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The Economic Role of Land Resource Institutions in Agricultural Adjustment

THIS STUBBORN PERSISTENCE of agriculture's problems after nearly four decades of public adjustment programs, from 1920 to 1960, suggests that public efforts have not as yet come fully to grips with agriculture's fundamental difficulties.² The purpose of this chapter is to direct attention to certain overlooked or unattended aspects of the agricultural problem complex.

THE PROBLEM

The thesis explored in this chapter holds that land resource institutions influencing resource allocation and income distribution within agriculture, between agriculture and other industries and between time periods provide some of the basic causes of agriculture's difficulties and present serious obstacles to remedial action.

More specifically, the institution of property in land with all of its attending implications induces the capitalization of many kinds of benefits into land values. Included are benefits from farm income-increasing programs, land development programs and production control programs, as well as benefits from cost-reducing technology and a host of other minor measures such as

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²The literature on agriculture's income and production problems contains abundant evidence of the persistence of agriculture's difficulties. During the 1950's the gross national product increased 60 percent, yet income to farm people declined. On a per capita basis, farm people realized less than one-half the increase in income that nonfarm people received. In addition, about \$11 billion worth of farm products are in public storage and 25 million acres of cropland are withheld from production.

homestead tax exemptions. Once the benefits become capitalized into land values, the higher values are reflected in amortization, interest and tax commitments. These commitments constitute fixed costs to the farmers and may in turn (1) magnify uncertainties of economic and natural origins and (2) necessitate increased production to meet these fixed commitments in periods of falling prices. At this point, acreage control and price support programs further enter the picture to relieve resulting surpluses of products and declining farm income. However, since the programs themselves are usually tied to land, program benefits are in turn capitalized into land values, which may lead to a circle of more program benefits, higher land values and an increasing need for further layers of program benefits.

This situation places agricultural programs in the position of supporting a system of land values which the programs helped create. As a result, the system builds up an artificial surplus of land estimated between 45 and 75 million crop acres which would not exist if land could move freely to other uses and substitute more freely for capital in all uses. In addition, the claim of the land factor brings lower net income to farmers and higher costs of farm products to consumers both through higher taxes to support farm programs and through higher costs of certain products resulting from withholding land from production. As a further consequence, excesses of products may be produced by farmers in an attempt to meet their fixed commitments as a necessary requisite for maintaining an equity in land and a position in agriculture.

This thesis does not imply that land resource institutions alone are responsible for agriculture's difficulties. These difficulties are complex and many faceted. However, the thesis does suggest that institutions have been instrumental in fostering misallocations of resources (1) between agricultural and nonagricultural uses, (2) within agriculture and (3) between time periods.

This thesis is further explained and developed in subsequent sections. Inadequate empirical evidence requires that the development of the thesis be largely conceptual, using such scattered data as are currently available in an illustrative manner. From this exposition, however, may come certain reorientation of research and thought essential to an improved understanding and amelioration of agriculture's difficulties.

CONCEPTS AND ASSUMPTIONS

Prior to exploring this thesis further, certain underlying concepts and assumptions should be stated. The term "land resource

institutions" means the entire body of rights and responsibilities created by society regulating the use and control of land resources.³ These institutions specify how rights in land are owned and transferred, who receives the value of land, how income is shared in the use process and the range of uses to which land may be put.

The term "land resources" means all attributes of a particular tract of land including (1) natural attributes, i.e., soil and climate; (2) socially created attributes, i.e., location and publicly supplied improvements such as highways, drainage and flood control; and (3) capital investments in land which become fixtures, i.e., terraces and fertility. Labor and capital are used to exploit the opportunities created by land resources. In most agricultural activities, land resources may serve as substitutes, within some range, for labor and capital.

A basic assumption of the subsequent analysis is that a particular gross national product is preferable from a public viewpoint to any smaller national product, given the amount of labor and capital used in productive processes. This assumption embraces the application of the familiar principles of maximization and equi-marginality, and applies to the use of resources within agriculture and resources that can be transferred between agriculture and other employments. These principles provide the criteria for appraising land resource institutions in terms of effects upon achieving or obstructing efficient use of resources.

HOW LAND RESOURCE INSTITUTIONS AFFECT RESOURCE USE AND THE DISTRIBUTION OF INCOME

Land resource institutions determine land use and income distribution as a consequence of three conditions.

1. A right to use some land is indispensable to the productive process in agriculture.⁴ Labor and capital usually may be

³ For further discussion of land institutions, see John F. Timmons, "Land institutions impeding and facilitating agricultural adjustment," Chapter 10 in *Problems and Policies of American Agriculture*, Iowa State University Press, Ames, 1959.

⁴ As stated by Marshall, "The use of a certain area of the earth's surface is a primary condition of anything that man can do; it gives him room for his own actions, with the enjoyment of the heat and the light, the air and the rain which nature assigns to that area; and it determines his distance from, and in a great measure his relations to, other things and other persons. We shall find that it is this property of 'land' which, though as yet insufficient prominence has been given to it, is the ultimate cause of the distinction which all writers on economics are compelled to make between land and other things. It is the foundation of much that is most interesting and most difficult in economic science." Alfred Marshall, *Principles of Economics*. 8th ed., p. 145.

substituted for some land, either in a firm or in an economy, but some land must be used, just as some labor and capital must be used.

2. Land, being immovable and serving as a spatial basis with its resources for productive activities, can and does reflect future income claims in terms of present values. Earlier in man's history, productivity of labor was capitalized into laborers through the institution of slavery. With the abolition of involuntary servitude, labor receives a periodic wage or other return tending to reflect current value productivity. Likewise, capital, unless and until it becomes real property (in which instance it becomes a resource of land), receives periodic returns which tend to reflect current value productivity. Unlike land, however, the value of a capital item is limited by its cost of reproduction.

3. The property institution in land requires that payment for the use of land for satisfying direct or derived demands must be committed ex ante, even though value productivity of land may be realized periodically over time in conjunction with the use of capital and labor. Once commitments are contracted on present values of rights in land, the institution of property enforces economic claims to and from land in the form of taxes, mortgage payments, payments on low equity nonmortgage contracts (i.e., land installment contracts) and rents. In addition, land rents and land prices (committed without debt claims) reflecting partial and lump-sum payments for the services of land in the production process are notoriously inflexible and lag behind changes in the value productivity of the factor.

Results of these three restraints surrounding the use, control, and valuation of land yield a current value of all farm land (with its resources) equivalent to about eight times the total current net income to agriculture.

Let us proceed by searching further into the implications of these restraints.

Through the capitalization process the burden of variability of output is shifted, in large measure, from land to labor and capital. The numerous examples of farm families reducing their levels of living and neglecting the maintenance and replacement of capital items to pay land costs are familiar. Familiar also is the memory of the thousands who failed and started over again as tenants with depleted resources or who sought public relief. One out of every four farms in Iowa, for example, was foreclosed or transferred under duress of debts and taxes between World Wars I and II.

Two other effects of land resource institutions stemming from the introduction of fixed land costs into the farm financial

structure are (1) market instability and (2) inefficiency of resource use.

With respect to market stability, it may be argued that high fixed commitments for land for any large proportion of farms producing a specific commodity can, after an initial decline in the price of the commodity, generate subsequent declines with the consequence that supply becomes inversely correlated with demand and a generally unstable situation is created. Let us anticipate the behavior of a farmer with heavy mortgage and tax commitments when the price of his products declines. As a competitive producer with no influence upon price, he can meet his obligation only by increasing output, by throwing into the current struggle for economic survival resources — for example, machine maintenance, breeding stock, and soil productivity — reserved for future production periods. Since his fellow producers are in similar straits and the expanded output is offered on an inelastic market for farm products, the prices of products again fall and new sacrifices are required. Thus, under some circumstances land institutions may create a supply of commodities that is an inverse function of their price, which generates general instability in the market.⁵ Further, there may be an intertemporal transfer of returns from the future to the present, i.e., some premium from the future is attached to present prices in order that the farm firm may exist in the future. Thus, resources are transferred from future to present uses, with the consequence that excessive production in the current period has the additional cost of more expensive production later.

In addition to the intertemporal aspects of resource use, there is reason to believe that some entrepreneurs adjust to economic hazards by restricting the ratio of liabilities to assets. The proper ratio depends, of course, upon the individual's taste for risk, but in general, the lower the ratio the greater the economic shock that one can successfully withstand. Usually, no other single farm investment is as large as the investment in land, and there is an abundance of empirical evidence to suggest that the hazard is met by restricting farm size, with the consequent restriction upon debt and financial vulnerability. Other data suggest that owner operators tend to substitute capital for land, and labor for capital.⁶ To the extent that these substitutions

⁵ The application of the Hicks type analysis to this phenomenon would yield an upward-sloping excess demand curve. Hicks demonstrates that a downward-sloping excess demand curve is an essential condition for a self-correcting market, i.e., market stability. J. R. Hicks. *Value and Capital*. Oxford University Press, N. Y., 1946, 2nd ed., p. 63 ff.

⁶ See Miller, Chryst and Ottoson, *Relative Efficiencies of Farm Tenure Classes in Intrafirm Resource Allocation*. Iowa Agr. Exp. Sta. Res. Bul. 461, 1958.

are required by the methods of holding and transferring land without additional resources or output being created thereby, it is difficult to see how the public interest is being served.

In summary, land institutions tend to imbed the prosperity of the past into the costs of the present. The mood of the buyers and sellers of land may be a major factor affecting the welfare of farm people; when they are pessimistic, cautious and uncertain, and when land values do not respond to an increase in commodity prices, those who work in agriculture will benefit. But when those who deal in land are optimistic and sure, a Procrustean bed may be made for agriculture that will require painful adjustments when prices decline.

NATURE OF PUBLIC INTERVENTIONS AND THEIR CONSEQUENCES — IN RETROSPECT

The plight of agriculture viewed through income and production consequences has induced the public to intervene in an attempt to remedy agricultural problems. Through the years, these interventions have been substantial in cost and varied in approach. At this point, it would be well to review some of these recent attempts to bring about agricultural adjustments and to ascertain, at least conceptually, the results of these attempts.

In the main, the resources directed toward the improvement of the situation in agriculture have been used in three ways: (1) direct intervention in production and in the market to increase the price of farm products above the levels that would otherwise prevail, (2) the development of resources through irrigation and drainage or the protection of existing resources through such measures as flood control and soil conservation and (3) the development of techniques, through research and education, of obtaining a given output at less cost.⁷

These public activities are justified on the basis that a contribution is made to national welfare in general and to the welfare of farm people in particular. No doubt there exists the inherent belief, reasonably founded at first glance, that if prices are relatively high and stable, new lands are being developed and cheaper ways are being found to grow crops and produce livestock, the agricultural sector will be well off. This apparently is not the situation.

⁷ This is not, of course, an exhaustive enumeration. Other items which quickly come to mind are farm credit, rural electrification, market news services, crop insurance, production credit, drouth relief, disaster loans and homestead tax exemption.

Publicly sponsored research and education in the agricultural sciences dates back to the Morrill Land-Grant College Act of 1862, reclamation has been a permanent feature of our national government since 1902, and direct intervention in the prices of agricultural commodities has been with us since the Agricultural Marketing Act of 1929. All of these activities have been greatly accelerated from 1930-60.

Questions may be appropriately raised about the effectiveness of these measures in alleviating the economic distress of farm people. If there is current concern about agricultural income after a sustained achievement of favorable prices, notable successes in agricultural research and education, the completion of large projects in reclamation and two decades which have seen the agricultural income divided among fewer and fewer people each successive year, perhaps it is time to see if there is something in the environment that prevents the methods from operating as expected.

The incidence of benefits and costs of these public programs has never been investigated on other than a nominal scale. Despite the many years of operation of these programs, there is practically no knowledge about who has been helped and by how much or who has lost and by how much. In attempting to assess the welfare implications of these public interventions in agriculture, there is recognition that many economists have avoided distributive problems on the basis that "interpersonal comparisons of-utility" are difficult, if not impossible, to make. Despite this trammeling factor, however, it would at least be of interest to speculate upon who gets the benefits and how land resource institutions help pick the beneficiaries.

Price Support — Acreage Allotment Measures

The consequences of a program which restricts the quantity of land that can be used in agriculture and which guarantees a per unit product price greater than that which would otherwise prevail appear to be as follows:

1. Marginal physical productivity of land increases and marginal physical productivity of labor and capital decreases.
2. Marginal value productivity of land increases, and marginal value productivity of labor and capital may increase or decrease, depending on whether or not gain in price offsets the reduction in marginal physical productivity of the two factors.
3. If the marginal value productivities of all factors are increased, it would seem reasonable to expect labor and capital

to flow into agriculture (or more realistically, the rate of outflow to be reduced) until these factors would earn only slightly more at the margin than before the program was put into effect. At the new equilibrium, since all labor and capital in the economy are somewhat less productive physically as a consequence of fewer natural resources being employed in conjunction with them, these factors can be expected to earn somewhat less in real terms than was earned in the original situation.

4. As the marginal value productivity of land increases regardless of the change in the marginal productivity of labor and capital, which can earn little more than was earned before the initiation of the program, most of the benefits of the program must accrue to land.

5. If the program has positive benefits, these benefits will be primarily reflected in land values and rents with little or none of the benefits accruing to labor or capital.

Evidence commensurate with this conclusion has been found in a study of tobacco acreage allotments in Virginia for the period 1954-57. A regression analysis of 213 farm sales in Pittsylvania County indicated that an acre of tobacco allotment accounted for \$962 of the selling price of a farm in 1954 and \$1,673 of the selling price in 1957.⁸ The value of an acre of cropland without the allotment was \$22.70.⁹ Similar evidence has been found in Greene, Wilson, and Pitt counties of North Carolina, where the regression estimates yielded \$2,327** in 1954 and \$4,036** in 1957.¹⁰

The impact of this capitalization of tobacco allotments upon farm purchases may be seen by referring to Figure 17.1. The chart represents data derived from the regression estimates for Pittsylvania County. The average sale price of the 213 farms was \$10,243, and an estimated \$5,650 was paid for the right to grow tobacco on a specified number of the purchased acres. For the \$5,650, the purchaser received a franchise to grow tobacco — nothing physical. A subsample of the transactions indicated that the buyers borrowed an average \$3,677 per farm — an amount roughly equal to two-thirds of the value of the allotments. If the

⁸Standard error: \$143 in 1954, \$208 in 1957. $R = .88^{**}$. (Double asterisk: significant at 1 percent probability level.) From Maier, Hedrick and Gibson. "The sale value of flu-cured tobacco allotments," Va. Agr. Exp. Sta. Tech. Bul. No. 148. Apr., 1960, p. 27.

⁹Estimate on pooled data for four years. Standard error, \$12. Intercorrelation of cropland with tobacco allotment may have biased noncropland estimate downward.

¹⁰Strong intercorrelation of the acreage allotment with cropland and noncropland suggests that this estimate is biased high. Use of "informed man on the street" estimates of the value of cropland and noncropland reduced the acreage allotment estimates to \$1,290 and \$2,500, respectively, for 1954 and 1957.

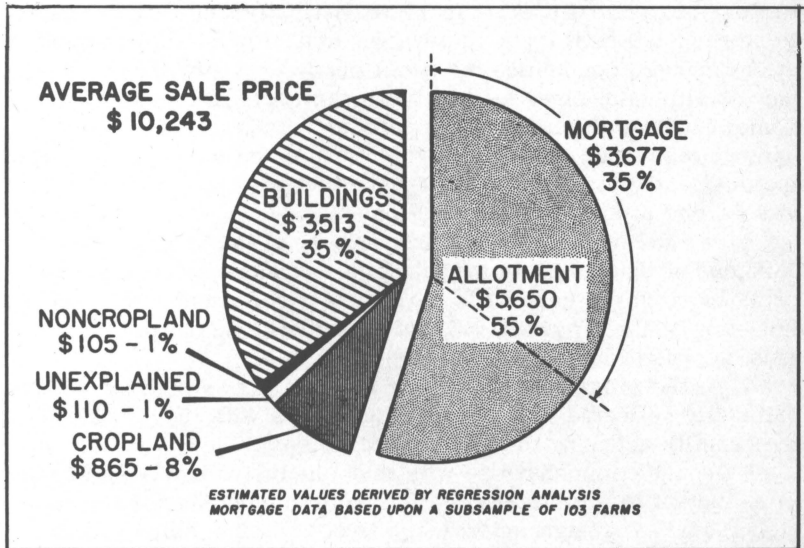


Fig. 17.1. Value of components of sale prices of 213 farms transferred in Pittsylvania County, Virginia: 1953-57.

program benefits were capitalized on the basis of the mortgage rate of interest, it would appear that two-thirds of the benefits are going to lenders on the land.

A regression study of land values in Kansas has yielded similar information on the value of wheat allotments. According to the study, the right to grow wheat added \$53 to the value of an acre of wheat land in the Anderson area and \$58 in the Logan-Wichita area in 1956.¹¹

The data support the hypothesis by showing that benefits accrue to land but the data do not give the full picture. We do not know, for example, the total amount of the benefits of the tobacco program and how these are divided between land and labor. We do know, however, that there is a flow of labor from the tobacco areas to the mills, and can conclude that the program apparently has not succeeded in raising the labor return of farm operators above the wages of a millworker. Perhaps, in the long run, it is the alternative employment in the mills that sets the reward of agricultural labor in the section.

With respect to the allocation of resources in agriculture, it

¹¹ $R^2 = .88$ and $.98$, respectively. The study was sponsored by ARS, USDA, and the Kans. Agr. Exp. Sta.

is reasonable to expect the usual consequence that follows the limitation on the quantity of a factor. As the available supply of the factor is reduced, it becomes more expensive; the new minimum cost situation includes less of the restricted factors and more of its substitutes. When the restricted factor is land, there is a social cost attached to this process in terms of the potential earnings of the substituted factors in other employments. While the earnings of the mobile factors may be no greater than their alternative opportunity, it may be reasonably anticipated that more of these factors will be employed than the minimum cost situation with full use of the land would require. This substitution has as its consequence concealed underemployment and higher cost food than is otherwise obtainable.

The land withdrawal programs may be expected to have similar effects in terms of land values. If some land is withdrawn and labor and capital applications are adjusted to their new earning opportunities, either through the retention in agriculture of supplies that would have moved or by the movement into agriculture from the outside, it cannot be anticipated that the return to labor and capital would be greatly enhanced. The marginal physical productivity of land was increased, however, and if we assume some positive effect on price, we must assume that marginal value productivity of land will be increased and the principal effect will be upon the return to land.

Resource Development Programs

Many resource development programs can be expected to yield effects similar to those previously outlined for the acreage allotment programs. Consider a program that involves the application of public capital in an area to increase yields over time (irrigation, drainage, or clearing) or in specific years (flood control). If the program is successful, the economic productivity of land, labor and capital in the project area will be increased. If labor and capital flow into the developed area to the point that their marginal earnings are again equivalent to their opportunities outside of the project, and if these opportunities are influenced in only a minor way, if at all, by the project, nearly all of the increased return can be expected to go to the land involved, some control of which is necessary for labor and capital to earn a greater reward. This effect has, of course, been long recognized by legislators, and some publicly sponsored development projects have had features to discourage land speculation.

Agricultural Research and Education

Gains in technology can usually be expected to reduce rent and land values. Technology, in general, results in a lowering of the cost schedules; price finds its way down to the minimum average total unit cost of the marginal firm; rents to all firms are reduced and, according to capitalization theory, land values should follow accordingly.

Let us suppose, however, that for institutional reasons the price is maintained in some fixed relationship to some price that may have existed before, say, from 1910-14. Let us say that, as a result of innovations, the cost structure drops vertically, i.e., any given quantity can be produced with fewer or less expensive labor and capital resources than before. The difference between price and the average cost of production (AUC) is increased rather than diminished, and in the absence of marketing quotas, rents (and land values) may be expected to increase with little or no effect upon the return to the other factors.

We may assume another, but a more realistic situation. As a result of gains in the technical processes of production, the cost curves move downward and to the right, i.e., the minimum average cost of production is not only less than it was before but occurs at an output greater than most firms are producing. The marginal cost schedule likewise shifts to the right for all levels of output. We assume again that labor and capital are not perfect substitutes for land at the new optimum level of production. All firms operating with a plant too small to take advantage of the gains in technique have an incentive to add land. If a number of firms existed which had greater capacity than that which was economically feasible, land offerings would possibly equate with the new demand and no change in land price would result. The distribution of holdings, however, is badly skewed toward the small operator, each of whom now has an incentive to hold more land and can pay up to the difference between the new average unit cost and the commodity price for the land necessary for the expansion.

This argument can, of course, be reversed. If, in a competitive market, the farmer must exchange all of his anticipated gain for the land necessary for expansion, i.e., if he is left no better off after the expansion than before, he has no incentive to adopt the techniques. Perhaps the interaction between the land transfer process and the price support program as an obstacle to technological progress is an appropriate subject for research.

TRENDS IN FACTOR REWARDS
IN AGRICULTURE

It is not our intention to say that the public programs have not provided any benefits for the agricultural population. We would suspect, however, that the benefits of these programs have had their greatest impact in improving agricultural welfare in those periods in which the uncertainty existing about their continuity was sufficient to preclude them from being capitalized into land values. The doubling of net farm income during the period 1933 to 1941 (and this increase must be attributed in part to the operation of the various public programs) was accompanied by an increase in land values of only slightly more than 10 percent (Figure 17.2). Again, during the period 1941-45, the wartime prosperity in agriculture was considered a temporary phenomenon, various educational measures were employed to refresh farmer memories of the 1920-21 experience and the increase in land values was considerably less than the increase in net income. Following 1946, however, confidence in agriculture prosperity apparently was placed on a firmer basis, and we have seen land values more than double (from \$61 billion in 1946 to \$125

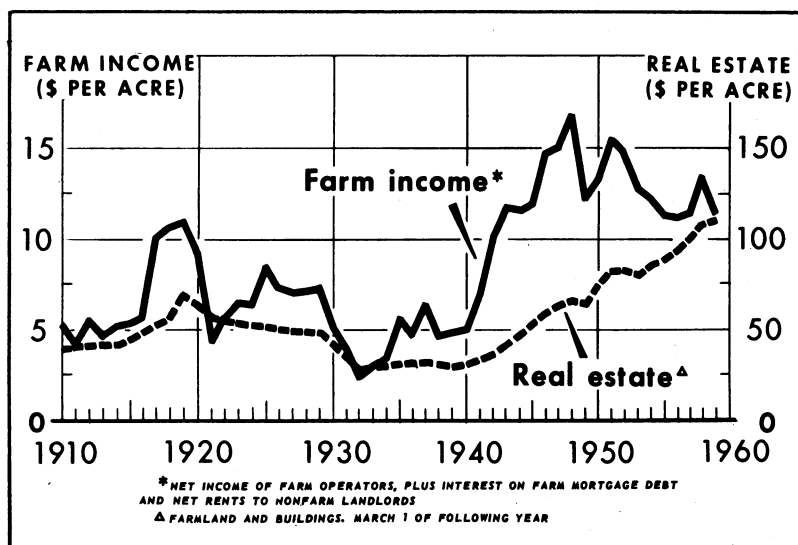


Fig. 17.2. Farm income and real estate values.

billion in 1959)¹² while farm net income has slightly declined (\$17 billion to \$16 billion from 1946-58).¹³

This has also been a period of rising interest rates, and the hypothesis that land is now claiming well over twice the agricultural income it claimed in 1946 would seem to be at least worthy of consideration. In this connection, it is of interest to note that the Ruttan-Stout estimates of labor's share of the gross farm income has declined from 51 percent in 1946 to about 24 percent in 1957.¹⁴

To suggest, at this point, that this capitalization is immaterial because farmers own their farms is to miss the real point. The farmer in Pittsylvania County, Virginia, who must spend \$5,650 for the right to produce tobacco and who must borrow \$3,700 of this amount, probably is not comforted by the fact that he may be buying these rights from another farmer. Due to the price stabilization features of the program, his expectations of variability in prices are no doubt less but will he not have to pay, through land, for this gain also? As he now owes interest and amortization, vulnerability to crop failure and risk to his personal health appear to have been increased. We must assume, since he borrowed, that he does not have unlimited resources; perhaps savings that could have gone into capital items to increase the productivity of his labor have, instead, gone into the right to use a given tract of land in a given way. It is likely that this purchaser will find it necessary to substitute his and his family's labor for land and capital in the productive process.

Having, however, made his commitment, he now has a vested interest in a continuation of this economic environment. To discontinue the program, even though the operator should continue to earn the opportunity cost of his labor, which is all that he

¹²Current Developments in the Farm Real Estate Market, ARS, USDA, 43-101, May, 1959, p. 13.

¹³Farm Income Situation, AMS, USDA, FIS-174, July, 1959, p. 35.

¹⁴Vernon W. Ruttan and Thomas T. Stout, "Regional differences in factor shares," Jour. Farm Econ., Vol. 42, No. 1, Feb., 1960, pp. 52 ff. Stout and Ruttan also estimate that the land share of farm income has approximately doubled in the 1946-57 period, rising from 7.5 percent of the gross income to 12.4 percent. The method employed allocated income to land by applying the prevailing mortgage rate of interest to prevailing land values. While this has validity in estimating the relative change, there is reason to believe that the technique will underestimate the absolute values. An investor in a rented farm is not likely to capitalize all of the rent into value; some margin will be left for safety. This is particularly true in view of the notorious history of variation in land values. Supporting this thought that land income is not capitalized like government bonds are the numerous production function studies which indicate that farmers have seldom carried their investment in land to the point where the marginal productivity of a dollar is less than 10 cents. Handling land and capital items by using protected earning rates and treating labor as a residual may seriously overestimate the return to labor.

could expect in the first place, would work an appreciable hardship upon the individual. He can only recover his investment through a continuation of the existing situation. It is also likely that the lender has a strong interest in the maintenance of the value of the program rights. The value of these rights is also basic to the local government, as most local governmental services, such as schools, secondary roads and police protection, are financed in large part from taxes on the real property.¹⁵

Looking backward from this point, one may appropriately raise a question about the inflexibilities that land institutions may have introduced into the structure of agriculture. The record value of farm property rests upon a specific pattern of land use and a specific set of commodity prices. Many have invested upon the basis of this pattern of use and set of prices, and they will, quite naturally, resist any adjustment in either prices or use which would result in their inability ultimately to recover their investment. Shifts downward in land use can only be accomplished at the expense of the return to labor and capital; and as the quantity of capital would be adjusted to its new return, the brunt of the decrease in the return to land would have to be borne by agricultural labor.

CONSEQUENCES OF PUBLIC INTERVENTIONS — IN PROSPECT

Inadequate as our understanding of program consequences remains, the future is even more obscure. However, viewed through the ideas presented in this chapter, certain guidelines may help lift the veil of obscurity. If, for example, some assistance is to be rendered through price supports to each generation of farmers who must obtain land, commodity prices must rise more rapidly than benefits can be capitalized into land values. If this is not the situation, benefits from price-supporting activities will accrue to new farmers only as the land market may fail to function, as both reason and history indicate that it will. Such a technique of assistance is not economically feasible in either the short or long run, and certainly might not be politically feasible for any prolonged period of time.

The possibility of the long-run effects of further land withdrawals should be examined closely. No doubt gross agricultural

¹⁵Beyond the local community, of course, is the storage industry, whose basis stems in part from the inability of the programs to limit output to the amount that consumers will take at the predetermined price.

income could be further increased by such withdrawals or by transfers of some lands to lower uses. Ignoring the effects of this action upon the efficiency of resource use in the national scheme for the time being, such action will not likely be of much benefit to those who must buy or rent farms in the future.

The Virginia-North Carolina tobacco studies have indicated that after adjusting the 1954 and 1957 estimates of the value of an acreage of allotment, the increase in value was in direct proportion to the reduction in the average size of the allotment (Table 17.1). The rapidity with which the acreage cuts were reflected into land values is surprising. Not only will further withdrawals not have a lasting benefit for most of the people in agriculture, but the resulting increased value of the land that can be used will probably introduce further rigidities, increased risk and additional inefficiencies. It is difficult to see how any long-term improvement in the welfare of agriculture can be achieved through any program which requires access to its benefits through rights in land.¹⁶ On the other hand, an adjustment toward a more economic use of the agricultural resources cannot be accomplished

Table 17.1. Estimation of Impact of Reduction in Tobacco Acreage Allotment Upon Value of Allotments

Factor	Counties	
	Pittsylvania, Virginia	Greene, Wilson, Pitt, N. C.
Estimated value of acre of allotment, 1954	\$962	\$2,327
General rise in land values, 1954-57	1.18	1.16
1954 estimate corrected to 1957 for land value change	\$1,135	\$2,699
Adjustment for allotment ^a reduction, 1954-57	1.49	1.49
Estimate based on price and acreage changes, 1954-57	\$1,691	\$4,021
Regression estimate, 1957	1,673	4,036
Difference	\$ 18	\$ - 15

^a Acreage allotments were reduced by one-third during the period. The test is for a linear effect upon land values, i.e., a rise of three-halves.

A similar table appears in Maier, Hedrick and Gibson, *op. cit.*, p. 40.

¹⁶The reasoning leading to this conclusion is equally applicable to any device relying upon a negotiable right, franchise, license or marketing certificate.

without considerable hardship upon those who have invested in the rights to produce.

But the problem of resource adjustment is upon us. As Professor Boulding has pointed out, agriculture tends to be chronically depressed in a progressive society because the immobility of the labor resource prevents adjustment as rapidly as technology would require to maintain a constant income.¹⁷ The distress in agriculture is accentuated by the effect of the retained labor force in depressing the reward of labor and increasing the reward of land.

In the long run, our land transfer processes may leave farm people facing the necessity of making payments on past prosperity from an ever diminishing income. The question now exists as to whether the income position of farm people should be protected by fostering further inefficiency of land use, or whether land income can be used to facilitate a long-run adjustment. Some possibilities of the latter type might be explored.

SOME RESERVATIONS ABOUT THE CONCEPT OF SURPLUS LAND

Few subjects, if any, have engaged more of the attention of those working in agricultural policy than the matter of surplus land. One hears many references to the surplus land that we now have, and a number of estimates have been prepared suggesting that there will be a great deal more surplus land in the future. The concept of surplus land has gained broad, if not almost universal, acceptance, and the central decisions that we are urged to face deal with the mechanics of getting this surplus land out of use: whether it is best to idle some land from each farm or to idle whole farm operations, and which of the available methods (lease, purchase or easement) are most suitable for this operation. There is a ring of urgency in the voices of those calling attention to these problems as they point out that new land substitutes are already en route and the problem of surplus land is already critical.

It would be helpful if the measure that is being employed to determine which quantity of land is usable and which quantity is "surplus" were restated. Once, no doubt, this measure was rather rigorously defined, but an occasional review along with a resurvey of the underlying assumptions would be helpful.

¹⁷Kenneth E. Boulding, *Economic Analysis*, Harper and Brothers, New York, 1941, pp. 778-79.

Is the measure wholly oriented around the income position of agriculture to exclusion of all other questions of national interest? Do these estimates assume that economic substitution is a one-way street — that capital and the resources which go into the development of technical innovations can be substituted for land, but that land cannot be substituted for these resources? Is the amount of nonsurplus land simply the maximum amount of land that can be used if a predetermined price, production and land value pattern is to be maintained?

If we were to escape the limits of our own economy or our own era; perhaps we could see the economic role of land in a light different from the one that has illuminated the subject from 1930 to 1960. And while we might, for a moment, escape to glimpse the economic problems of another economy or another generation, we are likely to remain prisoners of the thought that any economy has only four items with which to satisfy its wants: human energy, human ingenuity, some tools that have been accumulated at the expense of consumption and some "tools" provided by nature, i.e., the natural environment. Are we not likely to conclude that the fullest possible substitution of the tools provided by nature for the energy and the tools that can only be brought into being through a sacrifice in consumption is a necessary condition for the maximization of the economic welfare of the society? If we were to find two islands alike in every respect — populations, tastes, tools and the state of the arts — and each with a quantity and quality of land such that the cultivation of each acre would yield a product greater than the amount the labor and capital used would bring forth in other use, is it conceivable that one island can raise its per capita consumption above the other by refusing to use all of the land that it has available? Would we conclude, if 25 percent of the land can be offset by additional investments of labor and capital assigned to agriculture and agricultural development, that 25 percent of the land is surplus? If 50 percent can be offset by taking labor and capital from other employments, is 50 percent of the land surplus? Is any land to be considered surplus if its abandonment cannot be offset by the application of more labor and capital? If we look beyond our own shores, we will not find many places where a productive physical environment is considered a national handicap. It is difficult to understand how this phenomenon of natural wealth, responsible as it is for industrial growth of the United States by initially freeing labor from nonagrarian employment and by providing the balance of payments needed to repay European capital investments, has now become a burden.

If economists are motivated toward the maximization of real

income reflecting the preferences of the consuming group, in a world of diminishing returns with a labor supply that cannot exceed a finite number during any one production period, isn't there only one single definition of surplus land that is compatible with this objective? We define as surplus that land which, if used, would not (1) increase output, given the quantity of other factors employed, or (2) substitute for any other factor in maintaining a given level of output. Land of this type is clearly surplus and it also is clearly worthless.

It should be noted that these two conditions reduce to the same thing if there is continuity in the production function. Taking the first condition, if we can increase output by using more land with a specified set of labor and capital inputs, the original output could be achieved through the increased use of land and a reduction in the amount of labor and capital employed. The contribution of land in the productive process is the release of labor and capital to other employments, that is, the substitution of tools provided by nature for the tools and energy provided by man; and the value of land is whatever the tools and energy for which it substitutes would earn other employments.¹⁸

If this hypothesis is valid — if the value of land rests upon the productivity of those factors that it could replace — a considerable portion of the land now considered surplus would not be surplus under the definition above. The separation of the \$129 billion value of farm land into its components of capital considered as real estate, social investments in roads and land and associated production franchises is difficult, but few would argue that the capacity of land to substitute for other factors is not a major element of this value. This value is evidence that "surplus land," as defined in this chapter, does not exist. In the same manner, the payment to farmers for land placed in the various surplus land reserves is evidence that this land is not surplus.

¹⁸Even those who say that "land is capital" and those who say "land is like any other factor of production," may grant some validity to this theory of land valuation. A farmer, balancing his intensive and extensive margins, will not offer for land more than the cost of the labor and capital necessary to achieve the same increase in output on his existing acreage.

This argument has recently been stated very succinctly by Hawtrey:

"The producer who is calculating how much capital to employ with a given amount of labour and land will see the limit at the point at which the cost-saving efficacy of any additional plant ceases to cover the cost of the plant. That is why the price and the cost-saving efficacy of any factor tend to be equal. But the cost of land is zero, so that the landowner offers land of any cost-saving efficacy, however low, to producers for what it will fetch; only marginal and sub-marginal land are unused and fetch nothing."

Ralph Hawtrey, "Production function and land — a new approach," Econ. Jour., Vol. 70 (227), March, 1960, p. 114 ff.

Two effects of the policy of restricting land use are worthy of note. If a farmer cannot use land, he may use something else. If the nitrogen from the organic matter in soils in the Soil Bank is not available, he may find it profitable to get nitrogen from a sack. There are a number of commercial substitutions available to assist in achieving a certain output if land is not available. To the extent the purchased factors, the "nonfarm inputs," replace land that could be used, the net income of agriculture is correspondingly reduced by their value. Purchased inputs expanded by 40 percent in the 1940-59 period.¹⁹ It is possible that some of these inputs could be offset by the substitution of the already available land, and the net income to agricultural people, as a group, increased thereby.

The second consequence of the restriction upon the use of land pertains to employment. To the extent that the labor is being used, either on the farm or in the manufacture and distribution of the nonfarm inputs, that could be replaced by land not being used, it is difficult to see that this labor is effectively employed. At first glance, at least, it would seem likely that the method of idling usable land would result in concealing the underemployment of the resources that are used to replace it.

SUGGESTED CRITERIA FOR REORIENTING RESEARCH AND INTERVENTIONS

Significant and rapid shifts in land use within agriculture and between agricultural and other uses are necessitated by (1) the relative price elasticities of demand for farm and nonfarm products and services and (2) the application of product-increasing technology to a unit of land in agriculture. Current farm programs tend to prevent these shifts directly by freezing certain uses in land through the capitalization of benefits into land values and through routing program benefits through land. Let us observe more closely the economic reasons for adjustment as a basis for appraising land resource institutions, including programs involving the land factor.

With an increase in gross national product and income to consumers, consumer outlays for products possessing income elasticities greater than 1.0 will enjoy an increasing absolute and relative share of the consumers' outlays. Since the income elasticity of demand for food products provided by farmers is estimated to be less than .25, food-producing farmers cannot expect

¹⁹USDA. ARS-AMS, Agricultural Outlook Charts, 1960, p. 58.

to share in increases in national income. Furthermore, for certain food products, i.e., potatoes and cereals, possessing negative demand elasticities, actual decreases in demand per capita for the physical products may be expected despite increases in national and per capita income. Land resource institutions which restrict the intra-agricultural shifts in land use seriously interfere with providing consumers with the products they seek as identified by relative demand elasticities. As a result, agriculture and the nation experience misallocations of resources, with attending consequences on costs, prices and production.

From the supply side, the development of new techniques and expanded use of capital has resulted in fewer acres being used to produce given quantities of many commodities. For example, corn yields for the nation have increased fairly steadily from 28 bushels per acre in 1940 to 46 bushels per acre in 1959. Major technological factors accounting for this increase are hybrid corn and fertilizer.²⁰ But the acreage shift away from corn has not been sufficient to offset the productivity per acre flowing from fertilizer and hybrid corn. As a result, public granaries and Soil Banks are being overflowed with corn and acres. This is even more true with wheat. And other major crops are in a similar situation.

There remain other uses of land where the income elasticities of demand are much higher than for food. Recreation, timber and grazing are notable examples of uses, with high capacities to absorb land but obtaining relatively low returns. Other uses, with more limited capacities to absorb land, but with high returns, are industrial, residential, highways and airports.

Thus, supply and demand conditions flowing from production technology and demand elasticities are continually changing and charting a course for needed changes in land use both within agriculture and between agriculture and other uses. However, land resource institutions, including the property-capitalization complex and farm programs, obstruct these shifts. Although labor and capital might be expected to be relatively mobile and move about in search of higher returns, land being immobile physically, and pressed into economic immobility by its institutions, is particularly stubborn in shifting to uses demanded by society.

Underpinning the suggested criteria for reorienting research and public interventions in agriculture are two basic assumptions stated earlier in this chapter. First, the maximum gross national product is desired from a particular level of resources

²⁰L. N. Thompson, Iver Johnson, John Pesek, and R. W. Shaw, CAA Report No. 24. Iowa Agr. and Home Econ. Exp. Sta., 1959, p. 24.

devoted to production. Second, factors within agriculture and between agriculture and other industries should shift freely between uses on the basis of their relative economic rewards, i.e., rewards to factors in agriculture should approximate similar resources from various uses within agriculture and outside agriculture.

From ideas presented in this chapter we may generalize certain criteria for guiding future efforts to remedy the nation's agricultural problems. These criteria are as follows:

1. Land must be freely substitutable for labor and capital wherever such a substitution is economically feasible.
2. Productivity of past uses of land should not be a determinant of current and prospective uses.
3. Methods of guiding land use should not create franchises of value but, instead, should contribute to the improvement of the welfare of the agricultural population and to the public welfare to the measure that this welfare is concerned with the efficiency of resource use.

Application of these criteria and the reasoning leading to their development have been attempted in the program proposal presented in the next section. As developed here, the proposal is concerned with the creation of an institution to address the basic problem of income equality of labor in agriculture with labor outside of agriculture, subject to the condition that agriculture render its maximum economic service in the long run. The relationship of this institution to other institutions, such as law and the political process, is not explored. The relation of the proposed program to certain other historically held goals, such as the family farm, conservation, reduction of tenancy, and so on, is not treated. The first impression is that the proposal, or its variants, would contribute to the attainment of some of these goals while others, such as conservation, would have to be dealt with in separate approaches. For these and kindred reasons, the proposal in its present form is not being advocated by the authors, but it is hoped that consideration of its methods will help clarify the role of land and land institutions in agricultural adjustments.

A SUGGESTED APPROACH TO THE ACHIEVEMENT OF BETTER RESOURCE USE IN AGRICULTURE

The objectives sought by this approach are: (1) adjustment of the supplies of agricultural products, (2) development of incentives for a more efficient use of agricultural resources and

(3) the creation of a mechanism to facilitate the voluntary redistribution of the labor force in the national economy. This suggestion looks forward, optimistically perhaps, to the day when earnings of agricultural labor are commensurate with the earnings of comparable urban labor, with public intervention in agriculture at a minimum level. Basically, the approach seeks to divert the program-created income stream now flowing through land titles toward a long-run adjustment in the earning opportunities of farm people.

Observations and reasoning presented earlier in this chapter support the belief that no program can diffuse its benefits widely throughout the population if the instrument of control is of a permanent or semi-permanent nature and negotiable in the market. If such a diffusion is desirable, then control programs cannot rest upon acreage allotments, franchises, licenses or marketing certificates, or any other device of a transferable and permanent nature.

Therefore, it is proposed that production rights be made temporary for the production period and attach to the individual rather than to the land.

Further, it is proposed that the administrative agency determine each year the amount of each commodity that can be reasonably absorbed in domestic consumption and foreign trade. The price corresponding to this amount would be announced.

The agency would then let certificates, valid only for the forthcoming production period on the basis of competitive bid, the amount being paid for the certificates being deposited with the agency.

The purchaser of a certificate would be free to employ any combination of land, labor and capital he chooses in producing the amount of the commodity for which he holds certificates of entitlement. It would, of course, be to his advantage to use the least-cost combination, fully utilizing land as a substitute for labor and capital in order to make his production as efficient as possible.

The proceeds from the sale of the certificates would approximately equal the amount now being paid annually, through amortized land purchase and rentals, to obtain these production rights. It is proposed that these funds be used to facilitate an adjustment in the earning opportunities of farm people by (1) grants and loans to cover moving expenses of farm people to nonfarm employment; (2) unemployment compensation, as needed, for those who move for the first two years or so after leaving farming; (3) development of an extensive system of vocational training in rural high schools to prepare youth for nonagricultural

occupations; (4) establishing a program of college scholarships for the more talented young people; and (5) where economically feasible, assisting in the establishment of industries and other nonfarm businesses in rural areas.

The use of the funds for this purpose would continue until the number of people who had transferred was sufficient to make the earnings of farm people comparable to those of their urban counterparts. At this point the program would be abandoned.

There appear to be several advantages to an approach of this type. First, the full use of land in the production of food and fiber at minimum cost is encouraged. Second, the average and marginal productivity of labor in agriculture would be increased. Third, the uncertainty and economic vulnerability facing farmers would be reduced, as the production permit cost would be on a year-to-year basis.²¹ Fourth, the approach would contribute to a greater total national product by assisting underemployed people now in agriculture to transfer to more remunerative employment and by developing technical skills in farm youth that might not otherwise be developed.

There are, of course, difficulties as well as advantages with this program. Once initiated, this program should not be more difficult to administer than most of the current or proposed programs. The principal difficulty appears to involve the initiation of the program and its effect upon land values. This program, like most proposed modifications of the income-supporting programs in agriculture, would tend to reduce land values through increasing the supply of land available for use and reducing the amount of labor applied. And while these changes can be expected to have beneficial effects in the national interest, at least to the extent that the national interest is served or disserved by changes in the national product, the question will invariably be raised concerning the interests of those who have invested in farm land with the expectations that the present price and production situation would continue to prevail.

Consideration of the basis of the public obligation to maintain a static situation to prevent disappointment of the land buyers, or to compensate them for any change that might be made, is beyond

²¹Objection to this point has been raised. It has been suggested that the year-to-year letting of permits will not provide the certainty of expectations necessary to carry on agricultural operations. In response, it may be pointed out that buying a temporary certificate is not greatly different than renting a farm in order to produce, and that in 1950, the latest year for which production-by-tenure data are available, 54.5 percent of the farm products sold came from farms that were rented wholly or in part. Numerous studies have indicated that the one-year lease is the modal type. The uncertainty facing these producers under the temporary certificate program would not be greater than the uncertainty they face in the farm rental market.

the subject of this chapter. If, however, it is deemed desirable to minimize these disappointments in the course of the initiation of this proposal, this could be accomplished by easing into the program gradually. For example, the first issue of certificates could be made to farmers on the basis of their historical production and would be valid as long as they were being used by the individual. These certificates could not be transferred to any other individual or transmitted through inheritance. Upon the death or retirement of the farmer or a prolonged failure to use the certificate, the production rights involved would revert to the issuing agency. Present farmers would thus receive a return on their labor and capital plus the program benefits now being assigned to land. Owner operators would receive approximately the same amount that they could have expected to receive in their lifetime.

As farmers retire or take up other occupations, the administrative agency could let the reverted certificates, withholding such parts of them as necessary to maintain the desired commodity supply situation, on a bid basis. This issue would be temporary and nontransferable to prevent capitalization. The purchasers could be expected to pay whatever they are now paying for production rights by acquiring these rights through the purchase or renting of land, and they should be left no worse off than they would be through the continuation of the existing situation. In time, of course, all certificates would revert, leaving the agency with the control and the funds needed to effect a long-term adjustment. This is, admittedly, a leisurely approach to the solution, and several alternatives are available to hasten the process. For example, the lifetime certificates could be issued for 75 percent of the production and the balance let upon a bid basis in order to have funds to start the adjustment immediately.

This suggestion is obviously incomplete in many ways and is not offered as a solution to all of the problems confronting agriculture. It is believed, however, that such a program overcomes two deficiencies evident in current programs and in recent proposals: (1) the dissipation of the benefits through capitalization into the instrument of control and (2) the inefficient substitution of human energy and saving for land. Further, the possibility exists that ultimately the approach could lead to at least a temporary solution of the farm problem. On the basis of this hope, however faint it may be, the suggestion is offered to the profession for consideration and discussion.

FUNDAMENTAL RESEARCH NEEDED TO GUIDE LAND USE AND INSTITUTIONS

Information required to facilitate adjustments in land use and land institutions has not been developed as needed in recent years. In order that this deficiency may be overcome so that land can play its maximum economic role, a threefold approach is suggested.

First, research needs to be expanded and reoriented where necessary, to provide data on relative value product returns to factors in the various agricultural and nonagricultural uses. This analysis should be closely related to consumer wants and preferences as indicated by the price elasticities of various products. Basic to this research is the provision of physical and technological coefficients under existing practices and under new practices evolved and evolving from physical research. This involves a comprehensive productivity inventory of soil resources related to possible uses to which particular soils may be put under various levels of technology. Extensions of the envisioned research include development of institutions which will achieve the above criteria within the range of physical possibilities. Further studies are needed on the performance of current farm programs in terms of the initial and ultimate incidences of benefits and costs. Studies reported on tobacco allotments should be extended to other major crops under control. These studies should reveal the land uses in major physical areas (soils areas) created or maintained by public measures in comparison with optimal land uses for providing consumers with the products wanted at lowest average unit costs.

The planning and execution of this research demands the full cooperation of research in numerous disciplines. Economics, soils, engineering and law are heavily involved in satisfying these demands. Isolated results of this type of interdisciplinary research are already in evidence. However, the full realization of possibilities of interdisciplinary studies remains in the future.

Second, results of research in relation to principles underlying studies and interpretations thereof must be made more understandable and more readily available to the general public, legislators and administrators of agricultural programs. Possibly the research man's responsibility does not end with the completion of a technical bulletin or formal article which oftentimes represents little more than communication among researchers. In cooperation with extension workers, researchers might further the objective of understanding research results through special seminars with legislators, administrators of farm programs and farm

leaders both inside and outside farm organizations. These special educational measures should be supplemented with extensive educational programs for farm and nonfarm groups alike. Non-farm people, in particular, should be provided with an improved understanding of agricultural problems and possible solutions. This suggestion becomes increasingly important as the proportion of nonfarm to farm people increases throughout the nation.

Third, based upon research and a wider understanding and appreciation of results of research, institutions (modified to become politically acceptable, which is ultimately necessary in our society) may be forged which will meet the criteria presented earlier. However, political acceptability may likewise become modified through an improved public understanding of economic consequences of various alternative courses of action.

Throughout this discussion, land institutions are considered as means for achieving people's objectives. The objectives in this chapter have been limited to economic objectives. To the extent economic objectives are appropriate, these objectives provide criteria for testing and developing institutions for bringing about agricultural change. These institutions were made by man and may be altered by man to serve his objectives more adequately. Some of the inadequacies of current land institutions have been indicated and possible reorientations have been suggested. These indications and reorientations are offered for further consideration in research, educational and action programs concerned with improving the nation's agriculture in the national interest.