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Adjustments and Capital Use in Agricultural Regions

GREATER ATTENTION is being focused on the changes taking place in the agricultural sector of the economy. Adjustment problems inherited from the past along with the expected problems of the future make adjustment problems in agriculture more conspicuous. Population increases, changing tastes and values, technological developments, and institutional changes are among the factors giving rise to perennial adjustments which must be expected and accepted. The efficiency of agricultural production varies considerably among different regions and among different segments of the agricultural economy. Heady discussed efficiency in the utilization of agricultural resources by the farm firm in Chapter 6.

Maximum economic efficiency becomes intricate and complex and probably never will be attained. However, the considerable mobility of resources, such as labor and capital, provides evidence that the theoretical system is descriptive of desirable end points which cause resource shifts. The problem of unattainable ends derives, in part, from the fact that allocation for maximum net returns involves an anticipation by entrepreneurs of each others' actions as influenced by the time required for production. Therefore, errors in expectations are responsible for a large part of the misdirection of resource use. Experience with these entrepreneurial expectations leads to internal and external capital rationing which tends to cause emphasis to be placed upon resources that are more flexible — namely labor.

In a competitive equilibrium, a specific quantity of any resource should make approximately the same marginal contribution regardless of where it is employed. It is common knowledge that considerable differences in productivity of resources in agriculture exist within and among the geographic regions, and probably the most important reasons are the differences in the quantities of other factors available for combination with labor. This is not unlikely since about 60 to 75 percent of net farm income is attributed to labor when capital is valued at the current rate of interest.

The increasing need for maximizing net returns will prompt farmers, owners, and users of farm resources to allocate their resources in the "best" possible way under the existing and anticipated circumstances. While the quantity and quality of resources available clearly affect the

net return, the influence of social institutions in influencing resource adjustments must also be appreciated. However, the economic impact of resource adjustments on an area's economy is not fully understood because of the lack of knowledge of the technical rates of transformation and the rates of substitution of resources within regional and national aggregates.

For the individual farmer, the relative level of income, and therefore his standard of living, is determined by his ability to secure an efficient use of his resources. Regional differences in income per farm or per unit of resource results from varying degrees of inefficiency in resource use. Thus, low-income problem areas result mainly from pressure on the land to provide subsistence, and tend to predispose high degrees of conservatism in decision-making (Chapters 14, 21, 22, and 23). The unemployed or underemployed resources constitute one of the most basic of the long-range problems facing agriculture. Price supports and allied programs contribute little or nothing to the long-range resource adjustments and may even retard desirable trends of this kind.

TYPES OF AGRICULTURAL ADJUSTMENTS

Differentials in productivity of resources are largely a function of the quantities and combinations used. It is recognized that resources are not homogeneous in all areas since, for example, a 640-acre farm unit in east Tennessee does not have the same quality of land as one in Iowa or the Mississippi Delta. Climate, level of technical knowledge, and value systems operating in the region clearly affect the productivity of resources in any particular region (Martin's discussion in Chapter 4). There is no doubt that equilibrating forces are operating, but there is considerable doubt that the efficiency in the sense of the equalizing of marginal returns for comparable resources in all regions will ever be achieved.

Adjustments in Resource Organization

Under conditions of changing demand and technology, the farm income of an area depends largely upon the ability of farmers to adjust their resources to changing conditions. Often these conditions are closely related to nonfarm developments through the impact of the factor and product markets. Some regions have more efficient factor and product markets and fewer impediments to adjustments in factor organization.

Land use adjustments. The total acreage of cropland used in production expanded steadily along with the population until 1920, and has changed little since then, while population has continued to increase. This has resulted in a steadily decreasing per capita acreage from 3.8 acres in 1920 to about 2.0 acres in 1960. Increases in population,

expansion of industries, and scientific and technological advances in crop and livestock production have brought about shifts in the use of cropland. The resultant shifts reflect man's reaction to the environment since adjustments are made according to what has been perceived to be economic. Thus, regional specialization of farming activities tends to be conducive to development of economic group interests which become concerned and demonstrative when changes affecting their particular activities are taking place.

The all-time high output from farm crops in 1957 was from the lowest harvested acreage since 1917.¹ However, cropland harvested increased slightly immediately after World War II and remained almost constant until 1954 when it began to decline. Since 1940 some rather drastic changes have occurred in cropland used in the different agricultural regions. The New England states have experienced the greatest decline of any region, dropping to a low of 58 percent of the 1940 acreage, or 50 percent of the 1944 World War II level. On the other hand, the Mountain states increased their cropland rapidly until the 1952 level was 140 percent of the 1940 acreage, but this growth has leveled off to slightly below the 1952 level. Since 1948 the Pacific states have maintained the cropland acreage at about 112 percent of the 1940 level. The North Central states, which have a tremendous influence on farm output, have maintained cropland at 105 to 110 percent of the 1940 level with a slight decline since 1954.

In addition to the New England states, the Middle Atlantic, South Atlantic, and South Central states have experienced a rather steady decline in cropland used, though somewhat less dramatically than the New England area. These three regions have experienced fairly close rates of decrease, reaching a low of 75 to 80 percent of the 1940 level for all the three areas.

Adjustments in the number of farms, and consequently their size as measured by acres, are an important consideration in agriculture. Since 1929, about 1.5 million farms, or one-fourth of the number in the United States, have disappeared. About two-thirds of this decrease occurred during the 1945-54 period, with about one-third of the decrease occurring during 1949-54. Most of this reduction occurred in commercial agriculture, since part-time, residential, and subsistence farms increased approximately 200,000 from 1929 to 1954. Thus, the 1.5 million farms (about 65,000 per year) have been absorbed into active farms. The average size of all farms increased from 157 acres in 1929 to 242 in 1954, an increase of over 50 percent, with most of this taking place since 1940. The average size of commercial farms increased over 50 percent from 220 acres in 1940 to 336 by 1954.

Land substitution. Resources possess varying degrees of substitutability in production. Capital, labor, technology, and management may be considered as substitutes for land in producing a given output.

¹ Changes in Farm Production and Efficiency, USDA Stat. Bul. 233, Washington, D. C., Revised July, 1960, pp. 20-21.

Fertilizers are of great importance and can become a very important substitute for land, should farmers elect to hold output and other variables constant. No doubt fertilizer has played an important part in maintaining a high level of crop output in spite of the decline in cropland in the New England and the southeastern states. Assuming a fixed acreage, farmers obtain the highest net return when they distribute their expenditures so that the marginal value productivity of each unit of input is the same and is also equal to the prices of the units of input. Farmers have clearly found that the marginal value productivity of fertilizers is very high while its costs are relatively low. As a result, the use of fertilizers in the United States has expanded rapidly, increasing from 1.7 million tons of plant nutrients in 1940 to 6.2 million tons in 1957, or 368 percent of the 1940 level.² However, most estimates indicate that rates of application are still far below the level that would be most profitable in many areas, i.e., under usual cost-productivity conditions.

The greatest increase in the use of fertilizers has occurred in the North Central states, increasing from 252 thousand tons of nutrients in 1940 to 2,331 thousand tons in 1957, or 925 percent of the 1940 level, with the western portion of this area making the fastest gain. In the Corn Belt, estimates are that the rate of application could be economically increased by two to three times the amount applied in 1954 under reasonable corn-fertilizer price relationships. With large farm units, high levels of capital investment in equipment, and the good levels of management existing in these states, fertilizer use could reasonably be expected to be highly productive, particularly in irrigated areas.

A rapid increase in fertilizer use occurred also in the Mountain and Pacific states, reaching a high of 702 percent of the 1940 level in 1957. In 1940 only 85 thousand tons of plant nutrients were used. Fertilizer and water substitute for each other at a diminishing rate in farm production, and since water is the limiting factor, it has been economically feasible to use larger quantities of fertilizer not only to maintain but to increase the output.

The New England states experienced the least increase in the use of fertilizer of any geographic area, reaching a high of 158 percent of the 1940 level in 1949 but declining to 142 percent in 1957. The Middle Atlantic and South Atlantic states also made a relatively slow gain over the 1940 level of 888 thousand tons of plant nutrients, reaching a high of 215 percent of that level in 1955. However, these states have for many years made heavy use of plant nutrients. In the East South Central states, fertilizer use increased by 1957 to 277 percent over the 1940 level, while in the West South Central states it rose to 612 percent.

These regions with a smaller rate of increase of fertilizer use over the 1940 level apparently had a much more narrow gap between the marginal value product of fertilizer with respect to corn and the price

²W. Scholl *et al.*, Consumption of Commercial Fertilizers and Primary Nutrients in the U. S., ARS, USDA, Washington, D. C., fiscal years 1946-58; Changes in Farm Production and Efficiency, *op. cit.*

of fertilizer than had the Corn Belt. However, the gap in the Corn Belt area appears to be narrowing. Also, the relative changes that have taken place may also indicate that the marginal value productivity of fertilizer with respect to the crops of the Southeast may be closer to the price of fertilizer than that of the crops in the Corn Belt.

Pesticides, which include insecticides, fungicides, and herbicides have contributed greatly to increased production by preventing crop destruction. While they are not considered growth-producing resources, they must occupy an important role in making other resources more productive. Thus, pesticides may become very productive and a fairly important substitute for land in achieving a given level of output.

Farm labor adjustments. In the major part of the agricultural economy, labor is the chief single input. Priced at market wage rates, labor has a greater value than the annual services of land or other capital items. Labor has made up a decreasing percentage of total farm inputs since 1940, accounting for about 45 percent of total inputs in 1947-49 and dropping to about 30 percent in 1958. Labor in agriculture is more dispersed than in any other industry and is mostly furnished by farm operators and their families. One of its most valuable properties is flexibility of use. Many farm families can have a desirable level of income only if the productivity of labor can be increased.

Productivity of labor depends upon the level of other resources. In general, areas of low labor productivity are those of high capital productivity since labor is used in large quantities relative to capital. An increase in the amount of capital used with existing labor in areas of low productivity would increase the returns to the labor and lower the returns to capital. A reduction of the labor force because of the decrease in the labor-capital ratio would have the same effect. Both types of adjustments have been taking place.

Farm labor efficiency has been increasing since the country was settled, but the greatest gains have been made since 1910. Man-hours per crop acre have decreased steadily since 1942, reaching a low of 56 percent of the 1940 level in 1957.³ During the 1950's the decline averaged close to 4 percent per year. All geographic divisions except the western states (Mountain and Pacific regions) have paralleled closely the changes for the United States. The quantity of labor used in the western region declined, but at a slower rate, reaching a low of about 80 percent of the 1940 level by 1950.

While the labor input declined, the total farm output increased steadily, reaching 136 percent of the 1940 level in 1957.⁴ In the 1950's productivity rose over 2 percent annually as compared with 0.5 percent in the 1920's. Increases in crop yields have been the major source of the big increase in farm output, with yield increases ranging from 20 to 75 percent in the 1950's. The yield of corn, which accounts for a fourth of total crop production, increased by about 35 percent. Little improvement

³ Changes in Farm Production and Efficiency, *op. cit.*, pp. 36-39.

⁴ *Ibid.*

in feeding efficiency, except in broiler production, has occurred since 1947. Output of broilers per unit of feed has increased by about 40 percent. The farm output of the eastern states (New England and Middle Atlantic) and the southeastern states (South Atlantic and South Central) has not kept pace with that of the nation, while the North Central states and the western states have exceeded the national average, with the western states reaching 166 percent of the 1940 level by 1958.

The output per man-hour increased steadily to 204 percent of the 1940 level by 1957 due primarily to the declining quantity of man-hours used and to an increased quantity of other resources or resource adjustments caused mainly by improved technology.⁵ The output per man-hour in all geographic areas paralleled very closely the national average, except for the North Central states which increased at a faster rate, particularly after 1947.

Labor substitution. Labor productivity and farm incomes are highly dependent upon the amount of capital available. This means that capital will not substitute for labor at a constant rate. In many areas, an average farm family with a small quantity of capital cannot obtain a return from their farm comparable to that which could be earned if their resources were paid the market value in other uses.

Capital investment per farm worker averaged \$20,651 in 1959, or 605 percent of the 1940 level.⁶ This increase was due partly to a small increase in quantity, but mostly to rising prices of farm assets — particularly real estate — and a decrease in numbers of farm workers (Chapters 6 and 7). Of this investment, machinery increased at a faster rate, reaching 948 percent of the 1940 level in 1959. The number of tractors on farms in 1959 increased to 303 percent of the 1940 number.⁷ Together with tractors, increased investments were made in complementary equipment and farm trucks. Also, farmers have been purchasing nonfarm inputs which, when combined with labor, made their labor more productive. As a result, the number of people supported by a farm worker in 1959 increased to 220 percent of the 1940 level, indicating a considerable increase in farm worker efficiency.⁸

Capital adjustments. Capital investments are not inputs in the sense that they are immediately used up in production. They give services which vary in degree of exhaustibility (Chapters 2 through 5). To attain optimum levels of productivity in farming, it is important that the quantity of capital be adequate both in relation to the labor supply and other inputs and that the kinds of capital be in correct proportion for the level and type of production.

Real estate comprised more than 70 percent of the total value of physical farm assets in the United States in the 1950's (Table 6.1). In 1940 real estate comprised 75.5 percent of the total value of these assets; machinery, 7 percent; crops, 6 percent; and livestock, 11.5 percent.

⁵ *Ibid.*

⁶ Agricultural Outlook Charts, AMS, USDA, Washington, D. C., 1960, Table 34, p. 57.

⁷ Changes in Farm Production and Efficiency, *op. cit.*, p. 33.

⁸ *Ibid.*, p. 44.

By 1959 this asset mix shifted, with real estate decreasing slightly to 73 percent, machinery rising to 10.8 percent, crops decreasing to 5.5 percent, and livestock decreasing to 10.6 percent of the total value. The asset mix differs greatly between commercial and subsistence agriculture, especially when the various commercial types of farming are considered.

The real estate portion of the northeast dairy farms constituted about 50 percent of the total invested in the 1950's, whereas on Kentucky tobacco-livestock farms it made up about 80 percent of the investment.⁹ In general, the proportion of total investment in real estate did not increase greatly during the 1950's, although the Corn Belt hog-beef fattening area and the New Jersey poultry area did show substantial increases. Most of the adjustments over the 1950's in the asset mix occurred in machinery, livestock, and crops. In almost all of the commercial farming areas, the proportion of the total capital investments allocated to machinery increased.¹⁰ In the peanut-cotton area, machinery increased from 7.5 percent of the total investment in 1948 to 17.9 in 1958, with most of this increase occurring before 1954. The New Jersey poultry farms showed only a very slight increase in the machinery proportion during the same period of time. This increase of machinery came at the expense of livestock and crops. The capital investment in livestock and in crops on Piedmont cotton farms decreased from 8 and 5 percent of the total in 1948 to 4.2 and 2.3, respectively, by 1958.¹¹ Similar but less drastic changes occurred in other commercial farming areas.

The increase in proportion of machinery of the asset mix indicates that commercial farmers are increasing the productivity of their labor input by improving the labor-capital ratio. Also, the price of farm labor has encouraged a shift to more machinery.

Capital substitutes. Scientific and technological advances over the 1950's affected the productivity of land and labor (Chapters 4, 6, and 7). In one sense, science and technology constitute a form of capital when combined with management that is essential for modern commercial farming. The scientific and analytical mind which can view the varied phenomena confronting a farming operation and formulate decisions with a minimum of error is an excellent complement to the other resources involved (Chapters 20 and 21). A great deal of evidence points to a trend toward a higher level of formal education for highly commercialized farming and less reliance upon custom and tradition as a basis for decision-making. Woodworth and Fanning develop this point in Chapter 23.

⁹ Farm Costs and Returns, Commercial Family-Operated Farms by Type and Location, USDA, Info. Bul. 176, Aug., 1959.

¹⁰ *Ibid.*

¹¹ Farm Costs and Returns, Commercial Family-Operated Farms by Type and Location, *op. cit.*

Enterprise Adjustments

Specialization of production represents an adjustment to the prevailing physical and economic factors that influence land use. The degree of specialization depends on (1) the nature of the relationship of production possibilities, which in turn depends on the nature of the production function for each product, and (2) the price ratios of the products. Any forces which cause changes in price relationships or the nature of production possibilities can change the pattern of production. Enterprise adjustments can and do take place on the farm, within and among regions and among nations. A major shift in location of cotton production in the United States has taken place over the years since about 1930. The cotton acreage of the South has decreased from 43 million acres in 1929 to 17 million acres in 1955, while the three western cotton-growing states increased the cotton acreage from 645,000 to 1,498,000 in the same period.

The extension of speedy, refrigerated transportation equipment provided an opportunity for many areas to increase the output of vegetables. The substantial increase in the consumption of frozen vegetables since 1940 came at the expense of some other products, and the impact on the supply areas and market structure is obvious. Since 1940, the location of vegetable production has shifted significantly to the western states, particularly California. The western area has doubled its production, and the only other region to increase at a faster rate than the national average was the South Atlantic area. The South Central states maintained their proportion of the total output, while the North Atlantic and North Central regions increased production at a slower rate. The biggest increase in vegetable production occurred in three states producing for specialized outlets — Florida for fresh market, Wisconsin for canning, and California for both fresh and processing outlets.

Changes in per capita consumption of some farm commodities will force enterprise adjustments. For example, per capita consumption of cotton decreased from 30 pounds in 1940 to 22.2 pounds in 1958, and sweet potatoes from 16.2 to 6.6 pounds, while per capita consumption of processed frozen vegetables increased from 1.2 to 15.4 pounds during the same period. Many other adjustments which gave rise to major enterprise adjustments, not only within the farm unit but both within and among regions, have taken place in consumption since 1940.

FINANCIAL AGRICULTURAL ADJUSTMENTS

Credit agencies were among the first to feel the impact of the adjustments occurring within agriculture. Lower farm incomes led to many of the adjustments to improve farming efficiency. As the degree of commercialization and specialization continue to increase, more capital will be needed to finance resource acquisition. Farm enlargements, machinery, and other nonfarm production goods, such as fertilizers,

insecticides, gasoline, etc., have contributed to the increased use of borrowed capital to supplement the farm-generated capital and the capital obtained through leases. However, the large number of small farms, many with limited managerial input, which are found extensively in the South, presents serious credit problems for regular credit agencies (Chapters 14 and 23). These conditions are conducive to the development of contract farming where management and capital are provided in combination with the farmer's labor and land, as was shown by Jones and Mighell in Chapter 8. It has been said frequently that most farmers, except those with very low incomes, can obtain all the credit they are willing to use for making adjustments. Internal rationing of credit is probably the major obstacle to financing such adjustments. Coutu and Lindsey discuss this problem in Chapter 21.

Real Estate Mortgage Debt

Capital requirements to enlarge the size of farming operations by means of adding acres, and to finance purchases of real estate from those who leave farming, have increased since 1947.¹² Hathaway and Murray present detailed data on this subject in Chapters 5 and 11 (Tables 5.1 through 5.5). Over 40 percent of the purchases in 1958-59, as compared with 20 percent in 1950, were for the purpose of adding land to existing farms. The western two-thirds of the United States is most affected. In the western cotton area, 60 percent of the farm land purchases in 1959 were for farm enlargement as compared with 24 percent in 1949. From 1940 to 1947 the real estate debt declined to 69 percent of the 1940 level, apparently due to high incomes and limitations of consumption and production resources imposed by World War II. The farm mortgage debt in New England, West North Central, East South Central, and Mountain states decreased considerably more than the national average, with the East South Central region reaching a low of 46 percent of the 1940 level in 1946. The debt in the South Atlantic region reached a low of only 91 percent in 1946 and a high of 245 percent of the 1940 level in 1958. Two other regions—East South Central and Mountain—which had a relatively low real estate debt in 1946, increased loans at a faster rate than the nation as a whole, reaching 205 and 222 percent, respectively, of the 1940 level in 1958. The New England and West North Central regions, which has decreased the debt to 57 percent of the 1940 level, rose only to 109 and 116 percent of that level in 1958.

Prior to 1940, the federally sponsored agencies held large amounts of the farm mortgage loans, but since then, particularly 1942, the amount held by these agencies declined substantially. Mortgage holdings of the Federal Land Banks decreased to 37 percent of the 1940

¹² Agricultural Finance Review, ARS, USDA, Washington, D. C., Vols. 1-21, 1938-1959. . . See also Current Developments in the Farm Real Estate Market, ARS, USDA, Washington, D. C., Oct., 1959.

level in 1950, but had increased to 73 percent by 1958. Only the Mountain region had increased the real estate debt above the 1940 level by 1958. Changes in standards used in determining normal agricultural values and on-the-dollar limit will have some effect on the amounts loaned, but the 65 percent limit and conservative policies may make it difficult for the Land Banks to regain their prominence.

Life insurance companies have replaced the Federal Land Bank as the chief institutional lender. In 1940 Federal Land Banks held over 37 percent of the total real estate loans as compared with 13 percent for life insurance companies. By 1958 life insurance companies held 25 percent of the total as compared with 18 percent for the Federal Land Banks, and had increased the total amount held to 292 percent of the 1940 level. Recently they have been very active in the Northeast and in the western states.

Individuals have for many decades constituted the most important source of credit for real estate purchases. In 1940 this group held 49 percent of the total debt, and by 1958 their holdings had increased to 54 percent. This group has served a very useful function because they have provided credit when the traditional institutional patterns have failed to do so. The southeastern states have made more use of this group than other areas, reaching over 300 percent of the 1940 level in 1958 as compared with 167 percent for the nation.

The rapidly expanding industrial economy and greater urbanization of the population will place heavy demands on the anticipated savings for investment purposes. On the other hand, pressure can be eased considerably by the rapidly increasing use of the sales contract. This type of low equity financing was used widely during the 1950's in the North Central region. Also, commercial banks are becoming increasingly more active in this field, although their potential appears to be somewhat limited for long-term financing (Chapters 13, 15, and 16).

Nonreal Estate Debt

Adjustments in size of operations are also financed by borrowing for the nonreal estate items of production, although a large portion of these items are farm financed. Much of the borrowed capital for such short-term purchases is secured by chattels on crops, livestock, and equipment, and is therefore influenced greatly by the character and ability of the borrower.

All agricultural regions increased in the use of nonreal estate credit to about the same degree. The credit provided by the Production Credit Associations has increased rapidly since 1955, but commercial banks still provided approximately 75 percent of this type of credit in the United States in 1959. However, the amount held by lending groups varies from state to state and from region to region, depending upon the institutional restrictions. Bank credit, for example, accounted for

87 percent of the nonreal estate debt in Arizona in 1959, but only 48 percent in Louisiana.¹³

Installment credit has been used fairly successfully for medium-term investments, and in some areas farm credit unions have made significant headway. Merchant credit of some form has been used in substantial quantities and promises to increase, particularly if contract farming and the present interest rates continue (Chapter 11). Often a credit subsidiary of a retail store will show greater profits than the parent firm. This development will push farm financing away from the local sources and place it in the hands of absentee financiers. One of the principal developments in nonreal estate loans is the increasing need for longer maturities for loans, commonly called intermediate-term loans, for capital improvements. Diesslin presents the case for such a development in Chapter 13.

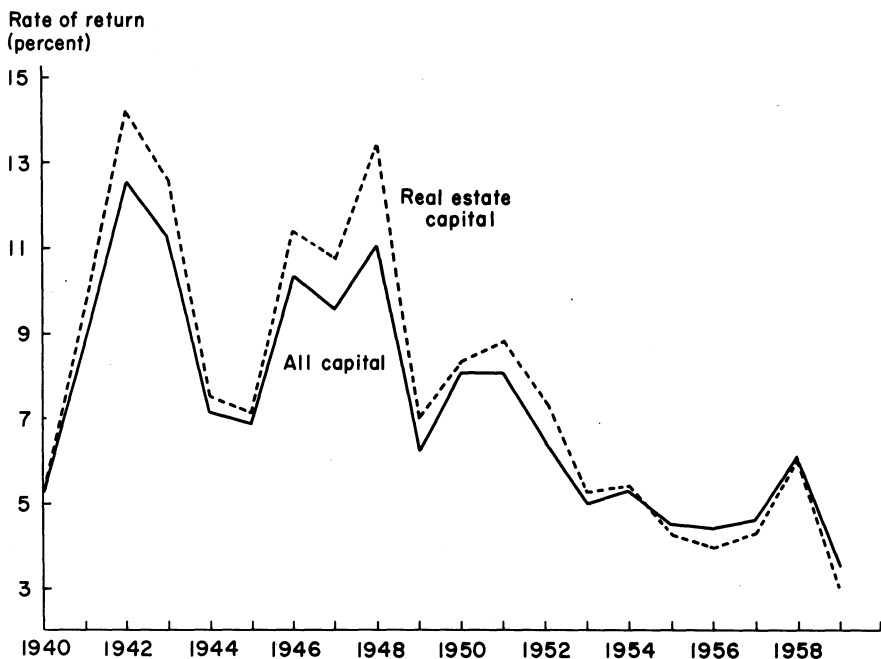
Productivity of Capital in Agriculture

The productivity of a resource in various uses in relation to its cost determines how much of that resource will be used. The productivity of capital invested in agriculture declined rather sharply during the 1950's. Capital investment per farm worker increased rapidly, while net farm income fell, resulting in a rapid decline in the net income per dollar invested. The net farm return per dollar invested for the nation in 1951 was 19 cents, but declined to a low of 10.7 cents in 1957.¹⁴ In the southeastern states where capital investments have been traditionally low, the net income per dollar invested has been the highest of any area in the nation. The western states have had the lowest net income per dollar invested.

During the 1940's and '50's about 75 percent of the farm assets were in the form of real estate and 25 percent in nonreal estate. The proportion of capital borrowed ranged from about one-fourth in 1940-41 to a low of about one-tenth in 1946-49, but was fairly constant at 14 percent after 1954. A large portion of the capital used by farmers, possibly 20 percent, has been "borrowed" under leasing arrangements with nonfarmers. The borrowed capital plus leased capital comprised about 30 percent of the total assets coming from external sources. When all purchased inputs are valued at their market cost, and other inputs such as owned capital and labor at their opportunity cost, the residual, when allocated equally between labor and owned capital, showed a downward trend (Figure 10.1). The rate of return for all capital used exceeded the interest rate paid on borrowed capital until 1954. After that, the rate fell to 3.5 percent, which is below the interest rate. Thus, part of

¹³ J. Z. Rowe, "Sources and growth of agricultural credit," *Business Rev.*, Vol. 44, No. 11, Nov., 1959.

¹⁴ Calculated from data found in *The Farm Income Situation*, AMS, USDA, Sept., 1959 and *Current Developments in the Farm Real Estate Market*, *op. cit.*



Source: William H. Scofield, "Returns to productive capital in agriculture," Current Developments in the Farm Real Estate Market, ARS, USDA, Feb., 1960.

Fig. 10.1. Changes in rate of return on market value of capital used in farm production, U. S.

the return (opportunity return) to family labor and owned capital must be used to pay the cost of borrowed capital.¹⁵

When the operator and family labor and nonreal estate capital are paid at their cost, the residual — which is the return to real estate capital valued at current values — also shows a decline, following the pattern of return to all capital (Figure 10.1). It seems that sufficient pressure will be exerted to reduce the rate of increase in land values and to bring about an adjustment in the land return-market value ratio.

¹⁵ William H. Scofield, "Returns to productive capital in agriculture," The Farm Real Estate Market, ARS, USDA, Washington, D. C., Feb., 1960.

Discussion

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Change seems to be the only constant in American agriculture. Redman presents the main elements of this process of change. The essence of this change seems to be the continual adjustment of the factor mix by entrepreneurs as they pursue a profit-maximizing position. Confronted by changes in product and factor markets and offered improvements in production technologies, American farmers seem to show less and less reluctance to alter their production combinations. American farming has moved very far from the traditional peasantry model of a farm as a relatively fixed combination of land and human labor. The farmer has come to treat more and more of his productive resources as variables. Who knows but what we are approaching a time when farming decisions may really be made on the basis of an equilibration of marginal costs and returns?

In addition to the factors discussed by Redman, there is a growing significance in two other factors. The first of these is social capital, or public investment. In the Tennessee Valley public investment has produced both public controversy and economic good. I would suggest that public development of a source of cheap electric power does affect decisions as to location of some kinds of industrial plants and thereby contributes to economic development. Also, the impact of an improved waterway on the pattern of agricultural output should be noted. Feed grains move in very large quantities down the Mississippi River and up the Tennessee River to ports in northern Alabama. The grain is then trucked to poultry production centers in Georgia and Alabama from these ports. The impact of the Georgia broiler industry is well known, particularly in the Northeast. It would seem that the improvement of the Tennessee River has given the Georgia and Alabama poultry producers a real economic advantage over producers in some other parts of the country.

Another kind of public investment is less direct, but equally effective. This is the very large investment which this country has made in technical education. We take for granted that we can have a large crop of technicians available not only to carry on agricultural research, but also to provide a personal advisory service to farmers. We also take it for granted that a high school education is commonplace and that many farmers have the benefit of some college training in agriculture. We should contrast our situation with the rest of the world, where this process of social investment is only just starting. In the late 1950's in the Ministries of Agriculture of three countries in the Far East — Viet-Nam, Cambodia, and Laos — there was a total of nine men who had

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college degrees in agriculture. What kind of program of private investment in agriculture is practical where such a situation prevails? What can one recommend in the way of private capital use in the agriculture of southern Italy, Morocco, or fifty other countries where most farmers are either illiterate, or at best have access to four years of schooling?

The capitalization of agriculture should be viewed also in light of another process of change. For many years there has been a gradual transfer of elements of the production process away from the farm. In 1959 the ultimate consumer received a product which was the result of a whole series of production processes and to which the primary producer, the farmer, made only a relatively small contribution. We are witnessing a growth of efforts to give centralized management to sets of these processes. To some extent this integration is under the control of farmer-producers through cooperatives. A large part of it, however, is controlled by large corporate firms with ready access to large sums of investment capital. The result is that a new channel for farm investment has been opened, but it is one which may have profound changes on the nature and the organization of farming.

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Considerable emphasis is placed on the fact that the trend has been for farmers to substitute capital inputs for labor inputs. Redman emphasizes the point that productivity of labor depends upon the level of other resources that are combined with the labor inputs. He also points out that, "To attain optimum levels of productivity in farming, it is important that the quantity of capital be adequate both in relation to the labor supply and other inputs and that the kinds of capital be in correct proportion for the level and type of production." With a substantially more rapid rate of increase in the price of labor than in prices of other inputs, and the prevailing stock of technology that existed, farmers were encouraged to make these capital substitutions. Considerable emphasis is placed upon the fact that any forces which cause changes in price relationships or the nature of production possibilities can change the pattern of production and, thus, the types of inputs that are used.

Commercialization and specialization are expected to continue in the future. These developments almost certainly will result in a continuation of the trends toward farm enlargement, mechanization, and the use of larger quantities of nonfarm production goods such as fertilizers, insecticides, electricity, fuel, and biologicals.

Thus, in the future, institutions financing farmers probably will be called upon to make a larger total amount of credit available to a smaller number of farmers. This will create additional problems for many financial institutions. For example, the size of loan that commercial banks can make to an individual is controlled by federal and state

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banking regulations. Many banks do not have adequate capital structures for making the size of loan that is needed by our larger commercial farmers. This problem will become more difficult, and banks need to give thought to methods for solving it in the most satisfactory manner. Although other agencies may not have such limiting legal restrictions, they must be careful not to lend too large a proportion of their total assets to any one individual and, thus, subject themselves to potential financial difficulties.

Much emphasis has been placed upon the importance of making more credit available to farmers on a so-called intermediate-term basis. This implies that the need for intermediate-term financing is growing more rapidly than is that for financing as a whole. Although the need for intermediate-term credit probably is increasing, the rapid rate of increase in use of such production items as fertilizers, insecticides, electricity, fuel, machinery rental, and purchased feed suggests that the need for short-term financing is growing at an even more rapid rate. Regardless of the relative rates of growth in the different kinds of capital requirements, the important consideration in financing is that the credit extended be tailored to the requirements of the production plan and that financial institutions keep pace with the changing needs dictated by changing technology. This consideration is developed in more detail in Part III.

Redman states that in 1958 commercial banks provided 75 percent of the total nonreal estate credit; production credit associations, 16.5 percent; and the Farmers Home Administration, 2 percent. These data indicate that these agencies provide for 93.5 percent of nonreal estate credit and other sources the remaining 6.5 percent. According to data available, other sources were more important providers of nonreal estate credit. Data from the American Bankers Association and the Balance Sheet of Agriculture indicate that at the beginning of 1959 commercial banks provided 45 percent of the nonreal estate credit outstanding; individuals, merchants, and dealers, 37.8 percent; Farm Credit Administration, 12.9 percent; and Farmers Home Administration, 4.3 percent.

