

## INDUSTRIALIZATION OF RURAL AMERICA

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Revolutionary War soldier - farmer would recognize only a few of the tools and none of the machines on a modern farm today. A technological revolution of great magnitude has taken place in rural America. Our revolutionary period visitor could not help noticing that in today's world, 74%, or three out of four of the population live in urban areas and only 26% live in rural areas. In 1790, 5% were urban dwellers and 95%, nineteen of twenty, were rural dwellers. How this "Industrialization of Agriculture" took place and what it means for our cultural and technical existence in America is the subject of this paper.

In the 19th century, one major thrust of agricultural change consisted of innovations designed to increase the average yield that could be cultivated by a single farmer. For example, in the area of labor - saving and land - using mechanical devices, horses were substituted for oxen as more efficient sources to move new machinery, and barbed wire in the West made practical the highly land-intensive techniques of raising livestock. And, of course, in the South, the cotton gin allowed the planting and harvesting of more acreage.

The second major change areas was in trade and transportation. For example, by making possible trade over a wide area, reductions in transport costs made possible new patterns of regional specialization in agriculture,

according to which each region can concentrate on those agricultural products best suited to the unique conditions of soil topography, rainfall and other factors. One of the great gains to the American economy in the last century was this pattern of regional specialization in agriculture. It was made possible by a sequence of transportation improvements, i.e., canals, steamboats, and especially railroads.

The turn of the century and the end of World War I saw the United States emerge as the greatest of the industrialized nations. Of all the technological and economic wonders of the time, the automobile was in the vanguard. And in rural America the introduction of the tractor is often considered as a major turning point. The introduction of the tractor freed approximately 90 million acres of land, because a farmer does not have to grow hay and oats for an internal combustion machine. Important transportation advances came in 1921 when Congress passed the Federal Highway Act which provided federal aid for state roads, and in 1923, when the Bureau of Public Roads planned a national highway system.

The Depression of the 1930's and the policies of the New Deal set rural America on the path it would follow through World War II. Rural America was hardest hit by the depression because of the drastic decline in the price of goods sold; the mounting surplus of agricultural products; the amount of debt incurred during the twenties by the farmers (purchase of machinery to modernize); and by the inability of rural banks to extend credit and prevent mortgage foreclosures.

One of F.D.R.'s first controversial New Deal measures dealt with the farmer - the Agricultural Adjustment Act of 1933. The AAA provided that the government would pay subsidies to farmers to reduce their acreage and farmers

would receive payments based on parity, a system of regulated prices for corn, cotton, wheat, rice, hogs, and dairy products. The second AAA passed in 1938, continued parity payments which lasted until 1970. In June of 1933, Congress passed the Farm Credit Act, which provided short and medium term loans to farmers needing to refinance a mortgage.

The establishment of the T.V.A. and the Rural Electrification Administration (REA) constituted a political and technical revolution. The Tennessee Valley Authority (TVA) established during the first one hundred days had far-reaching implications for rural America. It established a broad program of forty-seven dams for flood control and the generation of hydroelectric power; began reclamation and reforestation programs; produced nitrogen fertilizers and nitrate explosives; and began the improvement of navigation by digging a 650 mile channel from Knoxville, Tennessee to Paducah Kentucky. Nearly 57% of T.V.A. output of electricity goes to the rural electric cooperatives - which brings us to the electrical revolution.

In the mid-thirties, nine out of ten rural homes were without electrical services. Today 98% of the nation's farms have electric service. What happened? In May, 1936, the Rural Electrification Act was passed which continued the R.E.A. originally established by F.D.R. in 1935. The Act provided for federal assistance to locally owned rural electric cooperatives. This included loans to non-profit farmer-owned associations. The loans were guaranteed at 2% interest. The R.E.A. was a tremendous success; only two co-ops have defaulted on their loans.

In 1944 Congress passed the Case Act, authorizing the R.E.A. to continue indefinitely, reestablishing a fixed rate of interest at 2% and a fixed repayment schedule up to 35 years. The clear intent of the legislation was to

electrify all of rural America and since 1950, all loan contracts have contained an "area coverage" agreement, requiring the borrower to serve all within its area, no matter how sparsely populated. The R.E.A. was kept busy. In 1940, \$100 million was advanced in loans, in 1946, \$300 million and in 1949, telephone wiring loans were added, and in 1969, \$6,985,363,485 approved for loans to 1,100 rural systems, to build 1,660,527 miles of line and other facilities to serve 6,737,301 consumers. In other words, about 25 million people living and working in 2,600 of the nation's 3,072 counties depend on the rural systems for their electric services. There are today 985 R.E.A. cooperatives. After 1973 the R.E.A. guaranteed loans to rural electric systems but all funds come from private sources, now at 5% interest. The significance of this electrification of rural America is that it has broadened the tax base in rural counties and created an entirely new market for electric appliances and equipment estimated at 2½ billion dollars annually.

Because of electrification and World War II, the 1940's saw the most dramatic improvement in agricultural productivity. This era is called the "Second Agricultural Revolution" by Wayne Rasmussen, an authority on agricultural development. This revolution was not the result of adapting one tool or technique, but rather it came through farmers adapting what has been called a package of agricultural technology or "The Systems Approach" to the improvement of productivity. For example, with electricity farmers could run useful devices of all kinds, including not only electric lights but also milking machines, feed grinders and pumps. Plus, other changes included the controlled application of lime and fertilizer, soil - conservation techniques such as the planting of cover crops, irrigation where necessary, the creation of improved varieties of plants and breeds of animals, the adaption of hybrid

corn, the formulation of more balanced feeds for livestock, the more effective control of insects and diseases, and defoliants. This mechanization was extended to animal husbandry, particularly in the greater production of eggs, chickens, milk, hogs and cattle.

It took the war and accompanying shortages of farm labor, high prices for farm products and an enormous demand for farm products to accelerate the transition from the family - owned and operated farm to the large scale, mechanized agribusiness dominated by banks, insurance companies and farm co-ops. In economic terms: from 1940 - 1945, the value of American agricultural machinery rose from 3.1 billion to 6.5 billion and the average acreage per farm jumped from 179 to 195. The rise of the new machines and fertilizers boosted farm output per man hour by 25%. At the same time the farm population fell from 30.5 million to 24.4 million.

After the war, the trend toward economic consolidation continued. Between 1945 and 1970, new machines such as mechanical cotton, tobacco and grape pickers and crop dusting planes revolutionized farming methods and increased use of fertilizers and pesticides. This raised the cash value of farm output by 120%. Meanwhile labor productivity tripled, and the labor force shrunk by 56%. This consequent improvement in profitability drew large investors into agriculture. Average acreage per farm jumped from 195 in 1945 to 450 in 1980. The value of the farm also skyrocketed.

In many cases only banks, insurance companies, established family farms and other large businesses could afford the necessary land, machinery and fertilizer. The farm population took a dive from 23 million in 1950 to 6 million in 1980. Many went to the cities - often to impoverished or bleak situations; others are now among the rural poor. Of the rural population

25-30% are poor, whereas 15% of the urban population are poor.

A key economic concept to consider is that however small the proportion of the total labor force remaining in agriculture is, it should not be taken as an index of the total resource commitment of the economy to the production of agricultural goods - meaning that the growing output of American agriculture has been achieved by technological advances embodied in the inputs that the farmer now purchases from the machinery, chemical, feed-processing and related industrial sectors such as telephone and electric power.

In the early 1980's there are some who indicate that agricultural productivity may have reached a plateau because approximately the same total acreage is being farmed.

What is considered surprising is that the rural population has increased faster than the urban population in the past ten years. However, many of these people who have departed the cities are actually living a suburban life in areas formally classified as rural. There is only a slight increase in the numbers of people living on farms.

Some forecasters predict that all farming will be in the hands of three or four corporations by the year 2,000, with soil preparation, seeding, cultivating and harvesting being almost entirely mechanized. They see wider development of hybrid varieties of wheat, barley and soybean; higher protein content in grains, insect-resistant plant varieties, improved breeding practices for beef cattle; greater feeding efficiency and double cropping. Also the application of the computer farm management is seen as a powerful factor, leading to more efficient management of machines and energy. It should help in other farm operations, such as cost accounting, mixing feed and deploying fertilizers and other resources efficiently. Some regard increased

irrigation, soilless or hydroponic farming, the desalinization of seawater, the use of plankton as food, and the growing of edible protein on petroleum as necessary to maintain the world's population of the future.

Uncertain are the problems that may arise from this extreme specialization of much agriculture. Such specialization increases vulnerability to outbreaks of plant and animal diseases. The increased productivity that benefits so many carries with it great dependence on and responsibility of science to cope with so many inherent risks.

To summarize, we have seen that the Industrialization of Rural America has:

1. Demanded better farm management for the efficient utilization of capital-intensive equipment with resultant huge leaps in productivity.
2. Reduced drastically the opportunity for private ownership in farming and thus we have agribusinesses.
3. Dispersed pesticides throughout our environment.
4. Saw many small towns and rural social institutions disappear.
5. Increased efficiency and lowered the overall price of food in the United States.
6. Increased the disposable incomes of the surviving farmers.
7. Saw subsistence farmers all but disappear.
8. Left many rural poor.
9. Increased our national rural-urban dependence on science and technology.