The Changing Scale of American Agriculture

John Fraser Hart

Chapter One

Background

At the dawn of the twenty-first century entrepreneurs were transforming American agriculture from a simple cottage industry into an efficient modern system of large-scale food production. Similar transformations wracked the steel industry and the automobile industry a century earlier, and more recently the grocery business has been transformed in the same way.

Massive transformations have serious consequences. They change the status of individuals, and they may deprive individuals and firms of some of their independence, if not their very existence. Some producers have gone under, whether from bad luck, poor management, or some combination thereof, but others have been able to find niches for themselves in the new system, and they have grown larger by consolidating smaller entities into prosperous new firms.

The scale of farming has changed so dramatically that farmers have had to add a zero or two to the way they once thought, whether it be dollars or acres, crops or animals, bushels or head. Once they thought in tens or hundreds, but now they must think in thousands; once they thought in thousands, but now they have to think in tens of thousands or even millions. This simple idea, "Add a zero or two," seems tough for city folk to grasp, but every farmer to whom I have talked has immediately understood what I meant, because it so neatly summarizes how the scale of American agriculture has changed.

Entrepreneurs have driven this change in scale. Many people seem to assume that things just happen, but things do not just happen, they happen only because someone makes them happen. Things happen, places are changed, and new systems are created by the decisions and by the initiatives of individual entrepreneurs. They have transformed American agriculture. Many of the entrepreneurs who have driven this transformation are still alive, and I have enjoyed the pleasure of listening to many of them while I was doing fieldwork for this book.

They have developed streamlined new organizational structures that reduce costs by

securing economies of scale, and they have centralized control of production, processing, and marketing. These complex new organizations require a high order of managerial skill, because the effects of mistakes are magnified, and a large operation can lose money faster than a smaller one. They have reduced the cherished independence of farmers, because many of the major decisions that control the activities of modern farms are made in distant corporate boardrooms rather than in the farmhouse kitchen or in the barnyard.

In 1949 most American farmers sought to be as nearly self-sufficient as possible. They did a little bit of everything to produce most of what they needed. They grew a variety of crops, some of which they sold, some of which they ate, but most of which they fed to farm animals. Tractors were replacing horses and mules, but most farms had a milk cow or two, fed out a few steers and pigs to be butchered after the first frost of fall, and kept a flock of barnyard hens to produce meat for Sunday dinner and eggs that the farm wife could collect and barter for "store-boughten" delicacies (fig. 1.1). In summer she sweated over a boiling cauldron preserving vegetables from the garden and fruit from the orchard for winter consumption. In 1949 the average American farm sold only $4,097 worth of farm products.

<fig. 1.1>

In 1997 the average farm sold products worth $102,970. (I rely heavily on the 1997 Census of Agriculture, even though rapid change has outdated a few parts of it, because it is our most up-to-date source of detailed and comparable geographical information for the entire nation, and it is consistent and comparable with censuses taken in earlier years.) Today most successful farmers have become specialists, and they are doing what their computers tell them they can do most efficiently and most profitably. They specialize in producing a single crop, maybe two, or a single type of livestock, and they buy everything else they need. Farmers and their wives stand in supermarket checkout lines just like the rest of us.

Specialization on producing a single commodity has spawned a new tripartite (core, periphery, and rimland) macrogeography of American agriculture. To show this new macrogeography I calculated the percentage of farm income derived from sales of crops in 1949 and in 1997 in each county that equalled or exceeded the national value of farm sales ($85 an

acre) in 1997 (fig. 1.2). In the midwestern heartland most counties gained more than five percentage points and shifted toward crops, because farmers in this area had changed from mixed crop-and-livestock farming to growing corn and soybeans for direct cash sale.

<fig. 1.2>

Counties in the periphery southwest and south of the midwestern core lost more than five percentage points and shifted toward livestock, because in the periphery entrepreneurs have developed highly specialized livestock operations that rely heavily on feed grains shipped from the core. The third major area is the rimland in California, in Florida, and in the Northeast, where most counties gained more than five percentage points, because farmers in these areas concentrated on producing vegetables, fruit, nursery and greenhouse products, and other highly specialized crops.

By 1997 most farms had gotten rid of their chickens and their milk cows and their hogs, but more than half of our farms still hung on to beef cattle (fig. 1-1). Small landowners and hobby farmers like beef cattle, which are a source of prestige rather than profit for their owners, because they prettify the place where the hobby farmer likes to play cowboy on weekends. The digestive systems of cattle enable them to eat grass and other roughages that are unsuitable for other forms of livestock. They require relatively little time, so anyone with a small acreage of land may be tempted to run a few head on it. Despite the ubiquity of beef cattle, however, most of our beef actually is produced by a small number of large feedyards.

Most farms that once could comfortably support nearly self-sufficient farm families today are too small. Farms have had to get bigger or go under. This thought offends some people, because the Jeffersonian ideal of small owner-operated farms that are self-sufficient is deeply embedded in the American psyche. The idea that a family farm must be small and self-sufficient has died hard, but nowadays a family farm is a business that must gross at least $250,000 a year in order to remain in business and provide an acceptable level of living for a modern American family.[1]

Farmers who grossed less than $250,000 from their farms in 1997 received a paltry return indeed for their labor after they had paid their bills for machinery, fuel, seed, fertilizer,

pesticides, feed for livestock, taxes, insurance, interest, utilities, and other farm expenses. Farming is no longer simply a way of life, although for many farmers it is still a very good life, and they would not swap it for any other. The old-fashioned, nearly self-sufficient, small family farm is a thing of the past. Perhaps the old folks can gradually tighten their belts and still manage to hang on to little one-person farms on land they have inherited, but the younger generation are not willing to make the sacrifices necessary, and they have forsaken the farm in search of a better livelihood and lifestyle.

A successful modern family farm is a complex business that demands a wide range of management skills. It is a specialized commercial venture with greater gross sales and a greater capital investment than most of the businesses on Main Street. It has had to get larger in order to stay in business, but 95 percent of the farms in the United States still are operated by families, although many of them have had to hire nonfamily labor as they have grown larger.[2]

The number of farms has declined dramatically. Many undersized farms simply have dropped out of production, especially in environmentally constrained areas in the Northeast and in the South, but much of their land has been incorporated into larger farms. The number of farms in the United States fell from a peak of 6.8 million in 1934 to 5.4 million in 1949 and then to only 1.9 million in 1997, but the nation's cropland only slipped from 478 million acres in 1949 to 431 million acres in 1997.[3]

Nearly two million farms still sounds like quite a lot, but if they were spread evenly across the country there would be only one farm for every two square miles, and they would be hard to find. In 1992 fewer than half of the counties in the United States, mostly in the Midwest, could boast that they had at least one farm per square mile, and only a few intensively specialized (e.g., tobacco, dairy, poultry) counties had two or more (fig. 1-3). Most of the West and large areas in the South and the Northeast had less than the national average of half a farm per square mile.

<fig. 1.3>

Furthermore, most of the nation's 1.9 million farms are superfluous to the contemporary agricultural economy, and they are included in the census only by virtue of an official definition

of a farm that is extremely generous: a farm, according to the U. S. census of agriculture, "is any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year." At least a million of the places included by this definition could not be considered real, honest-to-God farms by the wildest stretch of anyone's imagination.

In 1997 61 percent of all our "farms" sold less than $20,000 worth of farm products, but they produced a mere 3 percent of the nation's food and fiber (table 1.1). Half of all "farm operators" reported that they had off-farm jobs, and nearly half admitted that farming was not their principal occupation.[4] Operations such as these might properly be described as nonfarm farms, because they must have nonfarm income to support their farm activities.

<table 1.1>

Although the official census definition of a farm is extremely permissive, it should not be changed, because it has the great advantage of allowing the census to report a wonderfully complete and detailed accounting of the nation's agriculture. Even those of us who grumble about it would object vigorously to any proposal for making it less liberal. Simply remember that more than four-fifths of the "farms" included in the census are actually nonfarm farms, and they contribute little or nothing to the nation's agricultural economy.

The size of farms has increased. The number of farms and the size of farms are merely two ways of saying the same thing, because the size of farms increases when the number of farms decreases unless the acreage of farmland changes significantly. The average size of farms in the United States increased from 215 acres in 1949 to 487 acres in 1997 (table 1.2), while the number of farms was dropping from 5.4 million to only 1.9 million. National averages are inflated, however, by the large farms and ranches in the dry West, and east of the Missouri River the average farm increased from 115 acres in 1949 to 250 acres in 1997.

<table 1.2>

The total acreage of farmland also can be misleading, because much of the farmland of the West is rangeland of only limited agricultural value, and much of the farmland of the East is woodland of equally limited value. The acreage of cropland harvested is a better indicator of

productive agricultural land, and on the average farm in the East it nearly tripled, from only 46 acres in 1949 to 127 acres in 1997 (table 1.2).

Individual farmers have had many reasons for deciding to enlarge their farms. Increased specialization, greater commercial orientation, and technological innovations have forced them to grow larger to achieve economies of scale. Some new technologies, such as improved fertilizers and hybrid seeds, can be used on farms of any size, but many innovations require larger farms, because they have extremely high unit costs at low volumes of production but low costs at high volumes. For example, a $250,000 tractor (yes, there are such!) would cost $2,500 an acre on a 100-acre farm but only $25 an acre on a 10,000-acre farm.

Farmers have had to increase the volume they produce in order to stay in business. They have no control over the price they receive for their products, and when the price drops they can only maintain their income by reducing their costs or by producing more. They have watched their profits per head or per bushel shaved thinner and thinner, and they have had to produce more head or more bushels in order to stay in business.

The farm business has gone the way of the grocery business. Once nearly every corner had a small ma-and-pa grocery store that eked out a living by taking a high markup on a small volume of sales, but today the grocery business is dominated by supermarkets that make their profits from a large volume of sales with razor-thin markups, just as the farm business is dominated by large operations that produce huge volumes with tiny profit margins.

American agricultural production has become increasingly concentrated. In 1997 less than 4 percent of the farms in the United States produced 57 percent of our farm products, while 61 percent of the farms produced only 3 percent (table 1.1). One-third of a million farms that each sold more than $100,000 produced more than four-fifths of the nation's crops and animals, while the other 1.6 million farms did not contribute very much.

The concentration of production of individual crops and types of livestock is even more striking. The largest size category of farms producing most commodities includes fewer than one thousand farms, and these farms account for less than one percent of all farms producing that commodity, but they produce ten, twenty, even one hundred times their share (table 1.3). For

instance, 640 feedyards that sold 5,000 fed cattle or more produced three-quarters of our beef in 1997. Fed cattle are the extreme example of concentration, but laying hens and turkeys are not too far behind, and even the major field crops show a remarkable concentration.

<table 1.3>

The largest farm operations are massive. One thousand acres of corn or soybeans, for example, is four times the size of the average farm in the East, or more than six times the size of an original 160-acre homestead, and the scale of the largest livestock operations is equally staggering. Such huge operations demand an extraordinarily high order of managerial skill, and successful modern farmers, like other business men, must know how to obtain and manage capital, and how to keep the farm in the family, on top of everything else they need to know and be able to do.

A successful modern farm is a tightly integrated operation that cannot be broken up and partitioned among the heirs when its owner dies. One child must continue to operate it as a unit, and the other children are not willing to donate their inheritance to him or her, so family farms have been forced to incorporate to facilitate the transfer of assets from one generation to the next. Incorporation is simply a legal strategy for keeping the farm in the family when multiple ownership becomes necessary.

Some people have ideological and emotional objections to the very idea of corporate farms, and some states have passed laws to restrict them, but in 1997 only 4.4 percent of the farms in the United States were incorporated, and 90 percent of these were family-held corporations (table 1.4). Only eight thousand corporate farms were not family-held, and one-quarter were in California, Florida, or Texas. Nonfamily-held corporate farms are so heavily concentrated in the irrigated oases of the West that easterners cannot understand why westerners are concerned about them, and westerners cannot understand why easterners are not.

<table 1.4>

A family-held corporation can keep a farm operation intact after the death of its owner, but nonfamily-held corporate farms generally have not been too successful, because farms, and especially livestock farms, need the constant attention of an owner to a greater degree than most

other businesses, and it is hard to find managers who have the dedication of owners.

Crop farmers and livestock farmers have different needs when they enlarge the scale of their operations.[5] Crop farmers need to farm more land in order to increase their volume of production, but farmland has been too expensive for them to buy, and it has been too valuable for the owners to sell. Crop farmers thus have elected to enlarge their farms by renting land rather than by buying it, and they have invested their capital in the machinery wherewith to work it.

Livestock producers want to own the land before they invest in buildings, fences, watering ponds, loading and handling facilities, and other necessary structures. Many livestock producers do not need large acreages, because they can buy feed more cheaply than they can grow it themselves, and they house their animals in special purpose-built facilities, many of which look like conventional factories. These facilities are not cheap.

Livestock producers have been forced into new patterns of organization that have deprived them of some of their cherished independence. They are driven by the demands of meat-processing companies, who in turn are driven by the demands of consumers. Contemporary Americans are reluctant to spend time in their kitchens preparing food, and they are concerned about their health. They demand cuts of meat that are leaner, of predictably uniform quality, and in convenient ready-to-use packages. Processors are happy to satisfy this demand, because they make far greater profits from selling value-added products that have been specially prepared and packaged in plastic than they do from selling raw meat.

In order to manufacture standard products the processors must have a steady supply of animals of nearly identical size, shape, and quality. They have kept animal geneticists working overtime to develop prolific breeding stock that grow faster and produce leaner meat with less feed. Generally it is easier to produce these superior animals on large farms, because they require a greater capital investment and more specialized management. Furthermore, the processors prefer to deal with a few large producers, who can regularly deliver large numbers of standard animals, than with many small farmers, who deliver small lots of highly variable quality on an irregular and unpredictable basis.

Entrepreneurs have modernized meat production, which has six major stages: (1) growing the grain, (2) milling the grain into feed, (3) breeding the animals, (4) feeding the milled grain to the animals, (5) butchering the animals, and (6) selling the meat. Many years ago farmers did it all themselves, but grain farms, feed mills, feeding farms, processing plants, and marketing companies evolved into more-or-less separate firms as agriculture became more specialized and more commercially oriented.

Today the various stages have been pulled back together by vertical integration and streamlined into more efficient meat-producing systems called food-supply chains. A firm is vertically integrated when it takes control of two or more stages, whether by outright purchase of other firms or by contract with them. Feed mills, for example, have tried to increase their sales of feed by forward integration: they have contracted with farmers to feed animals for them, and then they have marketed the animals. Processors have integrated both ways: backward, by contracting with farmers to deliver the steady supply of animals they need to keep their production lines running, and forward, by developing marketing and distribution systems for their products.

The farmer who contracts with an integrator is expected to provide the facilities and labor. The integrator provides the animals and feed, supervises the farm operation, and handles processing and marketing. Farmers appreciate the income they are guaranteed by the integrator, but they resent being supervised on their own farms. Furthermore, the integrators prefer dealing with large farms, and many small farmers fear that integration will squeeze them out of business.

Gary Benjamin of the Federal Reserve Bank of Chicago undoubtedly spoke for many small farmers when he said that large producers are "cannibalizing" small farmers,[6] but the large producers retort that the small farmers are shooting themselves in the foot by refusing to accept and adopt modern technologies.

Vertical integration has become a dirty word in the minds of many farmers, because they associate it with the loss of their independence. The term has become virtually synonymous with large-scale modern livestock production, and those who are trying to halt the development of large new agricultural systems have seized upon it as a potent political weapon. They have

secured the passage of state laws forbidding it, and the integrators have been forced to find creative ways of circumventing these laws, or to move their operations to other states that are more permissive.

Different commodities are at different stages of the integration process. Broiler production, which led the way, was almost completely integrated by 1960, but turkeys were not integrated until around 1990. The integration of hog production started late but it is catching up rapidly. Packing companies have integrated vegetable production, but the major field crops, such as corn, soybeans, wheat, and cotton, do not lend themselves well to integration. The farmer sells most of them himself, although processors have contracted with some farmers to produce special crops, such as white corn grown for tortilla chips.

Vertical integration into food-supply chains is the way to the future of American agriculture, which entrepreneurs have transformed from a cottage industry into a streamlined modern system of food production. This transformation has forced most farmers to specialize in producing a single commodity, and it has forced them to enlarge their scale of operations. It has marginalized the "small family farm," which did many different things, none of them particularly well. A modern family farm must be an efficient business with gross sales of at least $250,000 a year in order to provide an acceptable level of living for a contemporary American family.

Table 1.1

Number of Farms and Value of Sales, By Size-of-Sale Categories, 1997

Value of Sales	Farms		Sales	
	Number	Percentage	($000,000)	Percentage
All sales	1,911,859	100.0	196,865	100.0
$500,000 or more	68,794	3.6	111,476	56.6
$250,000 to $499,999	87,777	4.6	30,505	15.5
$100,000 to $249,999	189,417	9.9	30,143	15.3
$20,000 to $99,999	390,785	20.5	18,806	9.6
Less than $20,000	1,175,086	61.4	5,934	3.0

Source of data: 1997 Census of Agriculture.

Table 1.2

Measures of Farm Size

	1949	1997
Average total acreage per farm		
United States	215	487
East	115	250
West	527	1,100
Average acreage of cropland harvested per farm		
United States	64	219
East	46	127
West	122	426
Average value of farm products sold per farm		
United States	$4,097	$102,970
East	$3,291	$90,700
West	$6,613	$123,841

Source of data: 1949 and 1997 censuses of agriculture.

Table 1.3Largest Farms, by Commodity, 1997

Commodity	Number of farms	Trait	Percentage of	
			Farms	Product
Fed cattle	640	5,000 sold	0.6	74.7
Laying hens	606	100,000+	0.8	65.9
Turkeys	868	100,000 sold	14.4	63.2
Sugarcane	58	2,000 acres	6.0	53.8
Hogs	2,462	7,500 sold	2.6	50.1
Cotton	3,173	1,000 acres	10.1	39.7
Vegetables	604	1,000+ acres	1.1	36.4
Potatoes	220	1,000+ acres	2.1	31.4
Orchards	614	1,000+ acres	0.6	28.6
Broilers	1,319	750,000 sold	5.5	26.4
Milk cows	878	1,000+	0.8	17.5
Soybeans	6,962	1,000 acres	2.0	16.1
Wheat	2,783	2,000 acres	1.114.2	
Corn	6,535	1,000 acres	1.5	13.7

Source of data: 1997 Census of Agriculture.

Table 1.4

Number of Farms and Corporate Farms in Selected Areas, 1997

	All Farms	Corporate Farms	
		Family-held	Other
United States	1,911,859	76,103	7,899
California	74,126	4,473	779
Florida	34,799	3,881	635
Texas	194,301	4,659	610
Iowa	90,792	5,733	395
Illinois	73,051	2,790	253

Source of data: 1997 Census of Agriculture.

Insert New Tables for Ch 1 (2) [NEW TABLES FOLLOW]

Table 1.1

Sales of Farm Product, By Value of Sales, 2002

	Farms		Sales	
Value of Sales	Number	Percent	($000,000)	Percent
All sales	2,128,982	100.0	200.646	100.0
$500,000 or more	70,642	3.3	124,204	61.9
$250,000-499,999	81,694	3.8	28,530	14.2
$100,000-499,999	159,052	7.5	25,402	12.7
>$100,000	1,817,594	85.4	22,511	11.2

Source: 2002 Census of Agriculture

Table 1.3

Largest Farms, By Commodity, 2002

Commodity	Trait	Number of Farms	Percentage of Farms	Percentage of Products
Hogs	7,500+ sold	5,021	6.1%	74.1%
Fed cattle	5,000+ sold	684	0.6	73.4
Turkeys	100,000+ sold	800	9.5	65.3
Laying hens	100,000+	373	2.0	65.2
Sugarcane	2,000+ acres	82	8.6	58.2
Cotton	1,000+ acres	3,458	13.9	49.1
Potatoes	1,000+ acres	279	3.0	48.0
Vegetables	1,000+ acres	553	1.0	36.2
Broilers	750,000+ sold	2,211	6.9	32.0
Milk cows	1,000+	1,256	1.4	28.8
Orchards	1,000+ acres	586	0.5	28.3
Soybeans	1,000+ acres	10,385	3.3	21.2
Corn	1,000+ acres	8,902	2.6	20.9
Wheat	2,000+ acres	2,586	1.5	14.9