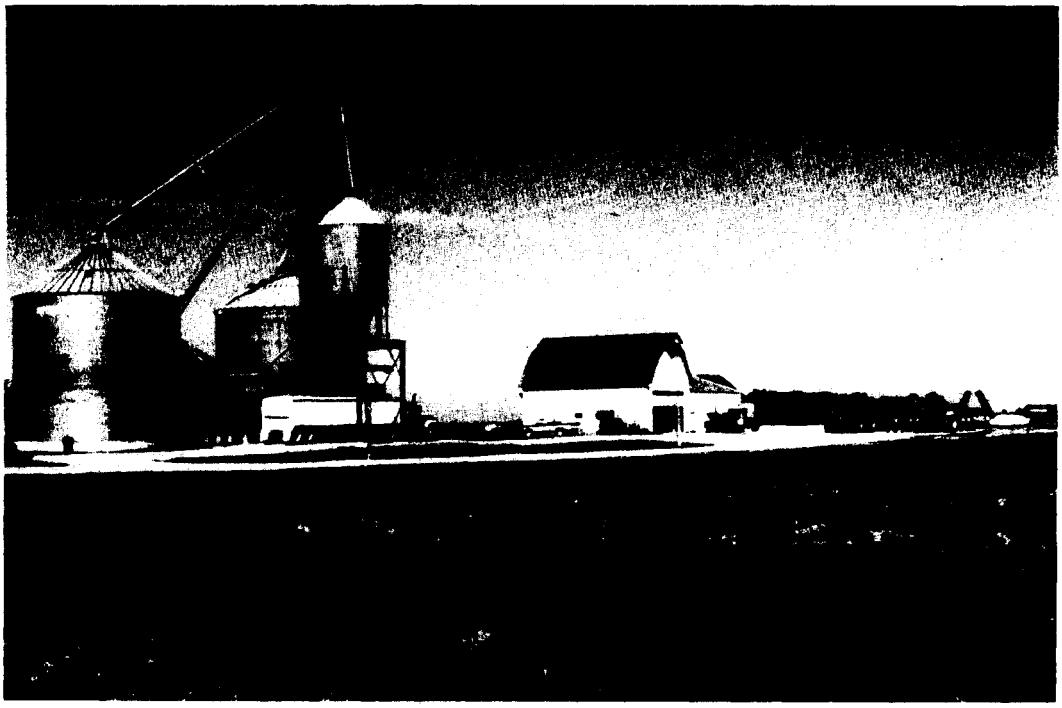

FIG. 16—Clusters of metal grain-storage bins are laced together by metal tubes through which grain can be transferred from one bin to another. The leg in the center of the cluster has a bucket elevator to lift grain to the distributor head at the top.

fuel that they must waste turning around large machines at the ends of rows (Fig. 18).

The fields themselves look different. Corn Belt farmers once planted corn seeds at precise intervals in neat square "checkrows" that could be cultivated lengthwise, crosswise, and diagonally to control weeds. Now the number of plants an acre must be increased to take full advantage of the productive potential of the new seeds and fertilizers. Concerns about soil erosion and the high cost of machinery and labor have motivated some farmers to cultivate less and to rely more on chemicals to control weeds, but the no-till fields look so unkempt and trashy that their more traditional neighbors contemn them.[9]

Dealers' yards at the edge of almost every small town in the Corn Belt contain long rows of fertilizer tanks, combines, tractors, and other farm machinery. Nearby are large warehouses for storing agrichemicals and huge new batteries of towering grain elevators (Fig. 19). The four Corn Belt states produced less than two billion bushels of corn in 1964, but more than four billion bushels in 1982. Soybean production doubled in the same period. Two billion bushels of corn are hard to visualize, but the new elevators are stark evidence that twice as much corn and soybeans had to be consumed by somebody. The American people could not possibly be expected to con-

[9] Philip J. Gersmehl, Non-Till Farming: The Regional Applicability of a Revolutionary Agricultural Technology, *Geographical Review* 68 (1978): 66–79.

Houses in Tipton County, Indiana, in 1982
(Secs. 29–32, T. 22 N., R. 3 E.)

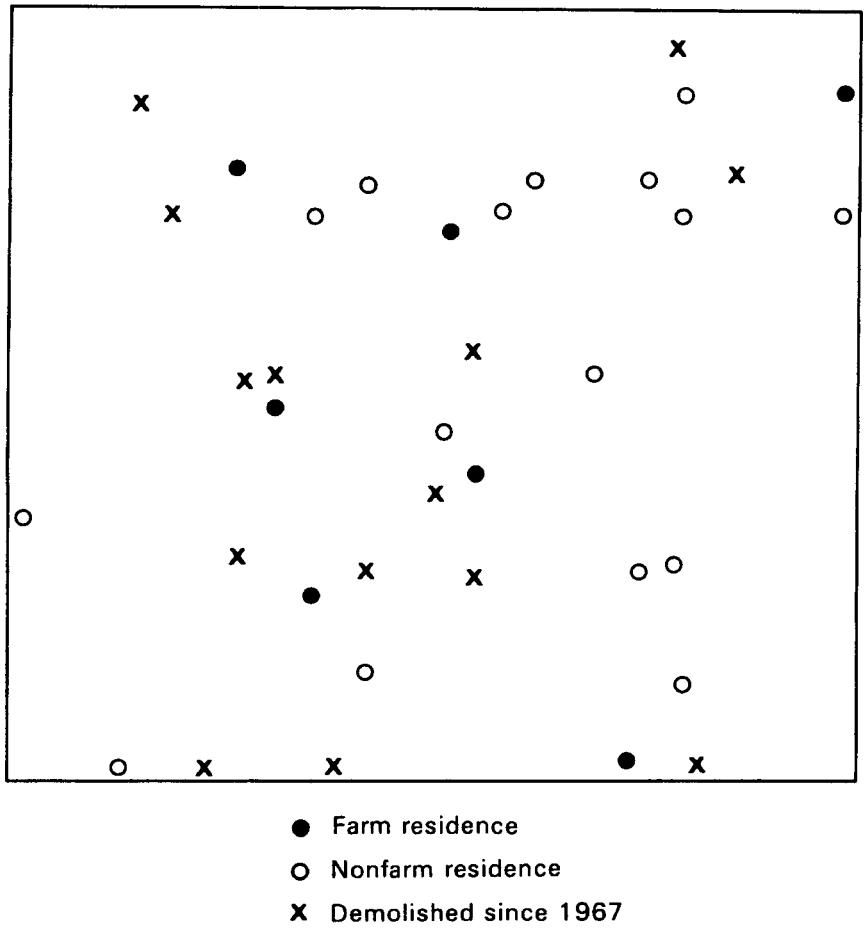

FIG. 17—Houses in Tipton County, Indiana 1982. The four-mile-square area of the county had 37 houses in 1967. By 1982 14 of them had been demolished, 16 were used by nonfarm families, and 7 were still residences of farm families.

sume this doubled production, and a market had to be found for it in other parts of the world.

THE CRISIS

The value of corn exports from the United States between 1970 and 1980 increased from $0.8 billion to $8.5 billion, and the value of soybean exports increased from $1.2 billion to $5.9 billion. In 1980 34.5 percent of the corn crop and 40.4 percent of the soybean crop were exported, and the domestic price of corn and soybeans was supported, at least in part, by the lusty export market. Then the bottom dropped out. A global recession and the waxing strength of the dollar cut sharply into corn exports in 1981 and into soybean exports two years later. Farmers in the Corn Belt learned to their

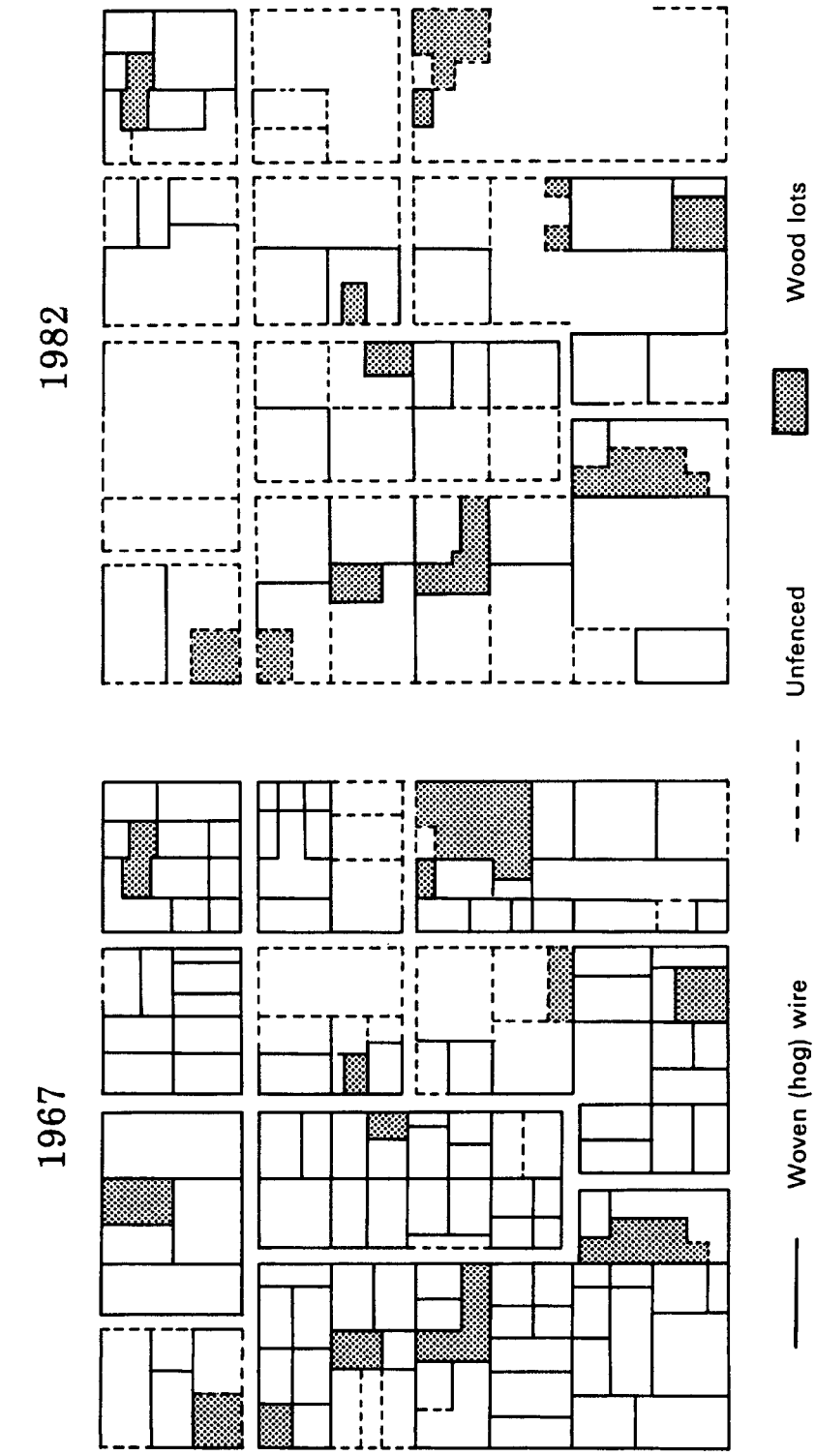

FIG. 18—Field boundaries and fence types, Tipton County, Indiana, Sec. 29-32, T. 22 N, R. 3 E. Fences were removed and fields were enlarged in this county between 1967 and 1982. In 1967 small fields of 20 or so acres were interchangeable units for rotation of corn, small grains, and hay. Each field was securely fenced to protect crops from livestock. In 1982 many fields had no fences, and the average size of a field had more than doubled to reduce amount of time and fuel wasted in turning around large machines at the ends of short rows.

FIG. 19—Tanks of anhydrous ammonia are now as essential and ubiquitous as the grain elevator and agrichemical warehouse in the Corn Belt.

dismay that the price at which they were selling corn and soybeans had dropped below the cost of producing them.

The crisis in the Corn Belt has been aggravated because farmers in other countries expanded their production, of soybeans especially, under the shelter of the "price umbrella" that the domestic U.S. price holds over the world price of principal export commodities. Farmers in other countries had cheaper land and cheaper labor, and they were encouraged by substantial government support such as cheap or even interest-free loans, import restrictions, and export subsidies.[10] In 1985 the *Des Moines Register* found a vegetable-oil processor in Louisiana who was using soybeans imported from Brazil because they were cheaper than those grown by farmers in the United States.

Persons with long memories are reminded that the United States once dominated the world market for cotton, but the price umbrella over domestic producers was so high that other countries were encouraged to get into the cotton business. Today the United States grows only a fifth of the cotton that enters world trade. Millions of acres in the erstwhile Cotton Belt have been abandoned for agricultural purposes and allowed to grow up in brush because no adequate replacement crop for cotton has been available. It is frightening to think that the same thing could happen with corn or

[10] Jean-Paul Charvet, The Recent Revolution of Farmland Values in Illinois and in France, *Bulletin of the Illinois Geographical Society* 24 (Fall 1982): 3–14.

soybeans in the Corn Belt, but it is quite possible if the domestic price remains significantly higher than the world price.

Farmers in the Corn Belt were able to tighten their belts and live on their accumulated capital for a while when prices started to drop below their costs of production. Eventually the crisis became so serious that it reached the popular press, to the obvious bafflement of many individuals who wrote or commented on it. The first victims of falling prices included some of the more aggressive and articulate farmers, who had borrowed large sums of money at high interest rates to expand their operations in the heady days of the 1970s, when bigger had seemed synonymous with better. They could not keep up the payments on their mortgage loans, and the lending agencies foreclosed. They were clever enough to attract attention from the media, whose close scrutiny of their affairs revealed their errors in judgment. Some people erroneously concluded that the only farmers who were in trouble were the victims of their own bad management.

Even farmers who were careful and cautious managers began to suffer from a reduction in their borrowing power. Traditionally they had borrowed money like any other business to cover their production expenses such as the cost of seed, fertilizer, fuel, and chemicals at planting time in the spring, or the cost of the lean feeder cattle bought in the fall to fatten over the winter. Farmland had been their principal form of collateral for such loans, although its value had been inflated during the 1970s. Falling crop prices depressed the price of the farmland from which the crops were produced, and falling land prices undermined the value of the loan portfolios of lending agencies.

Bank examiners have forced lending agencies to reduce the book value of their farm-loan portfolios. The lending agencies have compensated for the losses taken or expected by raising interest rates, even though the prime rate is dropping, and they have become more selective in the number and amount of loans that they will make. A bank can virtually force a farmer to sell his farm himself, and thus spare itself the unfavorable publicity that is sure to result from a foreclosure, merely by refusing to lend him the money he needs to stay in business by planting a crop or by buying feeder cattle.

Eventually even the best farmers have to start living on hope and borrowed money, if they continue to sell crops for less than the costs of producing them, but money is becoming more difficult to borrow, while interest rates remain high. Corn Belt farmers must reduce their production costs, increase prices, or both, and none of these options will be easy. They have already reduced production costs by becoming more specialized than their parents, but further concentration makes them vulnerable to fluctuations in prices of the limited range of commodities that they produce.

Farmers probably could receive higher prices, at least temporarily, by reducing agricultural production to the amount that the domestic market

can absorb. There seems to be a growing awareness that the United States has far more good farmland than it needs to feed and clothe itself. The current crisis has mercifully stilled the foolish lamentations about the supposed loss of agricultural land to urban encroachment. Agricultural production could be reduced by limiting output from better lands and by retiring large acreages of marginal land completely, but American consumers could be expected to object strenuously to any significant increase in the cost of food. Furthermore, an attempt to reduce food production seems much too heartless in a world in which many people are starving. In the long run, the strategy would not be successful, because high prices would inevitably attract cheap foreign commodities to the American market.

An alternative strategy would be expansion of the export market for American crops, but many countries that desperately need food cannot afford to buy it. An improvement in the global economy would undoubtedly ease the current crisis in the Corn Belt, but over the long run exports can be sustained only if American farmers can bring their costs of production in line with those of other countries. Achievement of such a parity might impose an unacceptably low standard of living on American farmers.

American farmers will presumably remain high-cost producers by world standards, no matter how much they manage to reduce costs, and the United States will continue to function as the supplier of last resort. Other countries will turn to the United States when they suffer bad years, and prices will rise sharply. In good years these countries will not be able to resist political pressure to protect their own producers against imports, and prices will plummet. The United States, as the producer and supplier of last resort, must expect to be whipsawed by violent price fluctuations that will be felt most keenly by specialized operators who have only a few commodities to sell. The situation is bleak. Defining the problem is far easier than finding a solution, and the current crisis in the Corn Belt seems singularly intractable.