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Fewer, Larger U.S. Farms by Year 2000—and Some Consequences

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Abstract

The number of U.S. farms will likely decline by about a third in the next 20 years, if present trends continue, while the number of large farms (annual sales more than $100,000) will quadruple. Family farms will continue to dominate, but the influence of small farms will wane. More large farms will probably mean more farm corporations, more specialization in what farms produce, agricultural production concentrated among relatively few farms, and fewer young people getting started in farming because of the high capital requirements.

Keywords: Projections, farm numbers, farm corporations, farm technology, farmland, entry barriers.

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Fewer, Larger U.S. Farms by Year 2000—and Some Consequences

> *"Cultivators of the earth are the most valuable citizens, the most independent, the most virtuous, and tied to their country by the most lasting bonds. Our citizens will find employment in this line, till their numbers, and of course, their production, become too great for the demand. . . . (When that happens) the surplus of hands must be turned to something else."*
>
> —*Thomas Jefferson, to John Jay, 1785*

Most of us have, as Jefferson foresaw, turned our hands to something else, and that will probably be the case in the future even more so than today. But our imaginations are still fired by the Jeffersonian ideal and its way of life—self-sufficiency on a small acreage, fully owned, debt-free—even though that ideal is not much reflected in American agriculture today. The future, if present trends continue, will offer fewer opportunities to get started in farming and the farm will represent less the pastoral way of life of the Jeffersonian ideal than a modern business—an immensely challenging business.

Those are some of the inferences of what the future might be for U.S. agriculture. The basics can be summed up in two words: Bigger, fewer. Big production from big farms. A little production from small and medium farms. Sharply fewer small and medium farms but more big farms.

Those changes may come about as farmers continue to adapt to new technologies and market pressures and try to become ever more efficient. The changes will probably be more sophisticated also, as farmers evaluate, for example, the advantages of different ways of organizing the farm business and whether or not to invest in bigger, more complicated machines. Such changes, however, seem to be a continuation of, rather than a break with, the impetus of that initial rural exodus following the Depression. To be profitable, farmers need to raise large crops with little labor, skillful management, and great determination. How farmers might do that and how their actions might change the face of U.S. agriculture in the next 20 years is the subject of this pamphlet.

One component of the projections might make some farmers wince—the likelihood that more farms will be corporations. Corporate farms are often perceived as being inimical to the traditional family farm type of

organization. Most of the incorporated farms in the future, however, will themselves be family-operated farms. The family farm organization is sound and will probably thrive, but with some changes.

Some other highlights of farming in the future, if present trends continue:

- More farms will specialize in the commodities they produce.
- Some commodities will be produced by only a few large farms.
- Inheritance will be the chief means of acquiring a farm.
- Farmers will rent more farmland.
- Farmland and farm wealth will be concentrated among fewer and larger farms.
- New farmers will be fewer and will need more capital to get started.
- Many new farmers will be part-timers, supplementing their farm income with nonfarm jobs.

Projections' Basis and Certainty

The mathematical basis for the projections in this pamphlet is in a more technical report published by USDA's Economics, Statistics, and Cooperatives Service and titled *U.S. Farm Numbers, Sizes, and Related Structural Dimensions: Projections Through the Year 2000* (TB-1625, July 1980), by William Lin, George Coffman, and J. B. Penn. All such projections are conditional. They are not predictions of what will certainly happen, nor necessarily of what is desirable to happen, but tell only what is likely to happen if underlying factors in the U.S. farm sector continue as they have since about 1950. The methods used to compute the projections were trend extrapolation, negative exponential function, Markov process, and age cohort. This pamphlet also incorporates information from other agricultural reports, some of which are listed on p. 19.

Farm Numbers Fall, Sales Rise

The number of U.S. farms, in a steady decline since about 1935, is expected to drop by another third in the next 20 years. There were about 2.5 million in January 1980 and there may be only 1.8 million by the year 2000.

Meanwhile, the average acreage of a farm will continue to increase (fig. 1), due less to actual growth of existing individual farms (although that, too, is taking place) than to a steep drop in the number of small farms. Those with less than 100 acres, for example, are projected to drop by more than a half million by the turn of the century (fig. 2).

Average farm acreage, however, is not a very useful measure of the production from a farm because of the diversity of farming and the different types of farms. For example, 1,000 acres might constitute an average wheat farm, while 100 acres would be a large fruit orchard. Similarly, a ranch in the Great Plains might be very inefficient below a size of 2,000 acres or so, while a beef cow operation in the Southeast might average only 250 acres. The requirements of different types of farms are also reflected in the differences of average farm acreage by region because most regions specialize in certain commodities (fig. 3).

FIGURE 1
NUMBER OF U.S. FARMS AND AVERAGE FARM SIZE

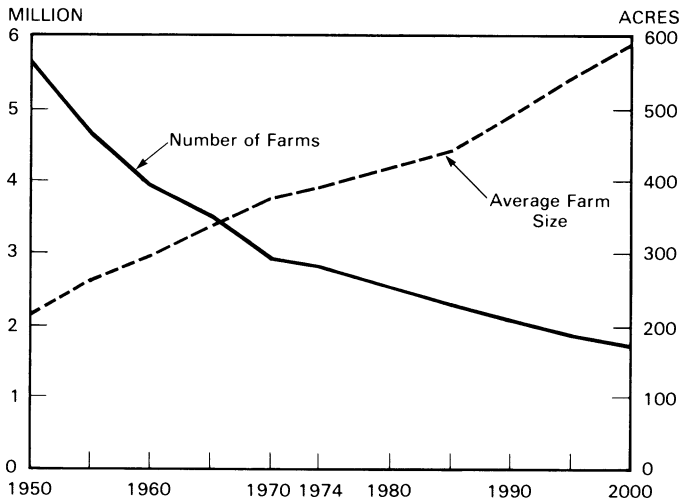


FIGURE 2
DISTRIBUTION OF U.S. FARMS BY ACREAGE, 1974 AND 2000

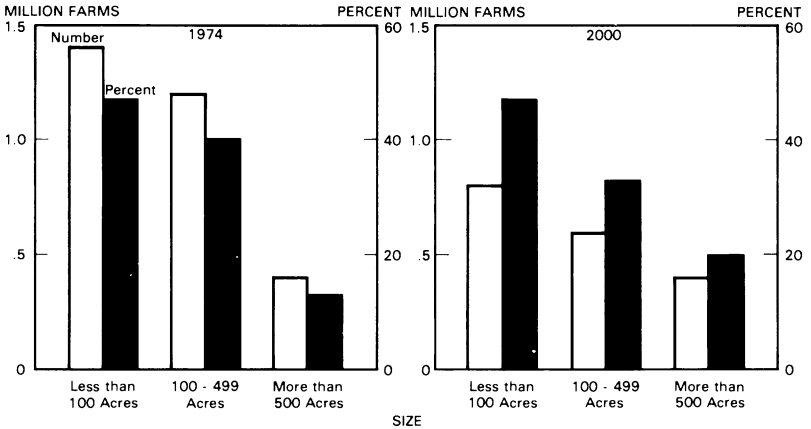
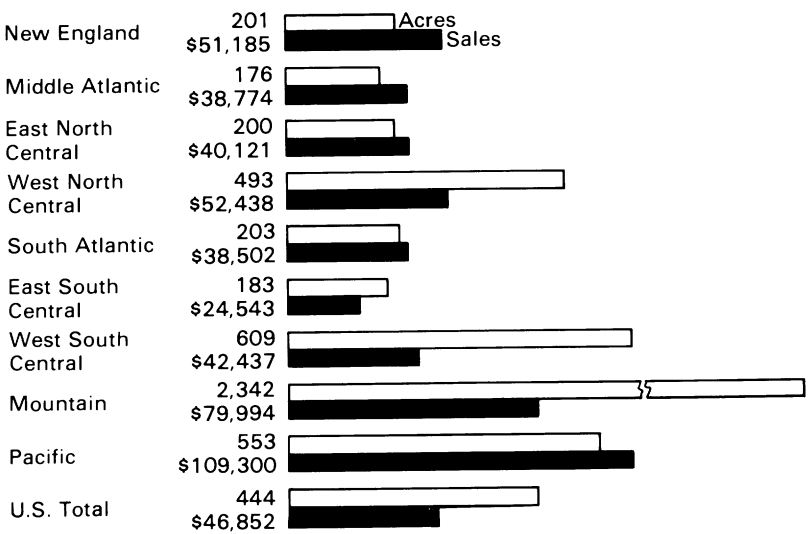


FIGURE 3
AVERAGE SIZE OF FARMS BY REGION, 1978



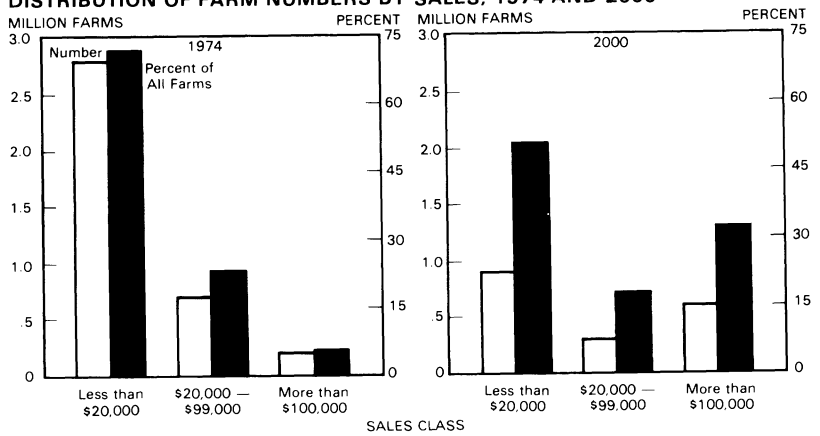
The projected distribution of farms based on sales of farm products might give a better picture of farm size than average farm acreage. The current numerical preponderance of small farms (farms with sales of less than $20,000 annually) is projected to diminish substantially (fig. 4). The numbers of small farms and large farms (farms with annual sales of $100,000 or more) will be more nearly equal—a bimodal distribution—and both will outnumber the middle-sized farms.

After increasing up to the present, the number of medium-size farms is projected to decline through the end of the century. Such a downturn will highlight the sharp distinction evolving between small and large farms, with little middle ground. Medium-size farms, rather than representing a transition between the small farm and the large, seem to be too large for part-time farming and too small for efficient full-time farming. They may also be too small for a beginning farm that the operator would like to expand. Such farms seem to be unable to generate internally the revenue necessary for farm growth.

Inflation Adds More Large Farms

Sales data in figure 4 are not strictly comparable between the two periods because the data are not presented in constant dollars but include the effects of inflation of farm prices. The data were estimated by assuming a 7.5 percent annual rate of inflation in farm prices over the next 20 years.

FIGURE 4
DISTRIBUTION OF FARM NUMBERS BY SALES, 1974 AND 2000



One effect of inflation is to push smaller farms into larger sales classes, so all the growth in large farms shown by the numbers is not real growth—some is due only to inflation. Inflation alone will probably account for a third of the projected gain in the larger farms; the other two-thirds gain ought to reflect real growth among the farms. Thus, although large farms are projected to grow by 410,000 in the next 20 years (nearly 240 percent), the growth due solely to inflation's pushing smaller farms into the larger category is estimated to affect about 140,000 of those farms. The other 270,000 farms will have real growth, in addition to their inflation-induced growth.

The inflation in the sales data is not that measured by the Consumer Price Index (CPI) but that measured by the Department of Agriculture in prices received by farmers (figs. 5 and 6). The CPI, from 1960 to 1979, increased inexorably while the index of farm prices actually declined in three of those years (1963, 1964, 1977). Both indexes eventually average out at the same rate, although the path taken by farm prices is more erratic. The 1977 decline in farm prices followed a 43-percent rise in 1974, the year of the large grain sale to Russia.

What is a Farm?

USDA and the Bureau of the Census (U.S. Department of Commerce) have, since 1974, defined a farm as any place with sales of at least $1,000 in agricultural products in the previous year. Previously, a farm was defined as any place of 10 acres or more with at least $50 in agricultural sales in the previous year **or** any place of less than 10 acres with at least $250 of agricultural sales in the previous year. Throughout this pamphlet, farm numbers are given under the old definition. This is so the reader may compare more easily the projections with historical data without contending with a change in definition before and after 1974. The following table might help, however, to give an idea of how the new definition affects the count of U.S. farms:

	1978	*Projected farms in year 2000*
Old definition	2,672,000	1,750,000
New definition	2,370,000	1,540,000

If farm price inflation in the next 20 years is less than the 7.5 percent per year used to compute the projections, there will be somewhat fewer large farms by 2000 than projected and somewhat more smaller farms. For instance, if the average annual rate of inflation in the farm price index is 4 percent per year from now to 2000, the farm distribution by sales will probably be as follows:

small farms—1,040,000

medium farms—375,000

large farms—435,000

Conversely, if inflation exceeds the 7.5 percent per year used in the projections, there will be more large and fewer small farms than projected.

The Big Get Bigger

Large farms are clearly the growth sector of U.S. agriculture. While the total number of farms will decline by a third, the number of large farms (sales of $100,000 and more) will nearly quadruple—from 150,000 (5 percent of all farms) in 1974 to 560,000 (32 percent of all farms) in 2000. They will be even larger than figure 4 suggests. Only one category of farms—those with annual sales of $200,000 and more—is projected to increase in number. Smaller farms will probably decline in number.

FIGURE 5
INDEXES OF FARM AND CONSUMER PRICES

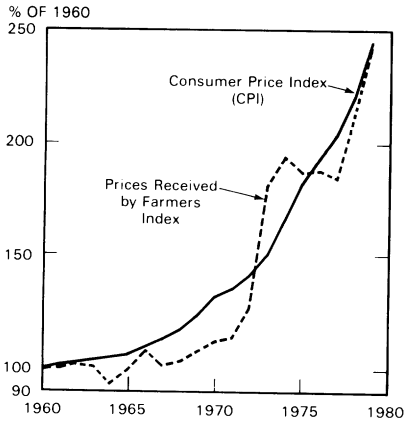
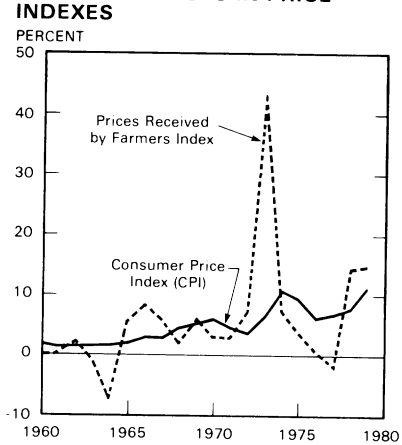


FIGURE 6
ANNUAL CHANGES IN PRICE INDEXES



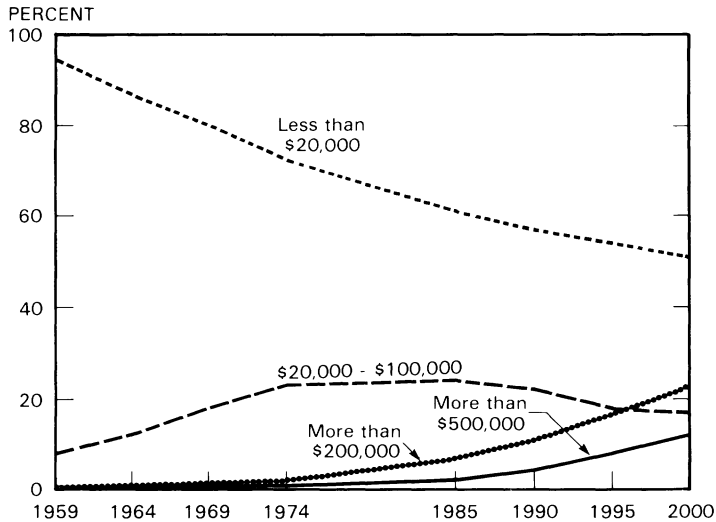
Farms with sales between $100,000 and $200,000 will increase through 1985 but decline thereafter until, by the year 2000, there will be fewer than in 1980. Like the medium-size farms mentioned earlier, these farms, with sales between $100,000 and $200,000 seem to be too small for profitable full-time farming and too large for efficient part-time farming after 1980.

One effect of more large farms will be that a larger percentage of U.S. food production will come from a smaller percentage of farms (fig. 8). In 1974, the largest 1 percent of the farms produced 27 percent of the food. In 2000, the largest 1 percent of the farms are projected to produce about 50 percent; at the other end of the scale, 50 percent of the farms—the smaller ones—will produce less than 1 percent of the food.

Production of some commodities is already heavily concentrated among large farms and within geographic regions. This trend is expected to continue. More than 80 percent of grain-fed beef, turkeys, eggs, and vegetables currently come from farms with annual sales of $100,000 or more. Within the next 20 years, cotton and fruit will probably be added to that category.

Partly related to concentration of production among fewer and larger farms is specialization of production. That is the trend, evident even now,

FIGURE 7
PERCENTAGE OF FARMS BY SALES CLASS

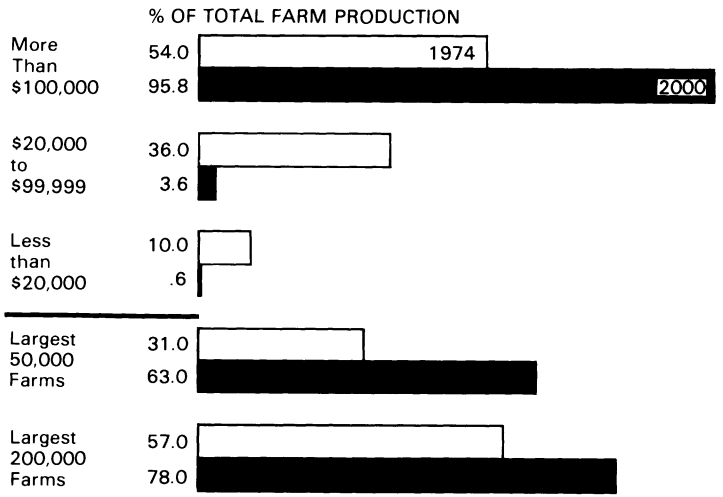


for farms to produce only one commodity. Diversified farms will be rare. One reason is the specialized nature and large capacity of farm machinery, which encourage large production, not small. Another reason is that producers find it more profitable to devote their attention and energies to only one product each. For example, poultry operations used to produce both eggs and meat in combination, but no longer. That's partly because of some physical differences between the two types of birds, requiring that they be tended differently: productive laying hens are leaner than good eating birds, for example.

Incorporated Farms Triple

Large farms are often linked in the public's mind with corporate farms, although the two are not necessarily linked in fact. Many large farms are not corporations, although most incorporated farms are large. The number of farming corporations is expected to triple in the next 20 years and sales of farm products from incorporated farms could account for 35-40 percent of total farm sales. That tripling, however, does not necessarily pose a threat to family farms. Two chief reasons explain why: first, even if they do triple, corporations still will account for only about 4 percent of all farms; second, and more important, most of the new farm corporations

FIGURE 8
CONCENTRATION OF FARM PRODUCTION, BY SALES CLASS



to be formed will be family operations that incorporate to take advantage of income and inheritance tax laws.

A major fear about farm corporations is that they represent nonfarm investors' gaining control over farm resources and farm production. That fear arises because many people equate corporations with giant industrial firms. The available data, although half a dozen years old, simply do not support that notion in the farming sector. In 1974, the latest year for which the data are available, 88 percent of the incorporated farms were family-run corporations and incorporated farms amounted to only 1.7 percent of all U.S. farms. (A more recent Census of Agriculture, undertaken in 1978, will help to show how the trend to incorporation has progressed. Results of that census were not available, however, as this report went to press.)

Most new corporations, therefore, will likely represent the incorporation of existing farms rather than the entry of corporations not now farming. In fact, the number of corporations could well exceed the present projections if circumstances—income tax laws, asset values, adoption of new technology—become more favorable to corporations. Few nonfarm corporations are likely to be attracted to farming unless the profitability of farming improves greatly.

More farm corporations, rising capital requirements for farms, and ever-increasing farm size do not necessarily endanger the family farm. As mentioned above, most of the new farm corporations between now and the year 2000 will themselves be family farms. Competition in the farm sector is not between sole proprietorships and corporations but between one farm and another regardless of type of organization.

Opportunities for New Farmers Decline

As farms become larger and require more machinery to operate, fewer young people will be able to get started in farming. Only those who can inherit a farm will have a good chance of acquiring one; and, frequently, the heir will not inherit an entire farm outright, but instead will inherit a position in a family-run farm corporation.

Those who do not inherit a farm will probably have difficulty getting started in farming and will probably be limited to small and part-time operations. Other barriers to entry that will influence farming in the next 20 years include:

- The rate at which farmers leave farming.
- The costs of machinery and equipment.
- Rising land costs.
- Lack of income during a new farmer's early years.
- Competition for farmland from present farmers expanding their operations, and from nonfarm investors seeking a good investment.

The number of young persons entering farming will probably have declined by 40 percent by the end of the century. That decline will be due both to the larger capital requirements for a standard of living comparable to nonfarm alternatives and to fewer farming opportunities. Many smaller farms, perhaps affordable for a young operator to form a base for later expansion, will be purchased or rented by other farmers seeking to expand.

The decline in new entrants will be confined to the smaller farms because those farms' low income and limited opportunities for expansion will induce many potential farm operators to seek better paying nonfarm careers. For every three operators who leave farms with sales less than $100,000, only one will begin; many of the younger farmers in this sales class will be part-time farmers, depending heavily on income from nonfarm employment.

For large farms (more than $100,000 in annual sales) more operators will enter than leave. That's for two reasons: large successful farmers will be able to recruit replacements before the farmer dies or retires; and previously smaller farms will be added to this farm category as they expand (through acquisition, for example) or as inflation increases their sales.

The interests of those who will inherit a farm and those who will not are diametrically opposed. Potential heirs favor easing inheritance and estate taxes. That would also reduce the amount of land available to other potential entrants and, over time, would contribute to farm consolidation and expansion. Entry by people who are not heirs would be helped by holding down increases in land values and by raising inheritance taxes, so that more farms would be sold at the operator's death. Such competition,

however, might also favor large existing farms—especially corporate farms.

Traditionally, the farm children of one generation have been the farm operators of the next. Over four-fifths of today's farmers are the children of farmers. Inheritance continues to be the most likely method of entry.

The Small Survive

Almost all the decline in farm numbers is projected to come from small farms—less than $20,000 in annual sales. The remainder will come from the medium-sized farms mentioned earlier. There may be only half as many small farms at the end of the century but they should still constitute more than half of all farms.

Most small farms will probably not be run primarily as a business but as a sideline. That is suggested by the projections that small farms will account for a negligible amount of total farm sales—less than 1 percent, a precipitous drop from their 10 percent share in 1974. Not operating primarily to raise crops for cash, some small farmers will probably try to produce a wide range of crops—perhaps to raise enough for most of their families' needs without trying to earn a living from their farms.

Three classes of small farms will continue to evolve in the next 20 years:

- Part-time farmers who want to remain part-time farmers (the hobby farmer and the retirement farmer).
- Part-time farmers who want to expand the farm into a full-time operation.
- Full-time commercial farmers.

Part-time farmers who want to stay that way rely intentionally on other sources of income to maintain the farm and to meet the family's living expenses. A person retired from another job might buy a small farm to raise a variety of crops and some livestock for family and friends, and sell some of the leftover. Often, the main reason for operating such a farm is to enhance one's quality of life rather than to cover living expenses; the pension check will do that. Hobby farmers might specialize in certain commodities to try to get the most profit out of the operation or they might operate a more diversified farm, however inefficiently, because they

think that living on a few acres in the country provides better living for their families.

Some part-time farmers will want to expand their farms to full-time operations. That is a rapidly diminishing possibility, however, because of rising land costs and other capital requirements to operate a farm of adequate size. In addition, to expand the farm by acquiring more acreage, such farmers will have to compete against other, better financed farms also looking to expand, as well as against nonfarm investors. Few part-timers, therefore, will probably be able to make the transition from small to large farms.

Other small farmers will still try to work the farm full-time to make a living for the family. It is unlikely that many will be successful. Some of the small full-time farmers will probably be unable to generate enough income to keep the operator's family from being impoverished. Between 15 and 18 percent of small farmers had incomes below the poverty line in the midseventies.

Curiously, many small farms will probably specialize in what they produce, just as the large farms do. Many part-time farmers will tend to specialize in producing commodities that do not take a lot of labor, simply because such operators are away from the farm much of the time, working at their primary jobs. Such commodities include beef cattle (rather than dairy cattle) and fresh fruits and vegetables raised for home consumption. Three-fourths of farmers in 1978 who marketed their goods directly to consumers were just such small part-timers. Small farmers also sell directly to consumers because the volume that they can produce is often too small for conventional buyers of farm commodities (processors, for example). Small full-time farms, however, unable to afford expensive machinery, will specialize in labor-intensive, high-value commodities, tobacco being an example.

Fewer farms will wean rural economies even more from a dependence on agriculture. Already by 1980, agriculture's dominance had waned. The 1979 farm population was less than 3 percent of the U.S. total and about 11 percent of the rural total. Manufacturers now often locate their plants in rural areas to take advantage of the lower cost of labor, further diversifying the rural economies. The exodus from farms to cities, begun early in the century, seems to have just about spent itself. The trend is now in places reversing itself, as the population shifts from cities back to rural areas, but not back to farms.

Much Farm Wealth Based on Farmland

With fewer farms, fewer opportunities for taking up farming, and large farms dominating production, the wealth of the farm sector will become concentrated in the large farms. Two-thirds of the value of the U.S. farm sector will be concentrated in one-third of the farms by the year 2000. Since nearly 70 percent of farm wealth is in farmland, such a concentration of wealth might presage the development of a land-based wealthy class. There is some doubt, however, as to whether the new rural rich will be able to convert their assets to income. Much of the wealth may be on paper, and farmers have usually tended to reinvest most of their income back into their farm businesses.

Nearly 60 percent of farmland will be operated by farms of 2,000 acres or more (only 4 percent of the total farms) by the end of the century. Less than 10 percent of the farmland will be in farms with less than 220 acres. As the land becomes merged into larger units and as the size of available farms increases, young people who want to become farmers may be barred by the heavy capital requirements to start.

Further encouraging the possibility of a land-based wealthy class is a changing perception of land, by farmers and nonfarmers alike. Land is now regarded as a value unto itself by some rather than just as a productive asset. That perception is confirmed as investments in farmland, over the long term, prove safer and more profitable than investments in common stocks, the traditional investment vehicle (figs. 9 and 10). Despite nonfarmers' interest in acquiring farmland, they must bid against farmers, equally eager to buy to expand their operations. As a result, farmland changes hands very slowly: in 1979, nonfarmers bought 20 percent of the farmland that was put on the market and sold 18 percent. The net transfer of farmland in that year was, therefore, about 2 percent of what had been available for sale, which in turn was only about 2.3 percent of all farmland.

Still, nonfarmers own about 44 percent of the farmland, so many farmers rent at least some of the land they operate. By 2000, it is projected that 63 percent of the farmers will own all the land they operate, 30 percent will lease some of the land they operate, and the remaining 7 percent will be tenant farmers, leasing all the land they operate. Most of the large farmers will probably rent some land from others.

Tenant farmers used to be agriculture's stepchildren. Full ownership by the farmer was touted as the most desirable arrangement. Now, tenancy

is becoming more respectable and part-ownership is becoming positively desirable. Farms will probably continue to develop along those lines. Although the proportion of tenancy is projected to drop slightly, both tenant farmers and part-owner operators will probably operate larger farms than full-owner operators. The most successful farms, the largest farms, will probably rent much of their land from others. The rise in land costs explains a lot of the current and projected recourse to part-ownership. Buying land represents a drain on capital and might limit the growth of the farm business returns compared to the growth that might be realized by investing a farmer's limited capital resources in machinery or livestock. There is little likelihood of a farmer's losing money on land purchases, but the mortgage payments may be difficult to meet and may tie up a large part of the farmer's future income. Furthermore, tenancy is becoming more respectable. Some tenants manage quite large operations and deal with their landlords as peers instead of overseers.

Technology Builds Bigger Farms

Farm growth and expansion is encouraged by inflation, economies of size, and new technology. "Economies of size" means that farmers can lower their production costs per unit of output by increasing, up to a point, the size of their operations. Some technologies introduced fairly recently probably further lowered the costs of production on large farms. Some examples include four-wheel drive tractors, electronic harvesting equipment, and computerized systems for monitoring crop conditions.

FIGURE 9
FARM RETURNS
PERCENT

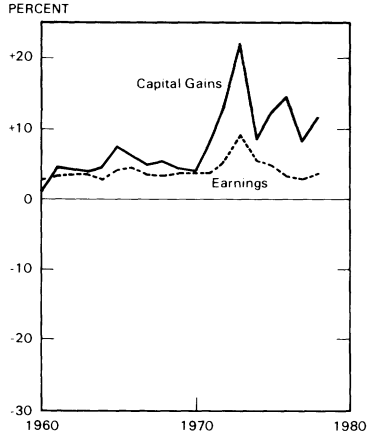
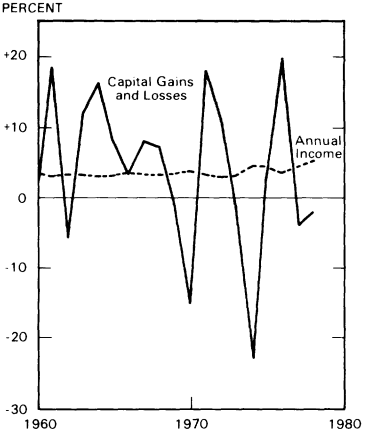


FIGURE 10
COMMON STOCK RETURNS
PERCENT



Other types of economies also favor large farmers but not small, further encouraging farm expansion. These market economies arise because some suppliers give discounts to large farms on their purchases and the large farms can sometimes negotiate better prices for their products than small farms because the large farms purchase and produce in such large quantities.

Future technological developments will probably also encourage larger farms, by requiring more land, increasing the potential for larger harvests, and substituting more capital for labor. The future for farms pictured here is based on technological development and adoption proceeding at a rate similar to that of the past. Faster development and adoption, or the introduction of totally new technology, could lead to faster changes in farm numbers and sizes. The rate of technological development and adoption also depends on economic conditions and national policies.

Some of the most likely areas of future technology are:

- Enhancement of photosynthetic efficiency, which increases the rates at which plants grow, to improve their yield.
- Better water and fertilizer management to increase plant production.
- Better pest control strategies that use less energy, cost less, and rely more on natural means to discourage pests rather than on chemically formulated pesticides.
- Growing more plants in greenhouses—probably limited to high-value and specialty crops.
- Multiple cropping, that is, planting and harvesting more than one crop per growing season on the same land to increase yields.
- Reduced tillage, which minimizes the times a farmer must cultivate a field, thereby saving on production costs and allowing more densely planted crops.
- New machinery and equipment.
- Automated processes that reduce labor requirements.

- Bioregulators, which enhance the ripening of crops to facilitate mechanical harvesting and slow down the aging of harvested crops to prolong shelf life after harvest.

- New crops, like new and improved hybrid strains, and even alternate food crops.

- Bioprocessing, to allow more of the harvested plant to be used.

- Antitranspirants, which inhibit plants' evaporation of water and allow plants to withstand drought and salinity.

- Inducing multiple births in beef cattle to increase calf production per cow.

Theoretically, these technologies will favor neither large nor small farms and will be applicable on both with comparable results. In practice, however, they will probably favor large farms, which have more to gain by increasing their production and productivity and tend to have the better management needed to adopt them. Fertilizer too, in theory, favors neither large nor small farms, yet the benefits from using fertilizer help large farms to increase their productivity, further increasing their competitive advantage over small farms, because of better management, quicker adoption, and interaction with other practices.

Even though farm growth is likely to continue, some events may have just the opposite effect, especially in the area of energy—its cost and availability and the way it interacts with other production inputs. Energy-based inputs (fuel, fertilizer, and farm chemicals) may become expensive enough relative to other inputs to force a change in some farming practices and the sizes of farms. The Texas High Plains, for example, now produces grain and cotton with deep well irrigation; but a steep rise in energy costs might cause this area to revert to dryland farming. If that were to happen, the size of farms there, as measured in sales, would probably be smaller than now. On the other hand, however, other responses to rising energy costs, such as reduced tillage, seem to continue to favor large farms.

How to Use the Projections

To make such projections is not to suggest that they will necessarily come about. They should be fairly accurate if present trends continue, and such continuation hinges on farm programs and tax laws remaining essentially unchanged.

Likewise, to make such projections is not to suggest that they *should* come about. Rather, they allow us to step back from the crises of the moment and ask, "Do we as a society want such changes to come about?" It has been observed that the rate of agricultural change has been so rapid that for 30 years Federal policy could do little more than react. It responded to immediate crises and tried to provide a measure of stability, but in so doing had results that were neither planned nor expected. The projections can give agricultural policymakers, at the State and Federal level, and members of Congress, a more detached view of the impact of the current policies by showing where such policies are likely to lead.

For More Information . . .

The following publications provide additional detail on the structure of U.S. agriculture.

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Economics and Statistics Service

The Economics and Statistics Service (ESS) collects data and carries out research on food and nutrition, international agricultural trade, natural resources, and rural development. The Economics unit researches and analyzes production and marketing of major commodities; foreign agriculture and trade; economic use, conservation, and development of natural resources; trends in rural population, employment, and housing and rural economic adjustment problems; and performance of agricultural industry. The Statistics unit collects data on crops, livestock, prices, and labor, and publishes official USDA State and national estimates through the Crop Reporting Board. Through its information program, ESS provides objective and timely economic and statistical information for farmers, government policymakers, consumers, agribusiness firms, cooperatives, rural residents, and other interested citizens.