CONTROLLING AGRICULTURAL SUPPLY BY CONTROLLING INPUTS

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Preface

In recent decades farm programs designed to enhance and stabilize farm incomes have been based, in large measure, on a system of price supports and acreage reduction. It has been assumed that acreage reduction would limit output and, therefore, make price supports effective. However, land is only one of many inputs. If the land input is reduced but other inputs are increased, it is possible, within certain limits at least, to maintain or even increase output and defeat the original purpose of restricting acreage. A common example is the reduction of acreage but applying more fertilizer on the remaining acreage.

This study takes a look at the problem of controlling production by controlling inputs in agriculture. It examines, not only possible methods of controlling major inputs but also the potential impacts of input controls on production and on the economy. Some of the problems that would be involved in administering such controls are also explored.

The report brings to light some concepts and problems that deserve discussion and consideration by those concerned with agricultural policy.

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Summary

Agricultural supply is believed to be excessive in relation to demand, as a result of excessive inputs of productive factors in agriculture. This report appraises alternative methods of controlling agricultural supply by controlling inputs.

Total agricultural production in the United States has been increasing rapidly over the past 20 years, but the total of the inputs in agriculture has been increasing only slightly. The *composition* of the inputs, however, has been changing markedly. The input of labor, which used to be the largest item, has been declining rapidly—from nearly two-thirds of the total in 1870, and more than half in 1940, to only 30 percent in 1958. The input of capital rose, offsetting the decline in labor, from 17 percent in 1870 to 54 percent in 1957.

Thus, measured in dollar-value terms, land is the least important input in agriculture and capital is rapidly being substituted for labor in agriculture, Now the input of capital is greater in value than the input of the two other factors combined.

Inputs can be controlled in two ways:

1. *General.* Control of the prices of outputs, which control the inducement to commit inputs to agricultural production, or control of credit for the purchase of inputs.

2. *Specific.* Control of specific inputs—land, labor, or capital—by specific methods.

These two classes of methods are appraised below:

1. *General methods.*

a. The traditional method for controlling inputs in agriculture is to let it be done automatically by prices in the open market. Some groups—even some commodity groups—recommend that agricultural prices be returned to the open market now.

This would reduce the cost and administrative problems of government production-control programs, and exert pressure toward efficient production; but the law of supply and demand works so slowly in agriculture, because of the low mobility of agricultural inputs, that agricultural prices would fall below long-run equilibrium levels for a number of years. This would cause severe hardships to many farmers.

b. A less drastic method is a two-price system, carried back to individual producers, under which each producer receives a relatively high basic price for his basic quantity, but a lower open-market price for production in excess of the basic quantity.

This would be only a temporary stop-gap to alleviate the symptoms. It would not correct the underlying disease of excessive inputs in agriculture.

c. If credit for the purchase of inputs were controlled, that would control the inputs. But restriction of credit would increase costs and conflict with governmental policy to amplify the supply of credit to farmers. It would in any case be difficult to institute for the bulk of the credit which is handled by private banks.

d. A continuous stream of irrigation and other forms of land reclamation projects continues to pour forth from one hand of government, increasing agricultural production, at the same time that the other hand is trying desperately to reduce agricultural production.

In 1959, the Bureau of Reclamation system of irrigation projects included nearly seven million acres of irrigated land, which produced a gross crop value of more than $1.1 billion. This value of $1.1 billion is more than 5 percent of the total value of all crops produced in the United States ($19.6 billion in 1960). This percentage is almost as great as the estimated annual surplus production in recent years (6 to 8 percent). And $1.1 billion is a little more than the estimated reduction in agricultural production that was achieved by the Conservation Reserve program at its peak in 1960.

In addition, ACP subsidies amount to more than $200 million annually. Most of these increase agricultural production in the long run.

A reduction of these BLR and ACP subsidies would reduce agricultural production to some extent. There would be, however, some political and economic objections to this.

2. *Specific methods.*

a. *Land.* The quantity of the input land can be controlled by two different methods:

1. By controlling the acreages of specific crops, as under the acreage control programs initiated in the 1930's and exemplified recently in the emergency feed grains programs and wheat programs of 1961 and later years.

2. By controlling cropland regardless of crop, as under the Conservation Reserve part of the Soil Bank program initiated in 1956.

The rental rates under the Conservation Reserve program varied directly but less than proportionately with the profitability (net revenue producing ability) of the land. The program paid relatively more for poor land, and more poor land than good land went into the program. This, plus the provision that whole farms could be put into the program (and 70 percent of the land in the program consisted of whole farms) caused participation to be concentrated in poor soil areas. This had ad-

verse effects on some communities in these areas, but it was in line with long-run goals of productive efficiency.

In contrast, the rental rates for the 1961 and later emergency feed grains and wheat programs were set more nearly proportionate with profitability, so that good, medium, and poor land alike went into the program. In addition, 40 percent of a farm's cropland was the maximum that could be put into the program. Participation, therefore, was less concentrated and had less adverse effects on communities, but more adverse effects on the efficiency of production. The program was larger and had more effect in reducing production than the Conservation Reserve program.

Land rent on poor soil tends to be a smaller percentage of the total value of the crop produced on the land than land rent on good soil. Accordingly, there are logical grounds for believing that programs of the Conservation Reserve type, which take out chiefly poor land, reduce production at less cost per dollar of program cost than programs like the food grains and wheat programs, which take out good, medium and poor land alike. This hypothesis is confirmed to some extent by available empirical data; the USDA estimates that production reduction per dollar of program cost for the 1960 Conservation Reserve program was $2.80. Our estimate for the feed grains program, $1.20, is less than half as high as this. The assumptions underlying our estimates for the feed grains programs differed to some extent from those used by the USDA for their estimates for the Conservation Reserve program, and there were differences in the programs themselves, which also affected the estimates; but the estimates indicate that the initial cost to the government per unit of production reduced was substantially less for the Conservation Reserve program than for the feed grains program.

The eventual costs, including a credit for the storage costs avoided, are difficult to compare, since the production of many other crops besides feed grains was reduced —some of which would not be stored.

At the same time programs such as the Conservation Reserve, which remove the poorer land and take out whole farms, promote more transfer of labor and capital out of agriculture per dollar of government payments than do the feed grains and wheat programs. This is in line with long-run goals of more efficient resource use.

b. *Capital.* Capital has grown to be the most important input in agriculture.

The use of fertilizer, for example, increased greatly during the 1950's. It is estimated that if 30 percent less fertilizer had been used, that would have reduced agricultural production about 8 percent, enough to have eliminated excessive production. Fertilizer use is responsive to price; if its price were raised substantially, less would be used. One of the simplest ways to raise the price of fertilizer would be to put a stiff tax on it. Fertilizer companies and farmers undoubtedly would object to this.

Diesel fuel and gasoline are exempt from the regular fuel tax when used in farm tractors. A program to reduce this input could be implemented by removing this tax exemption. The demand for tractor fuel is so inelastic, however, that the chief effect of doing this would be to raise farmers' ire rather than to reduce production.

The political pressure against such reductions of capital inputs as these would be fortified by economic arguments that this reduction would reduce efficiency, and thus, tend to reduce income per farmer. This tendency might be strong enough to offset the effects of higher prices for farm products if the program succeeded in reducing production. The same sort of thing is true, only less obviously, of reductions in the input of land.

Current programs to reduce production do not, in fact, control agricultural supply (the position of the supply curve); they deal only with production (a point on the supply curve) leaving the position of the supply curve unaffected. The over-production problem is only pushed back, not solved. The program works against itself; the more it pushes production back and raises prices, so that production becomes profitable, the more it has to pay farmers not to produce.

Production control programs do not get at the basic long-run farm problem. The current short-run problem is an excessive supply of farm products, but the basic long-run problem is an excessive supply of farm labor and management.

c. *Labor and management.* The basic long-run problem shows up in the form of low income per farmer relative to incomes in other occupations. The birth rate in agriculture is higher than the rate required to maintain a constant farm population, yet the demand for farmers has been decreasing rapidly as the average size and productivity of farms increases. Today the farm population in the United States is only half as great as it was in 1940. It is only 8 percent of the total population.

The supply of cropland was reduced by the Conservation Reserve, feed grains, wheat and other programs in recent years, and this had some reducing effect on crop production. The initial effect of this was to increase *gross* farm income. But the distribution of this increase in farm income among the factors of production, land, labor and capital, was determined by what had been done to decrease the supply of each one. And since only the supply of land had been reduced, and nothing had been done to reduce the supply of the other factors, labor and capital, economic theory would lead one to expect that

most of the increase in income in the long run, would go to land, and little or none to labor and capital.

The empirical data support this hypothesis. Other things were happening along with the programs, of course, to affect farm incomes. But official USDA data show that the United States average per acre value of farm land and buildings rose 78 percent from 1947-49 to 1961, while per capita farm income rose only 40 percent, and net income per farm rose only 24 percent. Another USDA set of data, compiled by type of farming areas, shows an actual decline in returns to farm operator and family labor since 1947-49.

The basic solution to the fundamental farm problem, then, is to reduce the continuing excess of farmers which continually depresses farm incomes.

This does not call for a program to "move farmers off farms." It calls for a program to help those farmers who want to move off farms themselves, but who need help to overcome the serious obstacles that impede their movement.

In the past, the reduction in farm population came about not so much by established farmers moving out of farming, as by young farm boys and girls—potential farmers—refraining from going into farming. They choose other occupations instead of going into farming. This is much easier than going into farming and then trying to get out. For the future, then, the chief emphasis needs to be put on programs to reduce the inflow of potential young farmers into farming, more than on helping established farmers to move out. If farm boys and girls who will not be needed in agriculture are informed about job opportunities in other occupations and given education and training for those other jobs, they will move into them relatively easily. This plus adjustments in farm size by those remaining on farms will reduce the excessive number of farmers and reduce the disparity between farm and nonfarm incomes.

The problem is more than an agricultural problem. It is part of the stubborn national problem of under- and un-employment, which persists at about 6 percent in spite of strenuous efforts to reduce it. Underemployment is a severe problem in a number of other industries—coal mining, for example—as well as in agriculture. It exists to some extent in a number of other industries, chiefly among the workers with the least training. The more completely the unemployment problem is solved in other industries, the easier it will be to solve the problem in agriculture.

Controlling Agricultural Production by Controlling Inputs

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● Much has been written concerning the farm problem in the United States in recent years. Diverse opinions are expressed about the kind of programs that are needed to cope with the problem; diverse opinions are expressed even about what the problem is in the first place.

Some observers believe that the farm problem is a price problem; they refer to it as "the cost-price squeeze". This is actually a "prices-received prices-paid" squeeze; it is shown in figure 1. This price problem, they say—low prices received by farmers, compared with the prices farmers pay—is caused by United States agricultural production increasing faster than United States population; this conclusion is based on the farm output and population data shown in figure 2.[1] Two years of emergency feed grain and wheat programs were required, in 1961 and 1962, to bring production down more nearly in line with population, and actually below utilization.

The USDA attributes the rapid increase in production to the widespread adoption of new production technology.[2] But a recent statistical analysis indicates that only half of the excess of production resulted from technology; the rest was due to a five-year run of good crop weather, from 1958 to 1962. The analysis indicates further that if the weather had been average, there would have been no surplus corn produced.[3] In this view, the farm problem is chiefly a good-weather problem.

With the weather as it was, however, production controls were used for 1961-1962. They are now in use for 1963, and they probably will be used again in later years. Agricultural production can be controlled by several different methods. Accordingly, this report is focused upon the specific question: If controls of agricultural production continues to be deemed necessary by Congress, what would be the consequences of using several different possible programs to attain it?

Programs to control agricultural production fall into two groups: (1) Those which seek to control production by controlling agricultural *output* (by marketing quotas, etc.) and those which seek to control production by con-

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[1]Earlier versions of this chart looked more alarming than the present chart. They showed a greater excess of the production index over the population index; the production index for 1957 was the same figure as the population index, and for 1958, 1959 and 1960, ran about eight points higher than the population index. Later revisions brought these indexes down several points, showing that the problem actually was not as bad as it looked in 1961.

[2]Orville L. Freeman, "Statement" in "Food and Agriculture: A Program for the 1960's". U. S. Dept. of Agriculture, Washington 25, D. C., March 1962. P. V.

[3]Louis M. Thompson, "How weather has affected our feed grain surplus," *Better Farming Methods.* September 1962.

Fig. 1—Prices Received and Paid by Farmers, 1947-62.

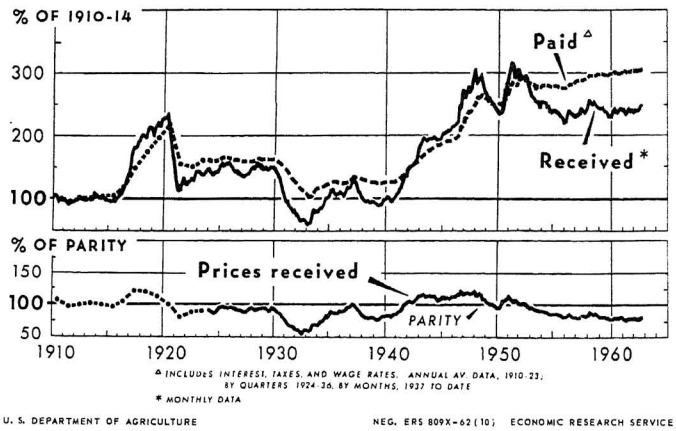
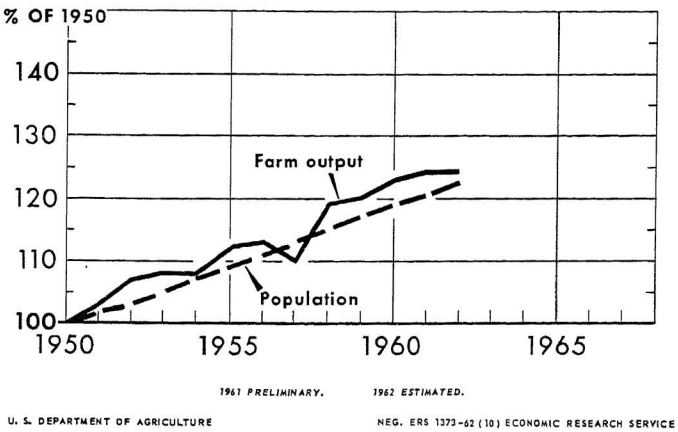


Fig. 2—United States Farm Output and Population, 1950-62.



trolling *inputs* in agriculture (of land, labor, etc.). This report is limited to the second of these methods—controlling agricultural production by controlling *inputs* in agriculture.[4]

CHANGES IN THE COMPOSITION OF INPUTS IN AGRICULTURE

TABLE 1-CHANGES IN COMPOSITION OF INPUTS, UNITED STATES AGRICULTURE, 1870-1957

Year	Labor	Real estate	Capital[b]	Total
	Inputs Based on 1935-39 Price Weights			
	Percentage of total imputs[a]			
	(Percent)	(Percent)	(Percent)	(Percent)
1870	65	18	17	100
1880	62	19	19	100
1890	60	18	22	100
1900	57	19	24	100
1910	53	20	27	100
1920	50	18	32	100
1930	46	18	36	100
1940	41	18	41	100
	Inputs Based on 1947-49 Price Weights			
1940	56	14	30	100
1950	40	15	45	100
1957	31	15	54	100

[a]The use of different price weights prohibits direct comparison of composition percentages for the periods before and after 1940. However, changes in composition within the two price-weight periods, 1870-1940 and 1940-47, serve to indicate the magnitude of changes in composition or input. Comparisons of periods before and after 1940 substantiate the trend in changes of input mix.

[b]All inputs other than labor and real estate.

Source: Productivity of Agriculture Technical Bulletin No. 1238 United States, 1870-1958, 1961, p. 11.

Total agricultural production in the United States has been increasing rapidly over the past 20 years, but the total of the inputs in agriculture has been increasing only slightly. The *composition* of the inputs, however, has been changing markedly. Table 1 shows these changes in percentage form by decades since 1870.[5] Figure 3 shows the changes in terms of dollars annually from 1940 to 1960.[6]

It is apparent that the input of labor, which used to be the largest item, has been declining rapidly—from nearly two-thirds of the total in 1870, and more than half in 1940, to only 30 percent in 1958.

The input of capital rose, offsetting the decline in labor, from 17 percent in 1870 to 54 percent in 1957.

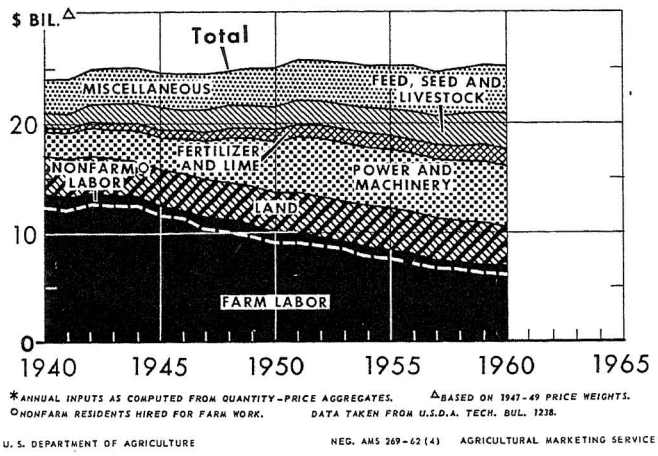
The most important facts shown by this table and chart are (1) that measured in dollar value terms, land

[4]Investigation of the first method was assigned by the Inter-regional Research Committee on Research in Agricultural Policy to Minnesota; the second was assigned to Iowa. The results of the Minnesota study were published by L. P. Schertz and E. W. Learn in, "Administrative Controls on Quantities Marketed in the Feed-Livestock Economy," Technical Bulletin 241, University of Minnesota Agricultural Experiment Station. December 1962.

[5]Ralph A. Loomis and Glen T. Barton, "Productivity of Agriculture, United States, 1870-1958," Technical Bulletin No. 1238, April 1961.

[6]*Ibid.*

Fig. 3—Inputs of U. S. Agriculture.*



*ANNUAL INPUTS AS COMPUTED FROM QUANTITY-PRICE AGGREGATES. △BASED ON 1947-49 PRICE WEIGHTS.
○NONFARM RESIDENTS HIRED FOR FARM WORK. DATA TAKEN FROM U.S.D.A. TECH. BUL. 1238.

U. S. DEPARTMENT OF AGRICULTURE NEG. AMS 269-62 (4) AGRICULTURAL MARKETING SERVICE

is the smallest input in agriculture, and (2) that capital is rapidly being substituted for labor in agriculture, until now the input of capital is greater in value than the input of the two other factors combined.

TWO CLASSES OF METHODS

Broadly speaking, there are two different classes of methods for controlling inputs in agriculture.

General.

a. The methods in this class control inputs by controlling the prices of the outputs. This affects the profits which constitute the inducement to commit inputs to the industry. The open market is one method in this class; milk price plans are another.

b. A different kind of method in this general class exercises control of inputs by control of credit for the purchase of inputs.

Specific.

The methods in this class attempt to control specific inputs—land, labor, or capital—by specific methods, different for each kind of input.

We will describe and appraise different methods under these two broad classes in order below, beginning with the general class and then proceeding to the specific class.

Part 1

General Methods of Controlling Inputs

CONTROL OF INPUTS BY PRICES IN THE OPEN MARKET

The traditional method of controlling inputs in any atomistically-competitive industry like agriculture is to let it be done by prices in the open market. This is one of the methods that is being advocated by some groups now—to abandon government farm programs and return agriculture to the open market.[7]

The general argument for returning agriculture to the open market runs like this: The amount of productive resources committed to agriculture is excessive. In a free market, the excessive production resulting from this excess of productive resources would drive the returns to those resources below the levels they would attain in other occupations. So the remedy is to stop supporting prices and return agriculture to the open market. Prices and returns then would fall. The low returns then would drive the excess resources out of agriculture until the resources would cease to be excessive and their returns would rise to competitive levels—the same levels as they would attain in other occupations.
to competitive levels—the same levels as they would attain in other occupations.

This general argument may appear merely academic, doctrinaire, and impractical to some, and hard-nosed commonsense to others. But several commodity producer groups support it by urgent practical arguments for returning their crops to or toward the open market.

Cotton in the United States, for example, is described by competent cotton authorities as being "now in the worst competitive position, by far, that it has ever held"[8] because of a change in United States price policy in 1960 which raised cotton prices. At the same time, rayon and dacron prices, which up to that time had run closely similar to cotton prices, were sharply reduced. These price relationships are shown in figure 4. Greater detail is shown in figure 5. This figure shows the sharp rise in rayon staple consumption and decline in cotton consumption that followed.

The high domestic prices for cotton also increased imports of cotton in manufactured form into the United States, from a negligible amount in 1952 to an annual rate equivalent to about 700,000 bales of cotton in 1962.

Fig. 4—Domestic Cotton Prices, January, 1955, to September, 1962.

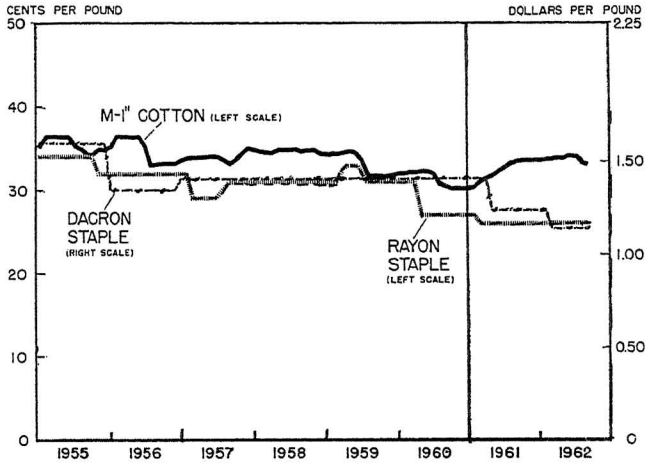
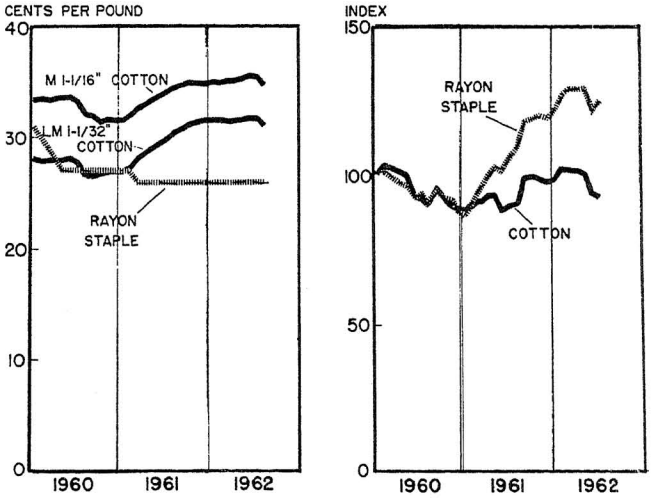


Fig. 5—Cotton Price and Cotton Consumption, 1960-62.



[7] "An Adaptive Program for Agriculture" A Statement on National Policy by the Research and Policy Committee of the Committee for Economic Development. 711 Fifth Avenue, New York 22, New York, 1962.

See also L. H. Simerl, "Do We Really Need Price Supports?", *Better Farming Methods,* November 1962, pp. 8-10.

[8] M. K. Horne, Jr. and Frank A. McCord, "Price and Today's Markets for U. S. Cotton," National Cotton Council of America, Memphis, Tennessee, September 1962, p. 26.

These imports are manufactured in foreign countries from cotton purchased on a world market in which the biggest influence is the price of our own cotton, which we export at a price 8.5 cents per pound lower than the price at which our own mills can buy it. We do this by means of a subsidy. While domestic prices are held at present high levels, even the present subsidy of 8.5 cents may not be large enough; yet it calls for a quarter of a billion dollars a year from the federal treasury if we are to export six million bales.

"There is a theory, which we often hear, that it is all right to prop up farm prices to certain preconceived high levels, provided the government is permitted to hold down production to the volume that will sell at those prices. This theory can be pushed too far, and we are on the way toward finding an example in cotton.

"For the catch in this thoery is that there is no market volume that we can count upon holding at these prices. We will have a certain market next year and the next and the next, but it will be disappearing rapidly as our competitors eat it up. Eventually this theory of a high price and a smaller market will wind up as a high price and no market, or a pitifully small one."[9]

PROJECTIONS OF PRODUCTION, PRICES AND INCOMES UNDER FREE MARKETS

How far would the prices of farm products fall under if agriculture were returned to the open market, and how long would agriculture take to adjust to these prices?

Two different sets of projections of prices for United States Agriculture under free markets were published late in 1959. One set was prepared by agricultural economists at Iowa State University;[10] it was confined to the feed-livestock economy. The other was prepared in the USDA.[11] It dealt with the whole of United States Agriculture.

The Iowa State University projections were made on the assumption that price supports for feed grains and wheat would be reduced to the point where no further additions to stocks would be made, and export subsidies would be eliminated, but sales for foreign currency or barter would be continued. The market thus would not be completely free.

The USDA study, made at the request of Senator Ellender, assumed that the stocks would be reduced to normal over a period of several years.

In general, the prices projected by the USDA were higher than those projected by Iowa State University. But both of them were so low that they thoroughly alarmed farmers and farm leaders. Hogs, $11.00 per 100 pounds; beef cattle, $15.00; corn, 80 cents per bushel, or less; wheat, 90 cents per bushel, or less—these projections indicated concretely what a return to the open market would do to the prices of farm products.

The Iowa economists estimated that if the storage programs had not been in effect during the 1950's, average annual cash receipts would have been about $3.6 billion lower—about 33 percent lower. The lowering of *net* income would have been less than the lowering of total cash receipts in dollars, but it would have been greater in percentage terms.

These estimates indicate that the storage programs raised total cash receipts about 11 percent, and net income about 33 percent. These are substantial percentages, especially the gain in net income.

WOULD THE LAW OF SUPPLY AND DEMAND SOLVE THE PROBLEM?

Some observers believe that the projected low open-market prices and incomes would shortly reduce production in agriculture. This reduction would be great enough to bring prices up again to levels high enough to bring returns to resources in agriculture up to comparable levels with returns in other occupations. That is, these observers believe that "the law of supply and demand would take care of the farmer."

Is this true?

The law of supply and demand in the open market is a valid economic concept, but it requires two conditions besides large numbers of producers in order to work as smoothly and quickly to bring about equality of returns as it does in the minds of many who have a knowledge of elementary economics. These two conditions are: (1) Perfect knowledge of opportunities in different occupations, and (2) Perfect mobility of the factors of production. Economic textbooks spell out these conditions, but often they are forgotten in application. And whenever these two conditions are not met, the law of supply and demand in the open market exerts severe economic pres-

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[9] M. K. Horne, Jr. and Frank A. McCord, *op. cit.*, p. 26.

[10] Geoffrey Shepherd, Arnold Paulsen, Francis Kutish, Donald Kaldor, Richard Heifner, and Eugene Futrell, *Production, price and income estimates and projections for the feed-livestock economy under specified control and market-clearing conditions,* Special Report No. 27, Iowa State University, Ames, Iowa, August 1960.

[11] *Report from the USDA and a statement by the Land-Grant Colleges IRM-1 Advisory Committee on Farm Price and Income Projections 1960-65 Under Conditions Approximating Free Production and Marketing of Agricultural Commodities.* Presented by Mr. Ellender. January 20, 1960.

In November 1960, further projections were published by John A. Schnittker and Dale E. Hathaway in *Economic Policies for Agriculture in the 1960's.* 86th Congress 2d Session, Joint Committee Print. pp. 21-32 and pp. 33-47.

sure upon many farmers who cannot respond by giving up their occupation, particularly if they are middle-aged or older.

These two conditions—perfect knowledge, and perfect mobility—are not met at all closely in agriculture.

Imperfect Knowledge. Farmers do not have full and accurate knowledge of alternative nonfarm employment opportunities. They hear that urban wages are high, but they also hear that the costs of urban living are high too, and so is unemployment at times; and in most cases they do not have specific information such as that the X company in Y city will take them on next month at Z wages.

Imperfect Mobility. In addition, the mobility of farmers is low. The law of supply and demand says that when prices decline, factors of production (land, labor and capital) move out of production, and production declines until that decline brings prices up to remunerative levels again. But labor and management (farmers) find it difficult to move out of agriculture because of the obstacles to free mobility that stand in the way.

Middle-aged and older farmers, particularly, find it difficult to pull up stakes and get a good job in town. They are not trained for city work, and in any case urban employers discriminate against men over 40. Young farmers can move more easily, but the psychological, sociological and economic obstacles are still high. Even reducing the flow of potential young farmers into agriculture is not easy. Farm boys in high school are likely to be taking classes in vocational agriculture rather than in vocational industry or commerce. The psychic as well as economic obstacles are hard to surmount.

Above these obtacles lies the further difficulty that a speeding up of migration out of agriculture would not reduce agricultural production proportionately. A small speed-up might not reduce production at all. The remaining farmers in many cases would combine the farms into larger and more efficient units, so that total agricultural production might actually increase rather than decrease. Only if the speed-up were substantial enough to induce transformation of farmers into more extensive types of farming would it have much reducing effect on production. And this process is painful and slow.

If agriculture were returned to the open market, then, returns in agriculture would decline from their present supported levels, not just to long-run competitive levels (equal to returns in other occupations) but below those levels. The distance below would be a function of the size of the obstacles to mobility, measured in dollar terms. And this situation would not bring its own cure in a year or two if things were left to themselves.

This means then that returning agriculture to the open market would not solve agriculture's and society's problem, until the conditions which could render the open market in agriculture effective are established.

To many observers, this means that, to put it in positive terms, steps need to be taken to increase farm income by various methods, (1) two-price systems, (2) production control by controlling inputs or outputs, or both, (3) direct payments to farmers, (4) expansion of the demand for farm products, etc., or all of these, until other longer-run steps to increase the mobility of the factors of production in agriculture, particularly labor and management, can take effect.

We will examine these alternatives in the next few sections.

MULTIPLE PRICE PROGRAMS

Under the open market, and also under most price-support programs, producers all get the same price, except for differentials in time, place and form.

More complex multiple price programs are in use in many milk price areas, by which the different prices received for the different classifications of milk (uses to which the milk is put, such as fresh fluid milk, manufacturing milk, etc.) are carried all the way back to the individual producers.[12] Multiple price programs of this nature are being proposed for other commodities.

A form of multiple-price system has, in fact, been in effect with a number of export crops since World War II. Exports of wheat and cotton, for example, have been subsidized by substantial amounts, which vary from year to year, and from program to program, sufficient to move the commodities into export channels at prices much below domestic prices. The different prices in effect for wheat in 1956-57 are estimated in table 2. ". . . during 1953-57, virtually all American wheat was exported under some type of subsidy or concession associated with official efforts to keep domestic wheat prices at artifically

[12]These milk price plans are described and analyzed in E. S. Harris, *Classified Pricing of Milk,* USDA Tech. Bul. No. 1184, 1958, and in G. Shepherd, *Marketing Farm Products—Economic Analyses.* Iowa State University Press, 1962, Ch. 24.

TABLE 2-INDICATED MULTIPLE PRICES OF REPRESENTATIVE AMERICAN WHEATS, 1956-57 AVERAGES AND APPROXIMATIONS

(Dollars per bushel)

Form of price	No. 2 Hard Winter (Kansas City)	No. 2 Soft Red Winter (St. Louis)	No. 1 dk. Northern Spring (Minneapolis)	No. 1 Soft White (Portland)
Terminal loan rate	2.30	2.30	2.34	2.21
Domestic market price	2.28	2.23	2.31	2.41
International Wheat Agreement export price	1.56	1.50	1.45	1.50
Barter basis				
Foreign currency net price:				
Sec. 402, Mutual Security	1.25	1.20	1.16	1.27
Public Law 480, title I	64-1.06	61-1.02	60-1.00	65-1.08
	55-0.91	55-0.92	60-0.99	63-1.05

Source: Helen Farnsworth, "Wheat Under Multiple Pricing: A Case Study," Policy for Commercial Agriculture, Nov. 22, 1957. Footnotes to the table omitted.

high levels in the face of record heavy wheat stocks."[13]

In this case, the different prices were not carried back to individual producers. All producers received the same price (the higher of the two or more prices). The government made up the loss resulting from sale at low prices abroad.

The treasury costs for this program for wheat are high. They run at about half a billion dollars a year.

MILK PRICE PLANS

Two-price or multiple-price systems have been in effect for a good many years with milk. Fluid milk prices in the Middle West usually run about 40 cents per 100 pounds above the price of surplus milk which is diverted to manufacturing purposes.[14]

Two-price systems for milk were developed because fluid milk producers believed that the prices they received were being beat down by the milk dealers, who were usually large in size and small in numbers in each milkshed and thus were in a oligopsonistic position. The producers formed themselves into "bargaining associations" which were designed to meet the oligopsonistic power of the dealers with monopoly power of their own, and enable them to take advantage of the differing elasticities of demand for fluid milk and manufacturing milk. But milk is irregular in flow and highly perishable, so instead of bargaining to set the price from day to day, the two groups meet only at infrequent intervals to work out a formula which would set prices from month to month automatically in response to changing supply and demand.

Multiple price systems are also used for some specialized fruits and nuts, as in California. They have not previously been used with such nationally-produced products as cotton or wheat, except in the form of export subsidies, as shown above. What is new in present proposals is the plan to use two prices for *domestic* sale, *carried back to the individual producer.*

TWO-PRICE PLAN FOR WHEAT

A formal two-price program for wheat was incorporated in the Food and Agriculture Act of 1962.

The level of price support (the commodity loan rate) for wheat of the 1963 crop is $2 per bushel for participating producers (those who agree to divert part of their wheat acreage, in accordance with the provisions of the program). The rate to "cooperators who are not participating producers" is $1.82 per bushel. The 18 cents difference between these two rates will be represented by negotiable certificates, prorated according to each producer's wheat acreage allotment.[15]

One of the results of supporting prices above open-

[13]Helen Farnsworth, "Wheat Under Multiple Pricing: A Case Study," *Policy for Commercial Agriculture—Its Relation to Economic Growth and Stability.* Joint Economic Committee, November 22, 1957, p. 563.

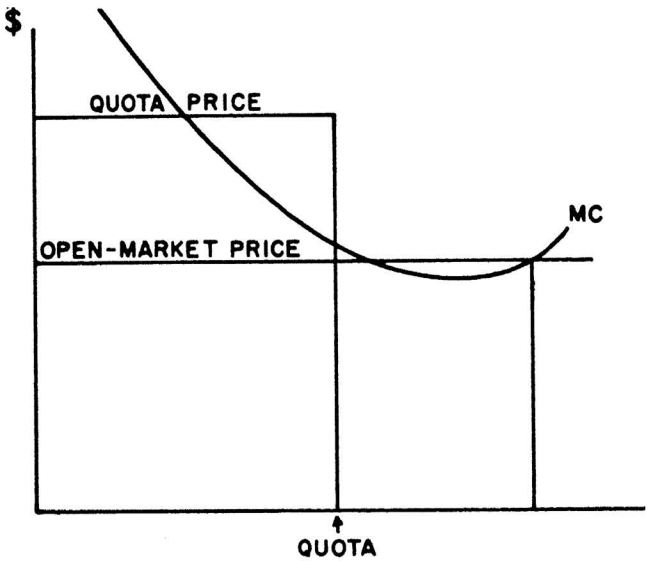
[14]Milk dealers in the Chicago area in March 1960, for example, paid farmers $3.39 per 100 pounds for milk for fluid purposes, but only $2.99 for milk for manufacturing purposes, out of the same cow. (Supplement for 1961 to Federal Milk Order Market Statistics. Stat. Bul. No. 248, USDA, Nov. 1962. pp. 88, 89.)

[15]Report No. 2385, House of Representatives, 87th Congress, 2nd Session, September 17, 1962, Food and Agriculture Act of 1962, Conference Report, p. 11.

market levels is that this leads farmers to increase production. A two-price system where the two prices are carried back to the individual producer can avoid this effect. In the two-price plan for wheat in the Food and Agriculture Act of 1962, the lower price for each producer's production above his (high-price) quota is intended to be low enough so as not to induce an increase in production.

This situation is shown in simplified form in figure 6. The high price for the quota quantity would cut the supply curve above the intersection point with the demand curve, but the high price applies only to the relatively small quota quantity. The quantity produced in excess of the quota receives only the lower price. In principle, each farmer carries his total production out to the point where his marginal costs equal the marginal (non-quota) price. Yet he still is able to get the high price for his quota quantity.

Fig. 6—A Two-Price System Reduces the Incentive to Increase Production.



This indicates that a two-price system may be a means for escaping the present dilemna in agriculture: (1) If prices continue to be supported at high levels, that provides an incentive for farmers to over-produce; this involves the government in expensive and dead-end storage programs to withhold the excessive production from the market, or adds to the expense of paying farmers not to produce the excess. (2) If price supports are lowered, that reduces farm incomes.

A two-price system which kept price supports high for say two-thirds of each farmer's previous production would maintain his income on that two-thirds, while the lower price for the rest of his crop would remove the incentive to increase production. This would partially resolve the present dilemma.

Two-price systems, however, can at best be considered only a temporary stop-gap. There are several reasons for this:

1. The quota quantities would have a tendency to freeze production patterns, in a world where continuously changing technology requires continuously changing production patterns.

2. They would be regarded by other countries as subsidizing production in the United States, and those other countries would believe themselves justified in putting countervailing duties on our exports to them.

3. In addition, two-price systems would help to alleviate the low farm incomes without encouraging an adjustment to the underlying causes of the low-income farmers' situation. A two-price program would not pay these farmers to move off the farm; it would pay them to stay. Many of these farmers would be those who prize the non-monetary values of farm life highly enough to offset the lower money incomes they would receive on the farm. If their money incomes fell lower than 20 percent below the income they could earn in town, many of them would move to jobs in town. But if income payments make up part or all of the gap, they would stay on the farm. Their symptoms, low incomes, would be relieved, but the causes of their low incomes would persist, unchanged. The problem would only be covered up; it would not be solved.

For these reasons, two-price systems are only temporarily effective unless they include a clear understanding, spelled out in the legislation, that the higher of the two prices would steadily be reduced over the next few years to the same level as the lower price. This would give farmers time to plan readjustments.

CONTROL OF CREDIT

Another general method of controlling inputs in agriculture is to do it by controlling the credit which gives command over inputs of capital, land, and labor. The control of agricultural credit would reduce many farmers' power to purchase inputs and commit them to agricultural production.

The Federal government plays an important role in farm credit, beginning during the depression of the 1930's when many farmers had difficulty in obtaining enough credit. The Farm Credit Administration was created in 1933, and the Federal government got into the farm credit business on a large scale. It is still in it. Table 3

TABLE 3-FARM-MORTGAGE LOANS: AMOUNT OUTSTANDING HELD BY PRINCIPAL LENDERS, UNITED STATES, JANUARY 1, 1944-60.[a]

Date in Millions of Dollars

Year	Federal land banks[b]	Federal Farm Mortgage Corporation[bc]	Joint-stock land-banks[bd]	Farmers Home Administration[e]	Life insurance companies[f]	Commercial and savings banks[g]	Individuals and others	Total
1944	1,452	430	10	174	987	448	1,894	5,396
1945	1,210	347	5	195	938	450	1,795	4,941
1946	1,079	239	3	184	891	507	1,856	4,780
1947	977	147	2	192	889	683	2,008	4,897
1948	889	107	--	198	960	841	2,069	5,064
1949	888	78	--	192	1,036	901	2,212	5,288
1950	906	59	--	193	1,172	937	2,311	5,579
1951	947	44	--	220	1,353	1,008	2,546	6,118
1952	994	33	--	241	1,541	1,046	2,819	6,676
1953	1,071	24	--	268	1,716	1,105	3,079	7,263
1954	1,169	18	--	282	1,893	1,131	3,279	7,772
1955	1,267	13	--	287	2,052	1,211	3,459	8,289
1956	1,480	--	--	278	2,272	1,346	3,690	9,066
1957	1,722	--	--	289	2,476	1,386	4,033	9,908
1958	1,897	--	--	340	2,579	1,414	4,277	10,507
1959	2,065	--	--	388	2,661	1,512	4,628	11,254
1960	2,335	--	--	437	2,819	1,625	5,072	12,289

[a]Excludes Alaska, Hawaii, Puerto Rico, and possessions.

[b]Mortgages in process of foreclosure were estimated for 1951 and 1952.

[c]Loans were made on the Corporation's behalf by the Land Bank Commissioner. Loans were limited to refinancing of existing Commissioner loans from July 1, 1947 to June 30, 1955 when outstanding loans of the Corporation were sold to the 12 Federal loan banks.

[d]Joint-stock land banks in liquidation which was completed April 26, 1951.

[e]Data include tenant-purchase loans; direct soil and water conservation loans to individuals; farm-development (special real estate) loans and farm-enlargement loans beginning 1944; project-liquidation loans beginning 1945; farm-housing loans beginning July 1950; and building improvement loans beginning 1955. Data also includes loans for these purposes from State Corporation trust funds.

[f]Estimates based on direct reports from the insurance companies, official reports submitted to State insurance commissioners, "Test's Life Insurance Reports," "Spectator Life Insurance Yearbook," and data from Life Insurance Association of America and Institute of Life Insurance includes legal reserve companies only.

[g]1944 -47 insured commercial banks; and 1948 to date, all operating commercial savings, and private banks. Beginning 1956, includes soil and water conservation loans insured by the Farmers Home Administration.

Agricultural Research Service. Data for 1919-43 in Agricultural Statistics, 1961, table 711.

shows that the Federal Land Banks held more than $2 billion of farm-mortgage loans in 1961.

The table also shows the loans held by the Farmers Home Administration, and by private lending agencies. The latter amount to nearly $10 billion, about four times as much as the two government agencies combined. Accordingly, any unified control of most of the credit extended to farmers today would have to be exercised by private lending agencies, chiefly.

It is difficult to see how this could be done. One of the most feasible ways would be for the banks, etc., to raise the interest rate on farm loans. But it is difficult to devise a feasible way to induce them to do this. It would reduce their loan business, and farmers would regard it as unfair discrimination among the bank's borrowers. The Farm Credit Administration was created to make credit more readily available to farmers; if credit were restricted now, farmers would simply turn to the Farm Credit Ad-

ministration in larger numbers, unless its rates were raised also. This too would be difficult.

Other methods of restricting credit—other than raising interest rates—could also be used. Some of them might be more effective and quicker acting, for agricultural interest rates are slow to move; also, it is believed that "the elasticity of the demand for short-run borrowings is low."[16] A more direct control is exercised by the local banker himself; he is likely to leave the interest rate unchanged, but when his clients come in to ask for loans, he may simply reduce the "availability" of his funds by cutting the amount he will loan to each borrower, or at least to the less desirable borrowers, say 10 or 20 percent. This rationing is likely to be quite effective.[17]

The problem of how to induce a large number of bankers to restrict credit like this would still remain. "Selective controls" on this type of borrowing might be imposed by some such legislation as Regulation X under the Defense Production Act of 1950, which delegated to the Board of Governors of the Federal Reserve System some control over real estate credit. It is impossible to assess accurately how effective this Regulation X was;[18] it was suspended in 1952.

In any case, if farm credit were restricted, that would bear unevenly on different classes of farmers. Those who had their farms all paid for, or who had independent means from other sources, would simply continue to finance themselves; it would be the young farmers starting in farming, and those with few reserves, who would feel the pinch. There would be strong objections from these farmers as well as from the credit agencies.

These objections could be fortified by appeal to considerations of economic efficiency. Reducing the input of capital would cause the rate of return to capital to rise. Reducing the input of capital would be a misdirection of resources from the national point of view.

General control over agricultural inputs by control of agricultural credit, therefore, appears politically difficult and economically unwise.

CONTROL OF APPROPRIATIONS FOR LAND RECLAMATION

A continuous stream of irrigation and other forms of land reclamation projects continues to pour forth from one hand of government, increasing agricultural production, at the same time that the other hand is trying to reduce agricultural production.

The size of the Bureau of Reclamation system of irrigation projects is greater than many people realize. In 1959, these projects included nearly seven million acres of irrigated land, which produced a gross crop value of more than $1.1 billion.[19]

This value of $1.1 billion is more than 5 percent of the total value of all crops produced in the United States ($19.6 billion in 1960).[20] This percentage is almost as great as the estimated annual surplus production in recent years (6 to 8 percent).[21] And $1.1 billion is a little more than the estimated reduction in agricultural production that was achieved by the Conservation Reserve program at its peak in 1960.[22]

The Bureau of Reclamation also handles extensive farm drainage projects. The farm drainage data are put up differently from the irrigation data; no estimates of gross crop value are made for the areas drained. The cost of these drainage operations from 1950 to 1959 totaled $186 million.[23]

Reclamation projects are defended because they add to the productivity of the nation. But in so doing, they create surpluses which lead to programs to *reduce* production in the established agricultural areas, at a cost of billions of dollars. Taxpayers pay twice—once, to finance the reclamation projects to increase production, and

[16]Harris, C. Lowell, section entitled "Interest Rate or Availability? or Both?" from *Money and Banking,* Allyn and Bacon, Inc., Boston 1961, p. 439.

[17]*Ibid.,* p. 440.

[18]Steiner, Shapiro, Solomon, "Real Estate Credit Control" from *Money and Banking,* fourth edition. Henry Holt and Company, New York, October, 1958. p. 330. See also "Selective Controls" from *Money and Credit, The Report of the Commission on Money and Credit,* Prentice-Hall, Inc., Englewood Cliffs, New Jersery, 1961. pp. 71-76.

[19]Statistical Abstract of the United States, 1961, p. 607. Data for 1961 are given, by states, in *Agricultural Conservation Program, Summary by States, 1961,* USDA, 1962.

[20]Agricultural Statistics, 1961, p. 451.

[21]USDA, Food and Agriculture, A Program for the 1960's, March 1962, p. v.

[22]"Total value of normal crop production at prevailing farm prices on all land in the (Conservation Reserve) program was equivalent to 4.5 percent of the total value of all crops produced in 1960. (R. P. Christensen and R. O. Aines, "Economic Effects of Acreage Control Programs in the 1950's," Ag. Ec. Rpt. No. 18, ERS, USDA, 1962, p. 26).

[23]Statistical Abstract of the United States, USDA, 1961, p. 607.

again, to finance the production-control programs to reduce production. It may be impartial to subsidize both teams in a football game, but it would be a lot more efficient and less costly to finance only one team to carry the ball unopposed to whatever destination the nation desires than to have two teams working at cross purposes.

A more rational defense is that many of the irrigation projects are merely by-products of power and flood-control projects which benefit the nation as a whole.

Another argument in defense of these projects is that they increase the production of farm products that are not in surplus—vegetables, fruits, etc., rather than feed grains or wheat. This argument is only partly true; much of the increase in cotton production in recent years comes from new irrigated area in the Southwest, particularly California. Cotton production in California rose from an average of 1,488,000 bales in 1949-58 to 1,939,000 in 1960—and increase of 451,000 bales.[24] This increase in production resulted almost entirely from an increase in yield per acre; acreage harvested increased only 1 percent.

Further research is needed to determine the accuracy of another view. This view is that crop production under irrigation is more efficient than existing marginal production on dry land. On this basis, expenditures on irrigation could be classed along with expenditures on research, vocational education, fertilizer, hybrid seen corn, etc.; all of these increase production, but enable farmers to produce more efficiently than before. The nation as a whole benefits from this more efficient production.

Whether the benefits are greater or less than the cost is a complicated question for irrigation experts to answer; the authors do not feel competent to deal with it. The answer probably differs from project to project in any case. Pending more research on the subject, this section remains inconclusive; but at least it indicates that the answer to the question whether irrigation projects are justified is not likely to be a simple yes or no.

AGRICULTURAL CONSERVATION PROGRAM SUBSIDIES

Another obvious opportunity to reduce inputs in agriculture would be to reduce the subsidies under the Agricultural Conservation Program.

This program subsidizes a number of conservation practices, most of which result in the long run in an increase in agricultural production.

These payments run into large figures. The annual totals for the United States as a whole since 1944 are shown in table 4. They have been running at more than $200 million in recent years. The average payment per payee in 1959 was $204. The relative importance of the different practices subsidized is shown in table 5.

These subsidies are intended to conserve production resources, and this aim is in line with long-run objectives of efficiency and abundant production. But a large share of the projects subsidized increase production now at a time when it is already too abundant.

TABLE 4-AGRICULTURAL CONSERVATION PROGRAM: ASSISTANCE TO FARMERS FOR CARRYING OUT CONSERVATION PRACTICES, UNITED STATES, BY PROGRAM YEARS, 1944-1960[a]

Program year	Assistance
	Million dollars
1944	294
1945	231
1946	267
1947	245
1948	125
1949	224
1950	252
1951	246
1952	227
1953	190
1954	147
1955	193
1956	222
1957	216
1958	220
1959	210
1960 [b]	213

[a]Includes assistance under the Naval Stores Conservation Program. Administrative expenses not included. Assistance for supplemental (emergency) practices included since 1951.

[b]Preliminary.

[24]Agricultural Statistics 1962, USDA, p. 62.

TABLE 5 - AGRICULTURAL CONSERVATION PROGRAM: SELECTED CONSERVATION MEASURE PERFORMED, BY PROGRAM YEARS, UNITED STATES AND TERRITORIES, 1950-59 AND 1936-59 TOTAL.

Practice	Unit	1950	1955	1958	1959	Total 1936-59[a]
Construction of standard terraces	1,000 acres	1,437	744	856	781	24,739
Construction of standard terraces	1,000 miles	75	37	44	38	1,345
Construction of diversion and spreader terraces	Miles	7,084	5,131	4,826	4,191	121,553
Establishment of sod waterways[b]	Million sq. ft.	2,001	1,553	2,129	2,011	27,824
Emergency tillage operations to control erosion on cropland[b]	1,000 acres	2,879	12,975	1,531	1,530	136,935
Stubble mulching	1,000 acres	4,049	6,048	6,666	5,030	83,941
Stripcropping not on the contour	1,000 acres	7,279	944	320	283	104,546
Stripcropping on the contour	1,000 acres	249	219	167	152	5,587
Establishment of permanent vegetative cover[b]	1,000 acres	6,459	1,221	2,475	2,462	89,432
Establishment of additional acreages of vetetative cover in crop rotation[bc]	1,000 acres	4,424	2,051	1,400	1,124	246,401
Improvement of an established vegetative cover for soil protection	1,000 acres	--	2,165	1,816	1,713	11,268
Establishment of annual cover and green manure crops[b]	1,000 acres	18,460	7,666	6,908	5,460	415,924
Application of liming materials to permit the use of conserving crops[bd]	1,000 tons	23,304	15,126	16,845	15,173	406,566
Planting trees and shrubs	1,000 acres	119	150	324	361	2,633
Improvement of a stand of forestry trees for erosion control, watershed protection, or forestry purposes	1,000 acres	30	133	321	304	1,934
Control of competitive shrubs on range or pastureland	1,000 acres	1,302	1,661	1,494	1,841	40,247
Drainage to permit a system of conservation farming	1,000 acres	2,971	1,362	1,636	1,598	38,492
Leveling irrigable land to control erosion and to conserve water	1,000 acres	377	375	346	341	6,841
Construction of dams, pits or ponds	Number	93,888	69,146	62,472	58,828	1,639,064
Constructing wells for livestock water as a means of protecting established vegetative cover	Number	6,673	8,054	8,824	12,117	172,584
Developing springs or seeps for livestock water as a means of protecting established vegetative cover	Number	1,050	2,321	2,262	2,793	69,551
Installing pipelines for livestock water to improve grassland management	1,000 lin. ft.	1,819	2,131	2,291	2,996	36,777
Deferred grazing to permit natural reseeding to increase vegetative cover	1,000 acres	1,969	2,742	5,265	4,313	214,777

[a]Rounded totals of unrounded data.

[b]Included supplemental (emergency) practices.

[c]Starting in 1950, a portion of the acreage represents an increase over the normal farm acreage.

[d]Standard ground limestone equivalent. Agricultural Statistics, table 9.

Part 2
Controlling Specfic Inputs

The *general* methods of controlling inputs in agriculture that are appraised above have their shortcomings —some of them, serious. Let us see how specific factor programs to control inputs of land, inputs of capital, and inputs of labor, have worked in the past, and how some new proposals might work in the future.

This appraisal will be made in three separate sections—one for land, another for capital, and another for labor and management.

A. LAND

Although land accounts for a smaller percent of the costs of agricultural production than either labor or capital, most input-controlling programs seek to control land, because it is the easiest factor to take hold of. This is true of the present production control programs, and of several others that have been proposed but not adopted (for instance, mandatory land retirement). Accordingly, this input, land, is considered first. Capital and labor are considered in later sections of this report.

United States' experience with programs for controlling agricultural production by controlling inputs has been analyzed in a number of publications, which are listed in a bibliography at the end of the present report. The purpose of the present report is not to appraise these programs further, as such, but to provide an overall perspective view and compare the estimated effects and costs of several alternative methods of controlling inputs. This comparison includes a number of different methods which have not been attempted yet, such as compulsory acreage allotments, government land purchase, compulsory land rental, and other forms of land rental.

Methods of controlling the input of land fall into two major groups:

1. *Specific crop acreage-reduction programs.*

These programs are designed to reduce the acreage of a specific crop (or closely related group of crops such as feed grains) by a flat uniform percentage cut on all farms which participate (such as the acreage allotment programs of the 1930's) or by a percentage cut of any figure chosen by the participant within a specified range (such as the emergency feed grains and wheat programs of 1961 and 1962). Some of these programs are backed up by marketing quotas.

Most of these programs have run for only one year at a time. Future programs, however, could cover several years at a time; that is, contracts could extend over several years.

2. *General land-retirement programs.*

These programs are designed to reduce the acreage of land in production regardless of what crop the land may be producing, such as the Conservation Reserve part of the Soil Bank program that was initiated in 1956. Contracts with farmers under this type of program usually extend for three, five, or ten years.

These two major methods are considered in order below.

SPECIFIC CROP ACREAGE-REDUCTION PROGRAMS

Specific crop acreage-reduction programs were first adopted in the United States during the great depression of the 1930's, They were designed to reduce the production of specified crops by taking stated percentages of the cropland out of production. They were called acreage-allotment programs.

For most crops, the chief inducement for farmers to participate in the programs was that participation made a farmer eligible for non-recourse loans from the Commodity Credit Corporation at rates considerably higher than the open-market prices for the crops concerned. In the case of wheat, marketing quotas, accepted by a vote of more than two-thirds of the producers, were applied to all producers.[25]

Acreage-allotment programs have several characteristic features, and farmers react to these features in such a way as to reduce production less than acreage is reduced.

[25]For a detailed history of the programs, see M. R. Benedict, Farm Policies of the United States, 1790-1950, Twenthieth Century Fund, New York, 1953.

1. Each participant is free to take out whichever acres of his cropland he wishes; naturally, he takes out his poorest cropland acres.

2. There is enough substitutability among the factors of production in agriculture so that reductions in one factor, in this case, land, can be offset to a considerable extent by increases in the other factors, particularly fertilizer.

In 1954, it was estimated that at the extent and level of use of fertilizer at that time, the rate of increase in average yield of all crops and pasture resulting from the last small increment of fertilizer applied, was such that one ton of plant nutrients substituted for the production obtained from 10.7 acres. At the average rate of application for all crops and pasture in 1954, the value of the marginal product per ton of plant nutrients was estimated at $681. The cost of the average ton of plant nutrients used in the United States in 1954 was about $230. This means that on the average, farmers would find increased rates of application highly profitable on the basis of estimated long-time average prices of crops and about 1954 prices for fertilizer.[26]

Farmers evidently did find it profitable. Table 6 shows that they continued to apply more and more tons of fertilizer after 1954, and that the plant nutrient content per ton also increased.

Farmers in effect substituted fertilizer for some of their acreage. Estimated fertilizer-acreage substitution curves for corn are shown in figure 7.

It is estimated that the increase in the use of fertilizer had the effect of increasing agricultural production more than the acreage-reduction programs reduced it.[27]

TABLE 6-FERTILIZERS: QUANTITIES OF COMMERCIAL FERTILIZERS CONSUMED AND THEIR AVERAGE PLANT-NUTRIENT CONTENT, UNITED STATES, YEARS BEGINNING JULY 1, 1944-60[a]

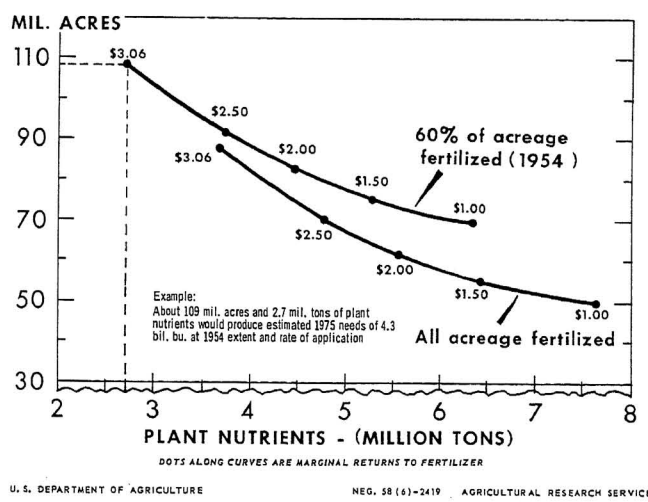
	All Fertilizers			
Year	Quantity	Nitrogen	Available phosphoric oxide	Potash
	1,000 tons	Percent	Percent	Percent
1944	13,466	4.68	10.05	5.42
1945	15,128	4.63	10.28	5.34
1946	16,839	4.65	10.31	5.10
1947	17,818	4.81	10.40	5.17
1948	18,542	4.96	10.47	5.79
1949	18,343	5.48	10.63	6.01
1950	20,991	5.89	10.05	6.57
1951	22,432	6.34	9.80	7.05
1952	23,413	6.99	9.70	7.42
1953	22,774	8.11	9.81	7.96
1954	22,726	8.63	10.05	8.25
1955	22,194	8.71	10.13	8.45
1956	22,709	9.40	10.15	8.53
1957	22,516	10.14	10.18	8.59
1958	25,308	10.56	10.08	8.66
1959	24,877	12.01	10.34	8.66
1960[b]	25,400	11.3	10.2	8.8

[a]Includes Hawaii and Puerto Rico; Alaska included only in 1950-52 and 1959-60; also fertilizers distributed by Government agencies.

[b]Preliminary.

Source: Agricultural Statistics, 1961, p. 493.

Fig. 7—Acreage-Fertilizer Combinations Needed to Produce the United States Corn Crop in 1975.



[26]D. B. Ibach and R. C. Lindberg, "The Economic Position of Fertilizer Use in the United States" Ag. Inf. Bul. No. 202. United States Department of Agriculture. November 1958, pp. 9, 10.

[27]"It has been estimated that 60 percent of the increase in crop production per acre from 1940-41 to 1950-51 and 70 percent of the increase from 1951-52 to 1955 may be attributed to the use of more fertilizer. Increased use of fertilizer added the equivalent of 22 million acres to total crop production from 1940-41 to 1950-51 and 21 million acres during the period from 1951-52 to 1955. On the average, each additional ton of plant nutrients in fertilizer added the equivalent of about seven acres of cropland to total crop production from 1940-41 to 1950-51 and about 19 acres from 1951-52 to 1955.

"Estimates of the proportion of the use in crop production per acre resulting from the use of additional fertilizer have not been made for the years 1956-60. An estimate of 40 percent, however, would appear to be conservative. On this basis, additional cropland equivalent attributed to higher yields resulting from the use of more fertilizer amounts to 35 million acres for the 1955-60 period. This is substantially more than the 28 million acres in the conservation reserve in 1960 or in the acreage reserve and conservation reserve in 1957. If account also is taken of the fact that cropland in the

3. Third, most of the programs are voluntary. *Non-participants* are free to expand their acreage and production of the crops concerned, and this expansion offsets part of the reduction expected by the participants in the program.

Non-participants in the 1961 feed grains program, for example, expanded their acreage of these crops, so that although participants reduced their acreage of these crops by 25.2 million acres, the reduction in the total acreage of these crops was only 20.4 million acres below the 1960 acreage. Feed grain production was reduced about 14 million tons (about 10 percent) below the 1960 crop.

4. Fourth, the producers of other crops are free to expand the production of those other crops; "cross-compliance" usually has not been invoked.

Farmers' reactions to the first three of these features of the specific commodity acreage control programs are the chief reasons why the reduction in the production of the specific crop is less than the reduction in the acreage of that crop. Farmers' reaction to the fourth kind of feature reduces the effect of the reduction of production of the specific crops that is accomplished, on *total* agricultural production.

Effects

a. *Acreage-allotment Programs.* Several different analysts of the acreage-allotment programs of the 1930's came to the same conclusion—that except for tobacco, the programs did not have much effect on production. The programs after World War II had more effect, but since cross-compliance was not included, the effect was mostly to shift production around from one crop to another.

The 1954 and 1955 corn-acreage programs, for example, apparently had very little effect on total acreage in crops. They also had very little effect on corn acreage; but they did affect total feed-grain production by increasing the production of other feed crops.

Table 7 shows that the total United States acreage of corn decreased only 1 percent from 1953-1955.[28] The small size of the decrease in corn acreage was chiefly due to the lack of compliance by many corn farmers. Most of the corn farmers who did not comply with corn allotments intended to feed their corn and, therefore, were not interested in complying for eligibility in the price-support program. Reductions in corn acres made by those who complied with the program were just about offset by increases in corn acres made by farmers who did not comply.

TABLE 7-CHANGES IN PRODUCTION, HARVESTED ACREAGE AND YIELDS FOR VARIOUS CROPS IN THE UNITED STATES BETWEEN 1953 AND 1955.

Crop	Harvested acreage (percent)	Total production (percent)	Yield per acre (percent)
Wheat	-30	-20	+15
Cotton	-31	-11	+28
Corn	-1	no change	+1
Rice (1954-55)	-28	-17	+16
Oats	+4	+30	+25
Barley	+66	+61	-3
Grain sorghum	+105	+113	+4
Soybeans for beans	+26	+38	+9
Flaxeed	+10	+11	+1
Rye	+49	+61	+8
All tame hay	+3	+7	+3

Source: U. S. Dept. Agr., Agr. Res. Serve. Effects of acreage allotment programs. U. S. Dept. Agr. Prod. Res. Rpt. 3. June 1956. p. 6.

Table 7 also shows that the corn program had little or no effect on corn production. But the programs for wheat and cotton had subsantial effects on total feed-grains production.

Compliance with the wheat and cotton programs was high. Most of the acres diverted from wheat, cotton and corn went into feed-grain production, soybeans and pasture. Iowa corn farmers, who complied with corn allotments, grew more soybeans and oats. Wheat acres were reduced by 30 percent. These acres were mainly diverted to grain sorghum in Kansas and to barley in other major wheat-producing regions. The acres which were taken out of cotton production were shifted mainly to the production of soybeans, corn, grain sorghum and barley. The diversions of acres from allotment crops to feed grains other than corn resulted in a 10 percent increase in the total production of feed grains. This increase in feed-grains production was not necessarily a net addition to the total quantity of grain fed, because some of the wheat would have been fed anyway. But the increase had some depressing effect on feed-grain prices.

From 1952 to 1955, the harvested acreage of the crops under acreage controls—wheat, cotton, peanuts, rice and tobacco—decreased by 33 million acres, but the

conservation reserve is below average in productivity, it is evident that since 1955 increased use of fertilizer has been more important in expanding crop production than the Conservation Reserve Program has been in reducing crop production." (R. P. Christensen and R. O. Aines, "Economic Efforts of Acreage Control Programs in the 1950's." ERS, USDA, Ag. Ec. Rpt. No. 18, pp. 23-24, October 1962.)

[28]U. S. Dept. Agr., Agr. Res. Serv. Effects of acreage allotment programs. U. S. Dept. Agr. Prod. Res. Rpt. 3. June 1956. See also: North Central Farm Management Research Committee. Farmers reaction to acreage allotments. Ky. Agr. Exp. Sta. December 1955.

acreage in other crops increased by 25 million acres The production of the controlled crops decreased by 12 percent, but the production of the other crops increased enough to more than offset this, so that total crop production increased. Thus, the producers of these crops transferred a substantial part of their surplus problem to the producers of the nonbasic crops, chiefly the feed grains other than corn, for which price supports were provided without restrictions on production.

b. *The 1961 and 1962 Feed Grains and Wheat Programs.* In 1961, the Congress set up an emergency program for feed grains and another for wheat. Under these programs, each corn grower, for example, was offered 50 percent of the estimated value of the crop per acre to keep 20 percent of the corn acreage on his farm out of production, and 60 percent for the next 20 percent, up to a total limit of 40 percent. The level of price support for corn was raised from $1.06 to $1.20, although loans at this rate were available only to participants, and only on the "normal production" on each farm.

The rental rates under the 1961 feed grains program differed from farm to farm according to the productivity of the individual farms, more than the rates under the Conservation Reserve program. The rates ranged from an average of $7.00 per acre in Florida to over $40 per acre in Connecticut. They averaged about $31 per acre for the United States as a whole. This was more than twice the $13.50 average rate under the Conservation Reserve program.

More than a million farmers signed up in the 1961 feed grain program, representing 55 percent of the base acreages of those crops; 25.2 million acres were held out of production by participants. Some of the non-participants increased their acreage. The net reduction in acres from 1960 was 20.4 million, equal to about 16 percent.

The emergency programs were extended with small changes in 1962, with similar results to those in 1961.

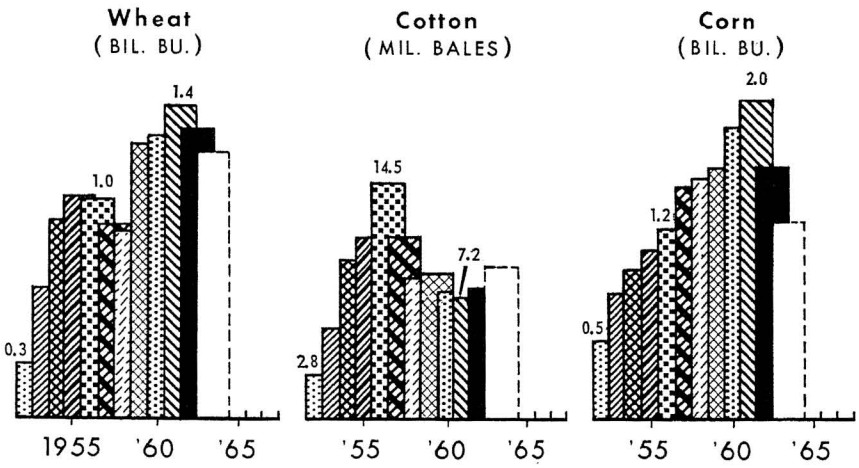
The 1961 and 1962 feed grains and wheat programs were effective in reducing production as well as acreage. The 1961 feed grains program reduced feed grain acreage on participant's farms about 25 percent. The feed grain harvested acreage reduction for the country as a whole was about 16.5 percent (non-participants increased their acreage). Participants, however, took out their poorest acres and applied more inputs on the acres in crops, and non-participants maintained or increased their production, so that the reduction in feed-grains production was only about 10 percent below production in 1960. Stocks of feed grains were reduced also. These things are shown in figure 8.

If the weather had been about average in 1961, feed grains production would have declined more than the actual 10 percent decline which took place. But the weather in the Corn Belt in 1961 was unusually good for corn. "The 1961 growing season was more nearly optimum for corn than in any (other) year of the study, 1935 to 1961", because of plentiful rains in July and relatively cool August temperatures.[29]

L. M. Thompson, the author of the study reported above, concluded that the weather in the Corn Belt was

[29]L. M. Thompson, "An Evaluation of Weather Factors in the Production of Corn," CAEA Report 12T, Iowa State University, Ames, Iowa, 1962, p. 20.

Fig. 8—U. S. Government and Other Feed Grain Stocks.



BEGINNING OF CROP YEAR: WHEAT, JULY 1; COTTON, AUG. 1; CORN, OCT. 1. HEIGHT OF BARS PROPORTIONAL TO VALUE AT 1955 SUPPORT LEVELS. 1963 ESTIMATED ON BASIS OF INDICATED PRODUCTION AND DISAPPEARANCE AS OF OCTOBER 1962

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above average each year after 1957, and that "had we experienced average weather after 1957 in the Corn Belt, there would have been no surplus corn produced. . . .

"In other words, *our continued build-up of surplus feed grains since 1957 was associated with a favorable weather cycle.* Just how long this favorable cycle will continue is beyond our present scientific approach to answer.

"We must continue these studies in order that we can distinguish between the influence of weather and technology. We would make a serious mistake to ignore weather and assign the trend in yields from 1950 to 1960 solely to technology. Our more recent statistical studies show *half this trend to be due to technology and half due to weather."*[30]

If further research confirms the existence of cycles in the weather, this would cast production controls in a new role. In this role, production controls would supplement storage programs as a means of evening-out year-to-year variations in feed grain supplies caused by variations in the weather. In the past, these storage programs have been based on the belief that variations in the weather are random and irregular, and that the average period of variation is short, so that a small crop would follow a big crop within a few years; thus the excess supplies from good years would have to be carried for only a few years before they would be needed to add to a small crop. But if weather comes in cycles, or even in runs of irregular sequences, it might be cheaper to reduce stocks by reducing production for a year or two during a good-weather cycle or run, such as that from 1957 to 1962, rather than by continued storage year after year.

Costs

The total rents paid out under the 1961 feed grains programs, for the United States as a whole, amounted to $782 million. Administrative costs were $42 million. These amounts add up to $824 million.

How much did this program reduce feed-grains production?

An estimate of the reduction in feed-grain production due to the 1961 feed grain program can be made by comparing the actual production in 1961, not with 1960 production (for other things—weather, for example—affected production in 1961 besides the 1961 program) but with what would have been produced if the previous price support programs at 65 percent of parity and no production controls had been in effect, instead of the 1961 emergency feed grain programs.

The following procedure was used to estimate what would have been produced in 1961 if the old program had been in effect, instead of the feed grain program.

1. The March 1, 1961 planting intentions were used.
2. The percentage of planted acreage of feed grain crops harvested for grain was assumed to be the same as in the 1960 crop year.
3. The December 1, 1961 estimate of crop yields was used, except for corn. The corn yields, an estimated 2.5 bushels per acre, based on opinions obtained in a survey of Extension personnel, farmers and commercial farm managers in five midwest states, was deducted from the 1961 yields to compensate for land selection, increased fertilizer use, and timeliness of operation resulting from the 1961 program.

On this basis, it was estimated as shown in table 8 that feed grain production would have been 166.9 million tons in 1961 without the feed grain program. The actual 1961 feed-grain production was 140.6 million tons. In other words, it was estimated that the 1961 feed grain program reduced feed-grain production by 26.3 million tons. This is equal to 939 million bushels when converted to corn equivalent on a weight basis.

Payments to farmers, and administrative costs, amounted to $824 million in 1961. For this outlay, the program purchased a reduction in feed-grain production estimated at 939 million bushels of corn equivalent. This amounted to about 1.14 bushels per dollar of program cost. With corn at $1 per bushel, this would amount to $1.14 worth of production-reduction per dollar of program cost.

[30]L. M. Thompson, "How Weather has Affected our Feed Grain Surplus," September 1962, *Better Farming Methods.*

TABLE 8-ESTIMATES OF WHAT 1961 CROP PRODUCTION WOULD HAVE BEEN UNDER THE 1958-60 PROGRAM:

Crop	Prospective 1961 1,000 acres	Percent harvested for grain 1960	Harvested acres 1961	1961 yield per acre	1,000 Bushels	Pounds per bushel	1,000 Pounds	Tons
Corn	82,405	87.7	72,269.2	59.3	4,285,564	56	239,991,156	119,995,578
Oats	32,480	84.5	27,445.6	42.1	1,155,460	32	36,974,712	18,487,356
Barley	15,427	89.3	13,776.3	30.3	417,422	48	20,036,268	10,018,134
Grain Sorghum	18,822	79.6	14,982.3	43.8	656,225	56	36,748,615	18,374,307
Total of 4 feed grains								166,875,375

The USDA estimates that the 1961 feed grains program reduced *corn* production by 617 million bushels.[31] The payments for corn acreage diversions were 645 million. On the basis of corn at $1.00 per bushel, their estimate indicates that the 1961 feed grains program reduced corn production worth 96 cents per dollar of program cost. This is lower than our estimate. For grain sorghum the USDA estimated that the 1961 feed grain program reduced production by 136 million bushels. The payments for grain sorghum acreage diversion were 137 million dollars. With sorghum grain priced at 90 cents per bushel, this indicates a 90 cent reduction in grain sorghum production for each dollar of acreage diversion payments.

This was only the immediate cost. It will be offset to a considerable extent by the reduction in losses which the CCC incurred and will incur for storage charges and for deterioration of grain in storage, on the crops that were not produced. The USDA states: "According to estimates for the 1959 fiscal year, government price-support losses on acquisitions averaged $2.70 per bushel for wheat and $1.75 for corn. This is more than the original values per bushel. For most other crops, losses amounted to more than half the amount the Government paid for these crops."[32]

GENERAL LAND-RETIREMENT PROGRAMS

The Soil Bank program initiated in 1955 included two parts. One part was an Acreage Reserve program, which was a specific commodity program on an annual basis, to take out acreages of specified crops. The other part was a Conservation Reserve program, designed to retire all types of cropland, regardless of crop, under contracts running from three to ten years in length.

The number of acres under Acreage Reserve contracts each year is shown in table 9. The Acreage Reserve program was discontinued after 1958.

TABLE 9-ACREAGE RESERVE ACRES AND CONSERVATION RESERVE ACRES, ANNUALLY 1955-60.

Year	Acreage Reserve	Conservation Reserve
1956	12,212	1,429
1957	21,354	6,427
1958	17,158	9,887
1959	--	22,422
1960	--	28,660

Source: Agricultural Statistics, USDA, Annual volumes.

[31]USDA, The 1961 feed grains program (Mimeo), Washington D. C., 1962.

[32]Christensen and Aines, *op. cit.*, pp. 27-28.

The Conservation Reserve part of the program was a general land-retirement program; it took out agricultural cropland regardless of crop. It began in 1956 and was modified and expanded in 1959. The number of acres under Conservation Reserve contracts each year from 1956 to 1960 is also shown in table 9. Figure 9 shows that participation was heaviest in the low-yield Great Plains states. The correlation between land value per acre, representing the productivity of the land, and percentage participation, with states as units, was -.53.[33] It is estimated that the yield per acre on the cropland in the Conservation Reserve averaged about 30 percent lower than the average for all cropland in 1960.[34]

The Conservation Reserve program rented land out of production under three, five, or ten year contracts. By 1960, farmers participated in the program to the extent of 28.7 million acres; about 70 percent of the acreage under contract consisted of whole farms. No new contracts were written after 1960. The existing contracts continued to run on to their individual termination dates.

Effects

Table 10 and figure 10 show that the total acreage of "crops planted or grown" in the United States decreased from 354.3 million in 1955 to 329.1 in 1960, or by 25.2 million acres. This is almost as much as the 28.7 million acres put into the Conservation Reserve.

Table 10 and figure 11, however, show that the acreage *harvested* declined only 12.1 million acres—less than half as much as the acreage under contract.

The difference between the behavior of these two series, acreage planted and acreage harvested, resulted chiefly from the changes in acreage abandoned; these in turn resulted from changes in weather. The rest of the difference resulted from some "crop" land being put into the program that was not really in crops before.

From 1950 to 1956, droughts in the plains states caused total acreage abandoned to average about 20 million acres. Before 1950, abandonment had usually run only a little above 10 million acres, and after 1956, it declined below 10 million. During 1956, the last year of the droughts, acreage abandonment was still high, and acres harvested declined by the same amount as the acres put into the Soil Bank. The lower part of figure 11

[33]R. Heifner, The Conservation Reserve Program as a Means of Controlling Agricultural Production, unpublished Ph.D. Thesis, Iowa State University, 1963.

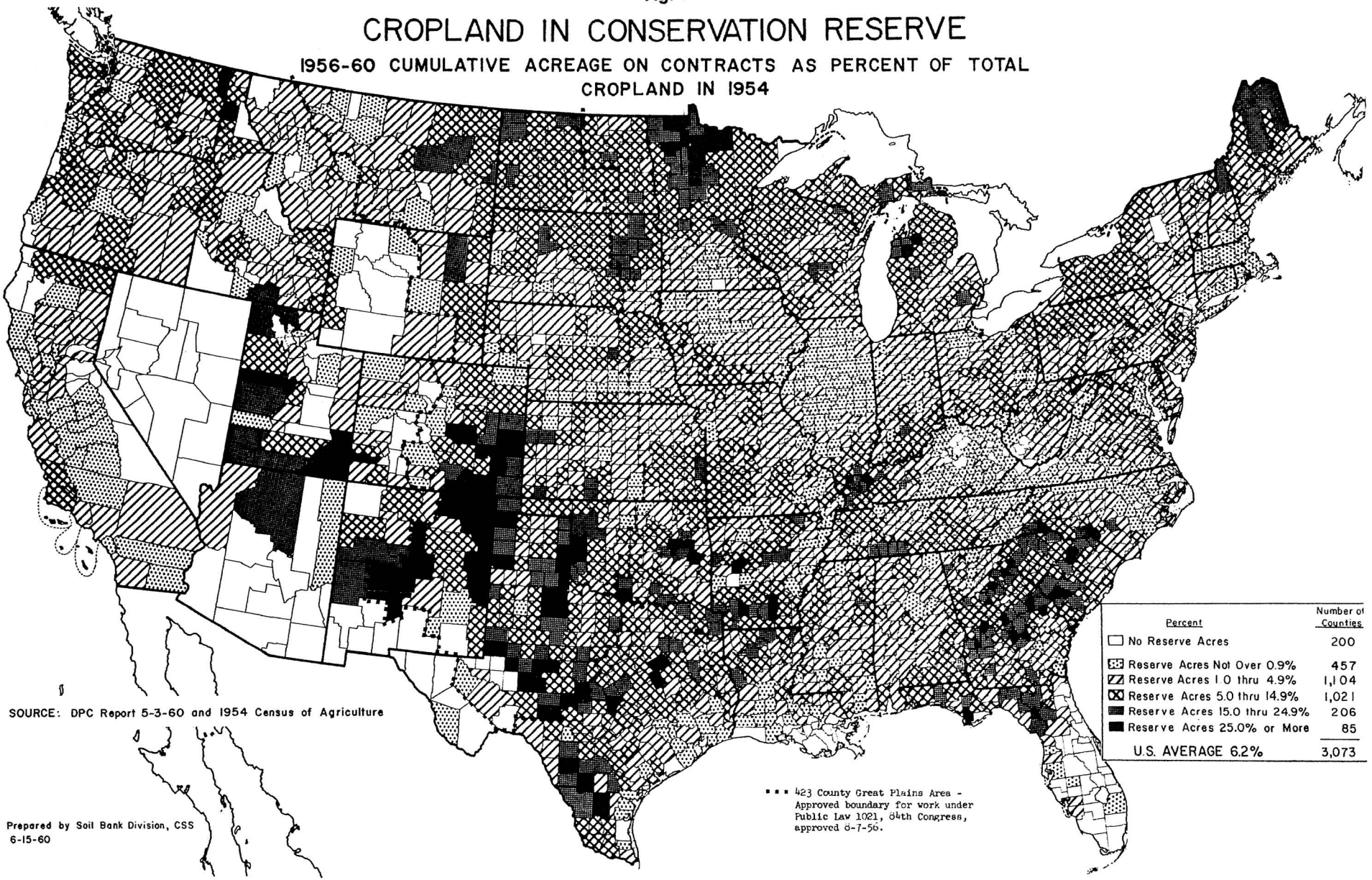
[34]Christensen and Aines, *op. cit.*, p. 26.

Aines also has made an unpublished estimate that the value of the reduction per acre under the Conservation Reserve in 1960 was about $31 to $35 per acre, while the value under the feed grains program, for corn, was about $50 per acre. (Letter to the senior author, November 6, 1962).

Fig. 9

CROPLAND IN CONSERVATION RESERVE

1956-60 CUMULATIVE ACREAGE ON CONTRACTS AS PERCENT OF TOTAL CROPLAND IN 1954



Percent	Number of Counties
No Reserve Acres	200
Reserve Acres Not Over 0.9%	457
Reserve Acres 1.0 thru 4.9%	1,104
Reserve Acres 5.0 thru 14.9%	1,021
Reserve Acres 15.0 thru 24.9%	206
Reserve Acres 25.0% or More	85
U.S. AVERAGE 6.2%	3,073

SOURCE: DPC Report 5-3-60 and 1954 Census of Agriculture

▪ ▪ ▪ 423 County Great Plains Area - Approved boundary for work under Public Law 1021, 84th Congress, approved 6-7-56.

Prepared by Soil Bank Division, CSS
6-15-60

Fig. 10—Total U. S. Crop Acreage Planted and Amounts Put in the Acreage and Conservation Reserves.

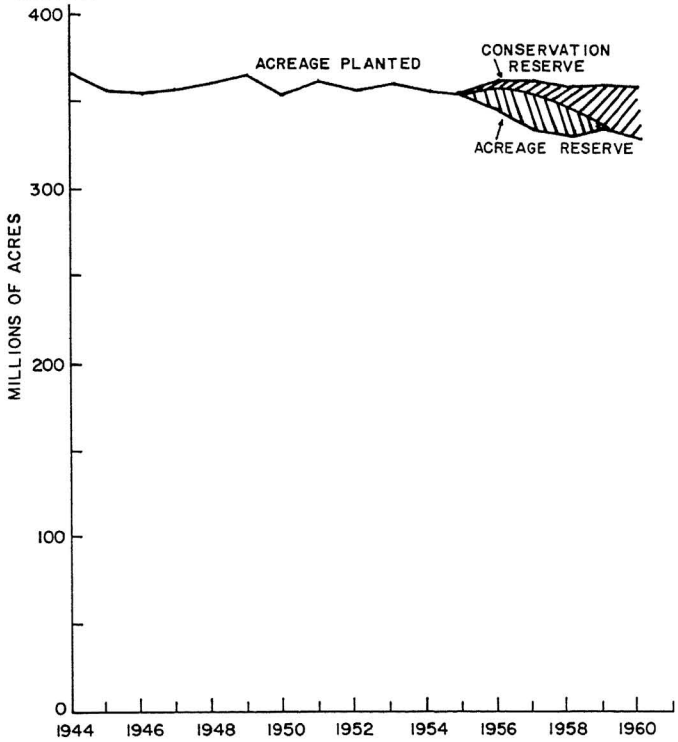


Fig. 11—Total U. S. Acreage Harvested and Amounts Put in the Acreage and Conservation Reserves and Acreage Abandoned.

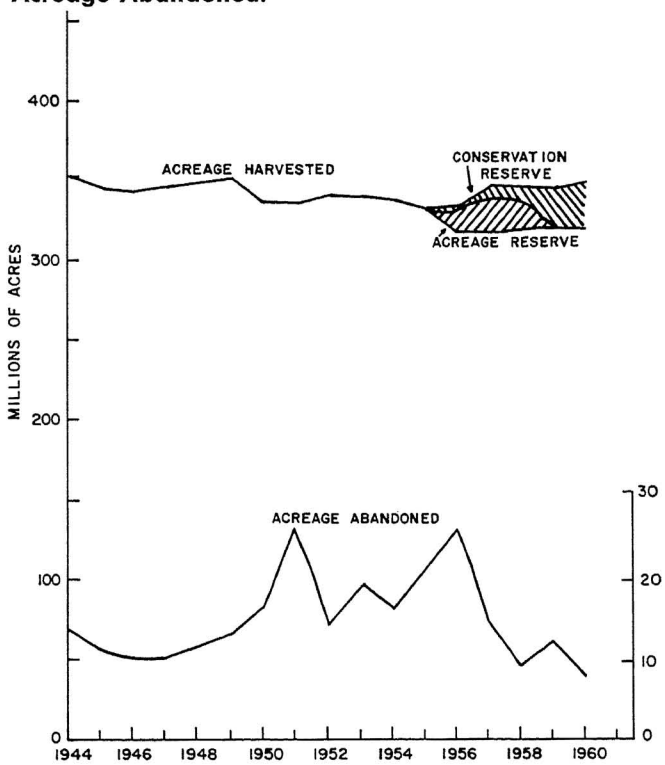


TABLE 10-PLANTED AND HARVESTED ACREAGES OF CROPS, UNITED STATES, 1944-60.

Year	59 crops harvested[a]	59 crops planted or grown[b]	Crops planted minus crops harvested
	(1,000 acres)	(1,000 acres)	(1,000 acres)
1944	352,868	366,099	13,231
1945	345,546	356,883	11,337
1946	343,012	353,522	10,510
1947	346,380	356,408	10,028
1948	348,047	359,807	11,760
1949	352,286	365,490	13,204
1950	336,437	353,246	16,809
1951	336,079	362,922	26,843
1952	341,313	356,093	14,780
1953	340,660	360,461	19,801
1954	338,214	354,806	16,592
1955	332,880	354,384	21,504
1956	318,579	345,294	26,715
1957	318,676	333,718	15,042
1958	320,753	330,054	9,301
1959	322,674	335,390	12,716
1960	320,823	329,154	8,331

[a]Totals are for crops shown in preceding columns, omitting alfalfa seed, red clover seed, alsike clover seed, and lespedeze seed. These are included in the count of crops, but the acreage is not included because mostly duplicated in the hay acreage; the acreage of peanut hay, largely duplicated in peanuts picked and threshed, has been deducted. Other crops not included are hops, spelt, hemp, velvetbeans, various legumes and other crops harvested by livestock, minor crops, and fruits and nuts. The acreages shown include some crops harvested in succession from the same land.

[b]Preceding column plus estimates of acreage planted and not harvested.

Source: U. S. Department of Agriculture, Agricultural Marketing Service, Crop Reporting Board, Annual Crop Summary, December 1960.

shows, on an expanded vertical scale at lower right, that only after 1956, when normal weather returned, did acres harvested plus Soil Bank acres increase. Presumably, if the droughts had continued, or if they had not happened at all during the period preceding the Soil Bank, the reduction in acreage harvested would have been almost as great as the acreage in the Soil Bank. It would not have been quite as great, for there is some evidence that some farmers "fudged" a bit under their contracts, and put in some land that was not really producing crops before.[35]

The Conservation Reserve program took out 8 percent of the total cropland used in 1960. The USDA estimates that the total value of the normal crop production at prevailing prices on all land in the program was equivalent to 4.5 percent of the total farm value of all crops produced in 1960.[36]

The long term Conservation Reserve contracts, up to 10 years in length, along with the features permitting whole farms to be put into the program, helped participants to make long-run adjustments. Most of them were older people, or were having trouble making a go of farming. The program helped make it possible for these people to retire or find nonfarm jobs. Thus, the program helped directly to reduce the number of farmers as well as farms, more than the specific commodity programs did; the latter took out only parts of farms.

The rental rates per acre, under the Conservation Reserve program, differed according to differences in the productivity of land. They did not differ as much as the differences in profit per acre, however, as shown in figures 12 and 13, where profit per acre is estimated by the value of land and buildings per acre.

Thus, the Conservation Reserve program over-paid for poor land relative to good land. Accordingly, there was a general tendency for more poor land than good land to go into the program. This is shown by the location of the participation, by counties in figure 9 and by state areas in table 11. It is estimated that the yield per acre on the cropland in the Conservation Reserve averaged about 30 percent lower than the average for all cropland in 1960.[37] This is not a necessary feature of gen-

Fig. 12—Relation Between Basic Rental Rate Per Acre and Average Value of Land Per Acre, by States, 1956.

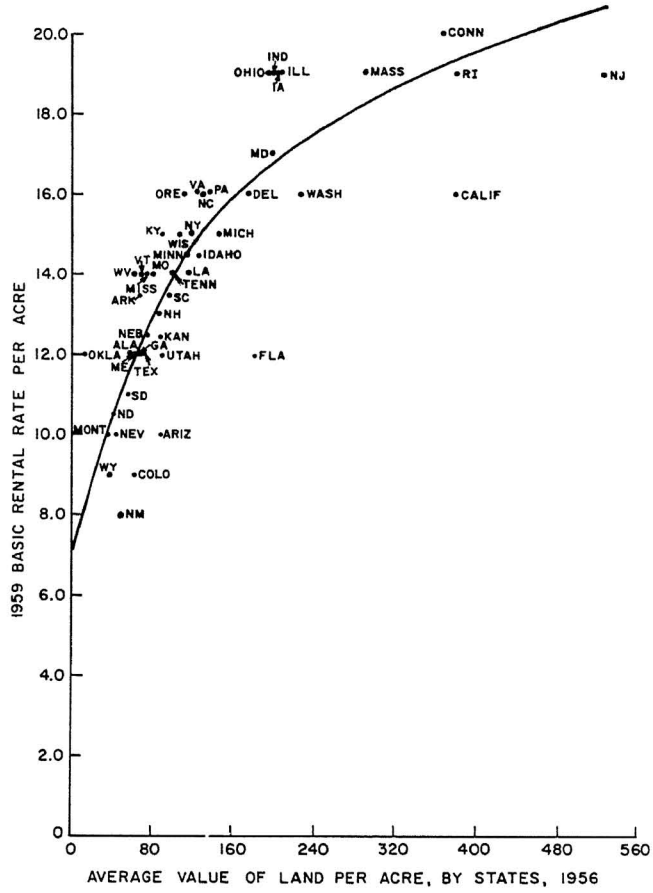
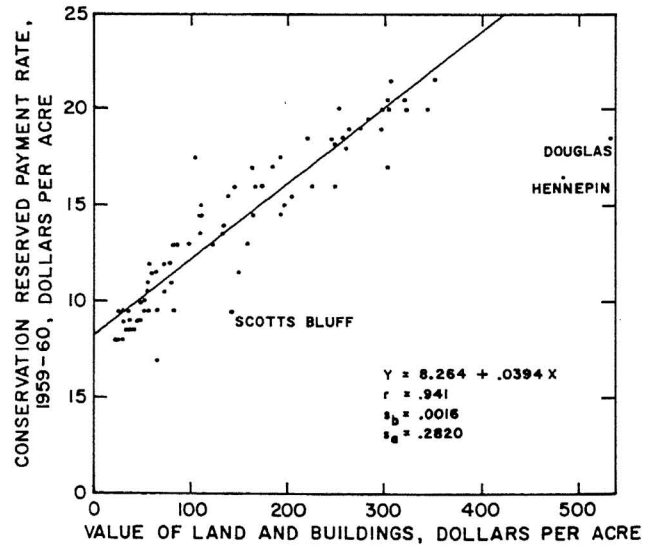


Fig. 13—County Data From a Sample of 80 Counties in the Dakotas, Minnesota, Nebraska, and Iowa.



[35]H. E. Conklin and J. V. B. Rice, "The People Who Have Land in the Soil Bank in New York State," Dept. of Ag. Econ., Cornell Univ. Ithaca, New York, February, 1961. See also Marlowe Taylor,"The Conservation Reserve Program in New Mexico" Res. Dept. 54, USDA, and Ag. Exp. Sta., New Mexico State Univ. pp. 23-24.

According to a report by the General Accounting Office, 23 percent of the estimated 23 million acres under Conservation Reserve contracts in June 1959 had been previously devoted to hay and pasture, had been idle or summer fallowed, or had a history of crop failure.

[36]Christensen and Aines, *op. cit.*, p. 26.

[37]*Ibid.*, p. 26.

TABLE 11-PERCENTAGE OF CROPLAND IN THE 1960 CONSERVATION RESERVE[1] AND THE 1961 FEED GRAINS PROGRAM,[2] BY REGIONS, UNITED STATES.

Region	1960 conservation reserve	1961 feed grains program
	Percent	Percent
Northeast	5.3	16.3
Corn Belt	3.1	23.4
Lake States	7.5	20.9
Appalachian	3.9	24.7
Southeast	9.3	15.6
Delta States	10.5	15.7
Southern Plains	9.8	26.7
Northern Plains	6.7	26.3
Mountain	8.2	25.8
Pacific	3.0	23.4
United States	6.2	23.4

[1]Total cropland reported by 1954 Census of Agriculture (6).

[2]Percent of base acreage for corn and grain sorghums in feed program.

Source: R. P. Christensen and R. O. Aines, "Economic Effects of Acreage Control Programs in the 1950's"; Agricultural Economic Report No. 18. USDA, ERS, FED. pp. 11 and 50, October 1962. Data on the feed grains program direct from USDA.

eral land retirement programs; the rental rates could be set more closely in line with profit-producing ability, so that good, medium and poor land alike would go into the program, as in fact it did into the emergency feed grain programs.

The tendency for poor land to be put into the Conservation Reserve program, and the fact that 70 percent of this land was in whole farms, caused a drastic reduction in the number of farms and farmers in some low-yield areas. Participation in New Mexico, for example, was 35 percent. This retirement of low-yielding land appeared to be in line with long-run goals of the most efficient location and utilization of productive resources for the nation as a whole, but it had a severe effect on the community schools, stores, churches, etc., in some of these areas. This was not true of the specific commodity programs, which took a bite out of each participant's farm but did not accept more than 40 percent of any one farm.

Costs

The "payments approved for rental and conservation measures" (most for seeding to grass) under the Conservation Program in 1960 totaled $367 million.

The USDA estimates that the reduction in value of crops produced per dollar of rental payment averaged $2.80 in 1960.[38] This is more than twice as high as the $1.20 per dollar of program cost estimated above for the 1961 emergency feed grains program.

Why was this?

The costs of land retirement depends not only upon the amount of land that is withdrawn but also upon the accompanying adjustments in the other agricultural inputs. We shall first examine the conditions for the individual farmer for participation in the Conservation Reserve as they bear upon the costs of retiring different grades of land.

Conditions for Individual Participation in Land Retirement Programs

For the individual farmer, certain capital and labor inputs are fixed with respect to Soil Bank participation, and others are variable. For example, the depreciation on his machines may be a production cost which cannot be terminated upon entering the Conservation Reserve, whereas fuel and lubricant costs can be terminated. To make Soil Bank participation more profitable than crop production for the individual farmer, the Conservation Reserve payment must cover all of his fixed production costs. The extent to which certain costs are fixed or variable with respect to Conservation Reserve participation varies from farm to farm. A farmer who has no off-farm job opportunity may treat his own labor as a fixed cost, whereas, a farmer who does have an off-farm job opportunity may treat his own labor as a variable cost. When two farms are similar in other respects and one exhibits lower fixed costs of production than the other,

[38]Christensen and Aines, *op. cit.*, p. 27. Estimates of this type are, by necessity, based upon assumptions about the crop acreages and yields that would have been experienced without the Soil Bank. The estimates reported by Christensen and Aines were based upon the assumption that the base period crop acreages on the Soil Bank land would have been continued in the absence of the program. They also assumed that the Soil Bank did not result in any changes in crop acreages and labor and capital used on the land not in the program. Alternative sets of assumptions may produce different estimates of the amount of production-reduction per dollar of payment. For example, a different estimation procedure indicated a $1.71 reduction in production per dollar of Soil Bank rental payments for five midwest states in 1960. (See: Heifner, Richard G., The Conservation Reserve Program as a Means of Controlling Agricultural Production, unpublished Ph.D. thesis, Iowa State University, 1963). The USDA estimate was selected for use in this report as the most widely accepted estimate pertaining to the country as a whole.

the farmer with the lower fixed costs will find Conservation Reserve participation profitable at a lower payment rate than the other farmer will.

Land Productivity and Land Retirement

Certain capital and labor costs, such as seedbed preparation and planting costs, tend to be approximately the same for the same crop on soils of differing productivities. We would expect such costs to absorb a smaller fraction of total product on the more productive land than on the less productive land, leaving a larger fraction of the total product to be imputed to land as rent in the more productive areas. This is illustrated by figure 14, Section A, based on hypothetical data, where the line T-T' shows the relation between total costs and total product. If this is the case, and the government paid only for the rent earned by the land, the cost of eliminating production by means of a land rental program would tend to be higher on the more productive land than on the less productive land.

Figure 14, Section B, based on county 1959 census data from a sample of 80 counties in five midwest states, provides some empirical confirmation of the relationships between costs and productivity hypothesized in figure 14, Section A. The region studied included Iowa, Minnesota, Nebraska, North Dakota and South Dakota.[39] The cost estimates were constructed from regression analyses of the various individual costs. The figure illustrates the tendency for land rent to be larger in proportion to gross product for the more productive land than for the less productive land in the region.

From the results illustrated in figure 14 some conditional comparisons can be made between the costs for retiring various grades of land. For example, for land with a gross product of $20 per acre the indicated rent constitutes about 15 percent of gross product. For land with a gross product of $40 per acre the indicated rent makes up approximately 22 percent of gross product. If production can be controlled by paying only for the rent earned by land, each dollar in payments would eliminate $6.66 worth of production on land with a $20 gross product or $4.54 worth of production on land with a $40 gross product. However, if the payment must cover not only land rent but also part of the capital and labor costs, the production-reduction per dollar of payment is less and the difference in the cost of controlling production on different grades of land declines. If the government payment must cover machine depreciation and operator and family labor costs in addition to land rent, a dollar of payment would eliminate approximately $1.60 worth of production on all grades of land.

[39]The data and the methods employed in analyzing them are explained in Appendix A of R. Heifner, The Conservation Reserve Program as a Means of Controlling Agricultural Production, unpublished Ph.D. thesis, Iowa State University, 1963.

Fig. 14a—The Hypothetical Relationship Between Costs and Total Product for Land.

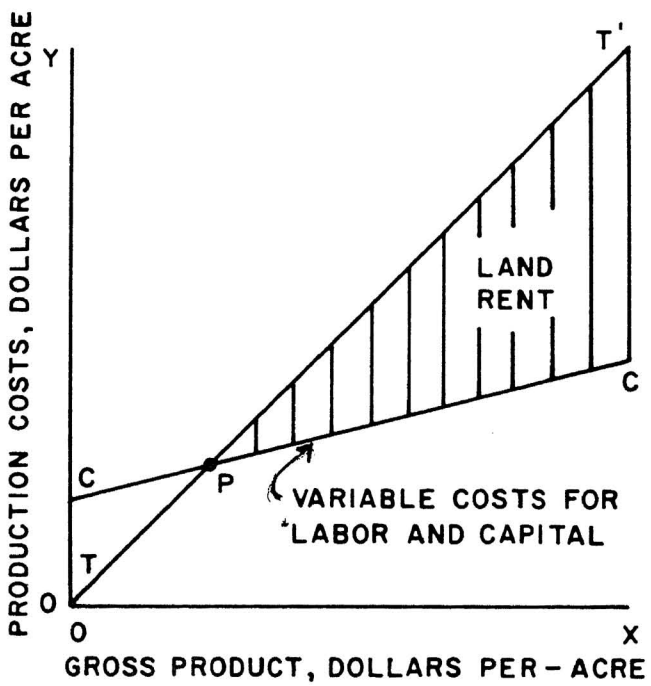
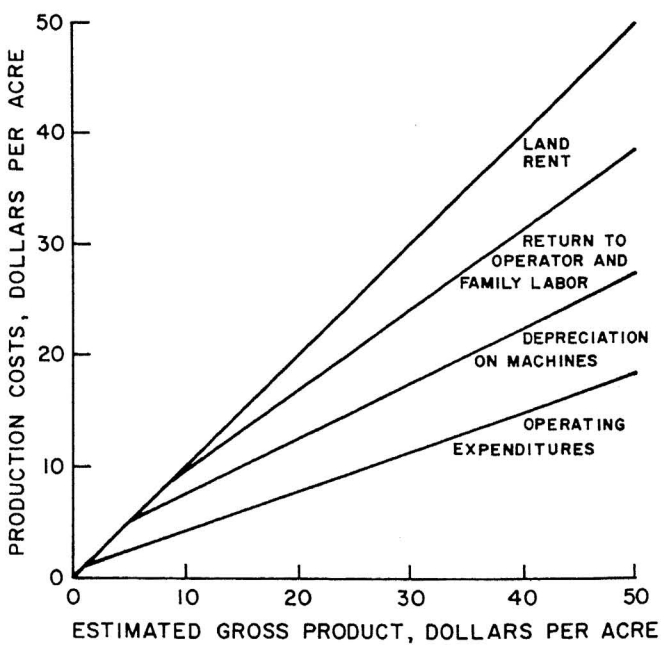


Fig. 14b—The Structure of Crop Production Costs for Five Midwest States.



The fixed costs of production tend to vary among farms of the same productivity because of differences in the flexibility of the labor and capital used on the various farms. Consequently, the cost of eliminating production differs among farmers of a given level of productivity. A program to reduce production at the minimum cost to government would not concentrate solely on poor land or on good land initially, but would take out those farms or fields in each area on which production could be reduced at the lowest cost. Over the long run, as all inputs except land become variable, participation would become more concentrated in the less productive areas.

Effects of Various Payment Rate Formulas for Land Retirement

Once the average level of land retirement payments is established, the problem of setting payment rates for areas of differing productivities arises. Three different rate formulas may be considered. First is a constant level of payment per acre for all grades of land. Second is a formula prescribing payment rates that are proportional to land rent. Third is a formula which sets rates proportional to gross product or yield.

The constant rate formula would involve paying more per bushel of production eliminated on the poor land than on the good land. It would result in high levels of participation in the less productive areas and low levels of participation in the more productive areas.

A program to reduce production at the lowest government cost per bushel of production eliminated would offer the same payment for an additional bushel of production control on each farm or each field. This would imply the use of a payment rate formula which takes into account differences in productivity. The choice between a formula which sets rates proportional to land rent and a formula which sets payment rates proportional to yield or gress product depends upon how the program is expected to affect capital and labor. To reduce production at the lowest cost per bushel, payments should equal the same percentage of the value of the inputs removed from agriculture on each type of land. For a program where there is a tendency for the labor and capital to stay in agriculture, payment rates should be approximately proportional to land rent. For a program that effectively removes labor and capital along with the land, payments should be set proportional to gross product or yield. For a program which removes only part of the labor and capital from agriculture some intermediate rate formula is indicated.

An alternative goal for land retirement would be to maximize the transfer of labor and capital out of agriculture in order to promote more efficient use of resources in the long run. This would imply setting payment rates proportional to the value of capital and labor removed; i.e., paying the same price for a dollar's worth of capital and labor removed on each farm. For a part-farm program which has little effect on capital and labor transfer, this goal is not relevant. For a whole-farm program which is effective in transferring capital and labor, this goal implies setting payment rates proportional to capital and labor costs on the various grades of land.

The payment rates for the Soil Bank in 1959 and 1960 were based upon a composite index reflecting both net productivity and gross productivity, plus a constant for all grades of land intended to cover costs which would continue on the retired land. The constant had the effect of raising payment rates in the low producing areas and lowering rates in the high producing areas relative to the rates indicated by the productivity index by itself. This resulted in higher payments per bushel of production eliminated on the less productive land than on the more productive land. It appears that more production control could have been obtained at the same government cost if the constant had not been included in the rate formula. Participation would have been somewhat lower in the less productive areas but would probably have remained higher there than in the highly productive areas.

Eventual Net Cost of the 1961 Emergency Feed Grain Program

It was estimated earlier in this report that the 1961 emergency feed grain program reduced production worth $1.14 per dollar of program cost—less than half as high as the estimate of $2.80 for the 1960 Conservation Reserve program.

But this is not the final cost. Much of this initial cost will be offset in future years, because the USDA will incur lower storage costs because it will not have to store the feed grain that was not produced under the program. An additional reduction in cost will result because the USDA will not incur any loss from deterioration of the grain in storage.

The extent of this reduction is indicated in a recent report by the Secretary of Agriculture:[40]

"Grain surpluses are being reduced. CCC holdings of wheat and feed grains are over one billion bushels less than the peak quantities held in 1961 before the new programs were effective. It means that 1964 budget for carrying charges on these grains will be $264 million less than was spent in fiscal 1961 . . . or $770,000 per day . . . and $813 million less than our costs would have been this year had we done nothing to change the pre-1961 programs."

[40]Orville L. Freeman, Farm Forum, Minneapolis, Minnesota, Raddison Hotel, 12 Noon, March 4, 1963.

The final cost of the feed grain program as compared with the cost of a "no controls" program, therefore, will depend on the eventual recovery value of grain which would have been acquired in CCC inventory. No one can say in any exact sense that this would have been. The CCC realized an average of $.995 per bushel for 498.8 million bushel of corn sold to meet certificate demands through January 26, 1962. But on the basis of experience in earlier years, a value of only $.53 per bushel could be expected. The net cost of the program therefore depends on what the recovery value of the corn and other feed grains will be, and this is unknown.

The same sort of thing is true of the cost of the Conservation Reserve program, although the question is more complicated there on account of the larger number of commodities concerned. It is almost impossible, therefore to make an accurate comparison of the eventual costs of the two programs.

APPRAISAL OF POSSIBLE NEW METHODS TO CONTROL THE INPUT OF LAND

The foregoing over-all appraisal of the two chief kinds of methods that have been put into effect to control the input of land in agriculture paves the way for us to appraise several other methods that have been proposed but not adopted.

Mandatory Land Retirement

Most of the programs for controlling the input of land in the United States have been voluntary: participation has been obtained by the government offering inducements to farmers to participate, such as renting acres out of production.

This is not the only way to do it. A mandatory (that is, compulsory) program might be considered—mandatory in the same sense that wheat marketing quotas, for example, are mandatory in that if more than two-thirds of the producers of the commodity vote for programs, they become compulsory on all producers of the commodity.

A mandatory land retirement program of this sort is no idle dream. It actually reached the stage of proposed legislation in 1962, but was defeated in the House by a narrow margin.

The reason for considering this mandatory feature is that without it, non-participants increase their acreage and production of the crop and nullify part of the reducing effect of the program. Accordingly, rental payments have to be set high so as to induce high participation and keep the numbers of participants low; in addition, the percentage acreage reduction has to be set high, since part of the reduction will be reduced by the increase in acreage and production by the non-participants.

What might be the effects and costs of a mandatory land retirement program of this sort? And what difficulties might stand in the way?

Estimated Effects and Costs of a Mandatory Program. The mandatory feature applied to programs that would take out parts of farms like the current feed grains and wheat programs, would have one obvious and immediate effect: It would prevent non-participants from expanding their acreage and offsetting part of the reduction affected by the participants. The programs would not "hold an umbrella" of price supports over non-participants as well as participants; there would be no non-participants.

Accordingly, the percentage reduction required by the program could be set lower than with a purely voluntary program. Under the 1961 feed grains program, for example, the government paid for, and participants took out, 25.2 million acres; but non-participants increased their acreage, and the net reduction was only 20.4 million acres. If the program had been mandatory, the government would only have had to pay for the 20.4 million acres.

At $31 per acre, this would have reduced the cost of the total rental payments $142 million, that is, from $782 million to $640 million. This is a substantial sum; it amounts to a reduction of about 18 percent.

In addition to this reduction in numbers of acres paid for, a mandatory program might get along on a lower rental rate per acre than a voluntary program, or none at all.

It is difficult to estimate how much lower the rate might be under a mandatory plan than under a voluntary plan. Under a voluntary plan, the rate has to be high enough to provide more income than the other alternative of staying out of the plan and increasing production. But under a mandatory plan, the second alternative would not be open; the only alternative would be no program at all. This would be less attractive than the alternative of staying out of a voluntary program and capitalizing on the beneficial effects of the participants' reduced production. Accordingly, it seems likely that a compulsory plan could get along with lower rental rates than a voluntary plan.

One other consideration, however, might work in the opposite direction. The rental rate would have to be high enough to induce two-thirds of the producers to vote for the plan, in order for the program to be mandatory on all producers. Under the 1961 voluntary feed grains program, producers representing about 56 percent of the feed grain producers signed up. The rate under a mandatory plan would have to be high enough to get the percentage of farmers who would vote for the plan up to two-thirds. This would tend to offset some of the

reducing effect of the rate of the other considerations given above.

It would be possible to cut this Gordian knot simply by legislation. That is, legislation might be passed similar to the earlier voluntary acreage-allotment programs, under which the government did not make rental payments at all. The inducement to participate consisted in the fact that participants were eligible for CCC loans at rates above open-market levels, while non-participants were not eligible.

This form of reward could not be used under a mandatory plan, since there would be no non-participants then. But some form of reward might be needed to induce congressmen to vote for the plan and farmers to support it. Perhaps the direct payments tried out on a small scale in the 1963 feed grains and wheat programs (at 18 cents per bushel for corn and for wheat) could be used.

Direct payments might work better than price supports above long-run market levels, for two reasons:

1. They would not reduce consumption, since prices would seek their own levels in the market place.

2. They would have less stimulating effect on production, if they were limited, as the 1963 direct payments are, to base quantities. If the payments were thus limited to base quantities, farmers would get the benefit of increased returns (prices plus payments) on their base quantities, but the lower open-market prices on quantities in excess of their base would be marginal prices which would offer less inducement to increase production than the prices plus payments for the base quantities.

Thus, a mandatory program (1) would cost substantially less than a voluntary program. (2) It would share the burdens and benefits of the program more equally among producers, and (3) it could make good use of direct payments limited to base quantities.

One of the offsetting features of the plan is its inflexibility. It would compel all producers of the crop concerned to cut their acreage by the same percentage. This would impose a rigidity on the cropping pattern that would be ill adapted to the continuous changes that require each individual farmer to make the adjustments on his particular farm that suits that farm best.

The big question about the plan is whether farmers, who prize freedom highly, want to subject themselves to the "regimentation" involved. This is basically a question of values, which are discussed in a later section.

Governmental Purchase of Land

Another method of reducing the input of land in agriculture would be for the government to purchase land and take it out of crop production rather than renting it out of production as under the Conservation Reserve, feed grains, wheat and other crop programs. Governmental purchase rather than rental has some interesting features that are worth investigating, to show what the administrative problems, the effects, and the costs might be.

Earl Heady has estimated that if the $8.1 billion loss on operations of the CCC from 1933 to 1960 had been used to buy land at $100 per acre, 81 million acres could have been purchased.[1a] The $213 billion of price support and conservation expenditures would have bought 213 million acres at $100 per acre, or half that many acres at $200 per acre. If this land had been held out of production, this would have solved the farm surplus capacity problem, and the government could recoup most or all of its costs by selling the land later for other uses. In that case, the annual cost would be only the comparatively small annual interest charges until the land was sold.

A government purchase program would necessarily be a long-run program, because of the permanent nature of the purchase operation. It should, therefore, be in line with the nation's long-run objectives of economic development and efficiency. What kind of purchase program would this be?

One answer might be—a program that would retire the poorest land—the least productive (low-yield) land in the physical sense. If this basis were chosen, a lot of the dry land in the Western Plains would be retired.

But this program would not necessarily make economic sense. The land might be yielding a net return of only $5 per acre. But if one farm family could handle 2,000 acres, the family would be making a good living, which would be cut off by government purchase and retirement of the land.

A manufacturer with many plants who needed to retrench might consider closing down the least efficient ones. But this would not necessarily be the best course for him to follow. The least efficient plants might have no alternative uses, whereas some of the more efficient ones might be easily convertible to other uses. The guiding principle, therefore, would be to close down the plants which could be converted to other uses with the least reduction in net income to the company as a whole.

Thus, the land to be retired would not simply be the least productive land; the net returns from its alternative (non-agricultural) use might be zero. Again we can use dry land in the Western Plains, yielding a net return of $5 per acre, as an example. Its alternative (non-agricultural) use might be zero. But land in the Southeast yielding $8 per acre might yield $3 per acre in forest, or in use for recreational purposes. The nation would be better off to retire this land in the Southeast from crop production and put it into trees than to retire the dry land in the West and put it to no use at all.

Thus, the land to be retired would be, not necessarily the poorest land, but rather the land where the alternative (non-agricultural) use would bring a return most nearly equal to its present return, whether that return be high or low. This land would as likely be in one place as in another, in one value bracket as another, and in one yield bracket as another.

The government purchase program that would reduce crop production with the least idling of productive resources, therefore, would be one that not merely took land out, but took it out and put it into non-agricultural uses that were the closest possible to full agricultural use of the land. The measure of fullness of use in this case would be net return.

If for example, the government purchased land and only let it lie idle, then the least idling of resources would be attained by idling poor land. But if the purchased land could be put to productive non-agricultural use, still less idling of resources might be attained by buying good land and putting it to a non-agricultural but still almost as highly productive alternative use.

What might some of these alternative uses be?

Alternative Uses for Land. In some areas, one alternative use might be sites for homes. This represents an intensive use, more valuable in most cases than use for crops. But it is very small in percentage terms, and not much can be done in any case to expand it.

Another use is forestry. Particularly in some areas in the Southeast, it offers a fairly close alternative to crop production. It is well suited to government land, since it is a long-range undertaking, whereas private industry is usually more interested in quick returns.

Another use is recreation. As population increases, income rises, and more people have more income and vacation time to spend, the demand for space for recreation increases rapidly. It offers a fairly good alternative to crop production, in or close to areas of heavy population. The 1962 Food and Agriculture Act provided a cropland adjustment pilot program for converting farmland into recreational uses. This points a direction in which much progress might be made.

One difficulty with these alternatives is that they would require careful governmental selection of the areas to be purchased, and careful governmental management and operation in the non-agricultural uses of the areas afterward. This would be an enormous administrative undertaking, running against the long tradition in the United States of getting land out of government hands and into private hands. At best, it would take years to get it going on any very large scale.

Alternatively, the program might be managed, not as a program directed from Washington, but as an adjunct to the RAD program. The initiative in this case would come from the local areas as they developed their programs. To the extent that these programs included the diversion of some land from agricultural to non-agricultural uses, Federal funds could be used to finance the purchase and development of the land. But so far, the RAD programs have not included much planning of this sort, and only small effects could be expected from it at an early date.

A more likely approach would be for the government to offer a land purchase program only one step removed from the Conservation Reserve rental program, which has proved to be administratively feasible. That one step would consist of offering to rent the land or purchase it, whichever the participant preferred.

If that were done, it seems likely that the purchase prices would need to bear a fairly close relation to the rental rates area by area and farm by farm. The simplest plan would be to keep these rental rates close to the rates in the present Conservation Reserve program. If this were done, mostly poor land would be purchased, much as mostly poor land has been rented under the Conservation Reserve program.

This would be the simplest plan, because the government could more easily let its purchases of poor land lie idle, or be used only for extensive grazing, than its purchases of good land. Zero use, or grazing, would be a much closer alternative to cropping, on poor land than on good land. There would be less waste of resources than if good Illinois or Iowa land were purchased and kept idle by the government, and less pressure for the government to put its idle land into some non-agricultural use.

Estimated Effects and Costs. The costs of a governmental land purchase program clearly would be high, up in the billions. To buy something costs several times as much as to pay a year's rent for it.

Yet it may not cost much more to buy a farm than to rent it for 10 years (many of the farms in the Conservation Reserve were rented for 10 years). And offsetting the cost of buying something is the value of the thing purchased. In accounting terms, a liquid asset (money) is exchanged for a fixed asset (in this case, land) with no effect on the total assets.

A man who buys a house ordinarily takes out a mortgage, a form of bond, to cover most of the value of the house. Similarly, the government could pay for the land by issuing land bonds. These bonds would represent, not particular farms but the value of the land in the whole purchase program. Then with the passage of time, the government would sell parts of its land for recreation, for forests, and other nonfarm uses, as occasion arose, and retire part of the bonds.

One disadvantage of a land purchase program is the slow rate at which it would proceed. Only about 11 mil-

lion acres come on the market for voluntary sales or transfers per year. The government would need to proceed slowly—not necessarily at a small percentage of this 11 million acres, because the government purchases would be a different element and would in most cases be focused on different land from that which ordinarily comes on the market—but still slowly, so as not to drive up the price of land unduly. To use a rough figure for illustration, say 5 million acres of purchases per year, that would take 12 years before 60 million acres were purchased.

Easements

Another method of taking land out of agricultural production would be for the government to rent land, not out of agricultural production completely as under the feed grains and wheat programs, but only out of the production of certain specified crops, for a specified period of time.

"Easement provisions probably could be more easily and effectively enforced than zoning regulations and might be more acceptable to local residents, but certainly that would be more expensive to the government. The two procedures are, in large measure, alternative methods of achieving similar objectives, and their relative merits need further exploration. Where good lands are interspersed with submarginal lands, the purchase of permanent easements would permit of releasing such lands for stated periods in time of need and thus would probably provide more positive control and greater flexibility than zoning. Furthermore, this could be a Federal program, whereas zoning ordinances are local and subject to many uncertainties both as to adoption and enforcement."[41]

Another form of easement would be to rent cropland out of crop production but let it be used for grazing. This would avoid idling cropland completely; it would merely put the land to a lower agricultural use, for the production chiefly of beef, a product for which the demand is steadily expanding. This would be an attractive proposition in many parts of the Great Plains, where a good deal of cropland is really marginal or submarginal for crops but would make good grazing land.

KINDS OF PROGRAMS FOR DIFFERENT OBJECTIVES

Economic theory and actual experience both indicate the different kinds of land retirement programs that are best adapted to achieve different specified goals.

The Short-Run Goal of Reducing Surplus Stocks.

To make the exposition as clear as possible, we will use some analogies with industry, using them for illustration only and not for proof.

If General Motors, for instance, found itself with a short-term accumulation of stocks of unsold cars, it could attain the short-run goal of reducing the stocks by reducing production (if union contracts permitted) by (a) laying off all its workers and stopping production completely for a short time, (b) laying off its least efficient workers but keeping the rest producing, or (c) putting everybody on a shorter work week.

The third method, putting all its workers on a shorter work week, would create the least personal upheaval among most of the workers.

Agriculture in its present situation, where its highest priority objective is to reduce its surplus stocks, is attacking the problem by retiring land under the feed grains and wheat programs in a manner that is analogous to the third method in industry—putting all its workers on a shorter work week. This creates less disturbance than laying off some farmers completely, as in effect the Conservation Reserve did, if those farmers are likely to be needed back in agricultural production again in a few years.

A program of this sort aims to take out about the same percentage of good, medium and poor land, as the feed grains programs did. This spreads the reduction relatively evenly over the country.

If agriculture were run from the top like General Motors, it could order a uniform reduction of say 15 percent in acres on all the producers of the specific crop concerned. Since agriculture is not run like General Motors, it has proceeded with feed grains and wheat programs of a voluntary nature, inducing participation by commodity loans above open-market prices, by rental payments, and so on. The preceding section has shown how using mandatory methods, mandatory on all producers of the crop concerned, could reduce the money costs of the program and improve effectiveness. But the fact that mandatory controls were defeated (though only by a narrow margin) in 1962, indicates that they run counter to some deeply held values of a free-enterprise nature, while running along with other values of an equity nature.

The Long-Run Goals of Efficiency and Economic Development.

The program outlined in the preceding section is suitable for attaining the short-term goal of reducing stocks, but it conflicts with long-run goals of efficiency and full economic development for the country as a whole.

The agricultural problem is regarded by many as a chronic tendency for production to outrun demand at acceptable prices. If General Motors were confronted by a chronic problem of that sort with its automobiles, it would not attempt to solve it by going to a shorter work week. Rather it would survey all its plants and workers, and begin to convert as many of its plants as possible to

[41] "The Wheat Problem: Which Road Shall We Take?" A statement by the NPA Agricultural Committee and a report by Murray R. Benedict. Planning Pamphlet No. 118. pp. 18-19, August, 1962.

the production of other products, and to close down its least efficient plants which could not be converted. It would retrain some of its workers for other lines in its plants, and lay off the least efficient workers which it could not retrain, abandoning them to unemployment insurance or to government retraining programs.

In agriculture, where there is a chronic tendency for production to outstrip demand, the Conservation Reserve type of programs, permitting the taking out of whole farms, would be best adapted to this kind of situation. The Conservation Reserve program is analogous to converting whole plants—whole farms in the case of agriculture—to the production of other products, or closing them down completely.

This kind of program would not need to have rental rates set relatively high for poor land, as they were in the Conservation Reserve, so as to take out mostly poor land. The kind of land that needs to be taken out of agricultural production, from the long-run point of view, is that which can be most easily (with the least loss of revenue) be converted to another use. This other use in some cases will be recreation; in other, country home building sites; in others, forest, and so on. It is only when there is no alternative use other than idleness that it is most efficient to take out the poorest land.

B. CAPITAL

Capital is a large input in agriculture, and it has been growing larger with the passage of time.

Table 1 and figure 3 earlier in this report show the changes that have been taking place. They show that the value of the capital input in agriculture had grown by 1960 to more than half of the value of the total inputs in agriculture, offsetting the decline in the inputs of the other two factors—land and labor. Land has declined moderately, and labor has declined substantially, from nearly two-thirds of the total inputs in 1870 to less than one-third in 1958.

The value of the input of capital is now greater than the value of the inputs of the other two products combined. On this basis, it is a likely factor to consider in an attempt to limit agricultural production by limiting inputs.

AMOUNT OF CAPITAL INVESTMENT IN UNITED STATES AGRICULTURE.

Capital inputs in agriculture may be divided into two major groups (1) capital *investment,* and (2) operating expenses (exclusive of labor). Capital investment, exclusive of the investment in land, amounted to more than 10 percent of total farm inputs in 1960.

Table 12 shows capital investment in agriculture annually since 1950. It shows that roughly a third of the capital expenditures goes for each one of three main items. These are (1) buildings, (2) tractors, trucks, and automobiles, and (3) other machinery and equipment. These items totaled more than $4 billion in 1961.

These are all items of capital *investment* in agriculture. Their relation to production depends heavily upon the length of time involved. If this investment were curbed, some time would elapse before this curbing would have any substantial effect on production. More repairs would be made to carry the old buildings and machinery along; the old tractor would run another year or two, and so on. In order for control of capital to be effective quickly, repairs would need to be controlled, too.

AMOUNT OF CURRENT FARM OPERATING EXPENSES.

The second kind of capital expenditure is current farm operating expenses. Exclusive of hired labor, these totaled over $16 billion in 1960. The data for the years since 1950 are given in table 13.

Feed and Livestock Purchased

The first and largest of these items is feed purchased. It amounted to $4.8 billion in 1961. This input for livestock feeders to a large extent is an output for grain producers. It has been subjected to some degree of control by the loan and storage operations of the CCC, and by the 1961 and 1962 emergency feed grain programs.

Livestock purchased is the third largest operating expense; it was $2.5 billion in 1961. This also is a farm output item for many farms and ranches. It has been subjected only indirectly to control, through the effects on feeder prices of the federal grain programs.

The USDA exercises a good deal of control over feed available, and thus over livestock purchased for feeding, through its CCC commodity loan and storage operations. Most of the immense stocks of feed grains that the CCC now owns would otherwise have been fed to livestock. But storage is only a temporary control measure; the CCC cannot go on accumulating stocks and withholding them from livestock feeding indefinitely, and when it does return them to feeding, the stocks will add to the then current supplies.

The acreage control programs, at least the emergency 1961 and 1962 feed grain programs, have had some effect in reducing production. They are expensive, and their

TABLE 12-FARM CAPITAL EXPENDITURES AND NET INVESTMENT, 1950-60

Year	Gross capital expenditures on: Buildings[a] Farm operators' dwellings	Buildings[a] Service buildings and other structures[b]	Buildings[a] Total	Motor vehicles Tractors	Motor vehicles Trucks	Motor vehicles Automobiles[c]	Motor vehicles Total	Other machinery and equipment[d]	All items	Total net investment in farm plant and equipment[e]
	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars
1950	739	841	1,580	769	520	446	1,735	1,279	4,594	1,858
1951	788	897	1,685	807	481	469	1,757	1,383	4,825	1,599
1952	885	1,008	1,893	755	396	284	1,435	1,368	4,696	1,297
1953	848	965	1,813	722	437	588	1,747	1,225	4,785	1,265
1954	788	896	1,684	570	452	404	1,426	1,120	4,230	614
1955	766	872	1,638	689	406	397	1,492	1,099	4,229	507
1956	740	842	1,582	525	432	326	1,283	998	3,863	141
1957	737	840	1,577	522	488	392	1,402	976	3,955	70
1958	700	796	1,496	677	500	443	1,620	1,328	4,444	496
1959	747	879	1,626	763	505	387	1,655	1,348	4,629	494
1960	767	841	1,608	496	486	379	1,361	1,178	4,147	3

[a]Includes new construction, additions, and major improvements.
[b]Includes fences, windmills, wells, and dwellings not occupied by the farm operators.
[c]For farm business use (40 percent of total farm purchases of automobiles).
[d]Excludes harness and saddlery and other minor types of equipment charged to current expense in the "miscellaneous" category of table 14H.
[e]Gross capital expenditures on all items minus total depreciation and other capital consumption.

Source: The Farm Income Situation, Economic Research Service, U. S. Department of Agriculture, FIS-183 July 1961, p. 49.

TABLE 13-CURRENT FARM OPERATING EXPENSES, 1950-60

Year	Feed purchased	Livestock purchased	Seed purchased[a]	Fertilizer and lime	Repairs and operation of capital items[b]	Miscellaneous[c]	Total excluding hired labor	Hired labor[d]	Total
	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars	Million dollars
1950	3,283	2,004	531	978	2,921	1,750	11,467	2,678	14,145
1951	4,144	2,437	561	1,085	3,187	2,079	13,493	2,800	16,293
1952	4,331	1,917	594	1,229	3,433	2,117	13,621	2,802	16,423
1953	3,770	1,320	560	1,245	3,435	2,100	12,430	2,793	15,223
1954	3,906	1,563	542	1,274	3,353	2,076	12,714	2,716	15,430
1955	3,840	1,530	577	1,256	3,423	2,167	12,793	2,736	15,529
1956	4,058	1,629	537	1,241	3,617	2,303	13,385	2,733	16,118
1957	4,083	1,957	529	1,280	3,773	2,286	13,908	2,785	16,693
1958	4,592	2,711	526	1,338	3,795	2,436	15,398	2,895	18,293
1959	4,808	2,723	506	1,460	4,002	2,665	16,164	2,962	19,126
1960	4,848	2,508	538	1,463	3,986	2,728	16,071	2,935	19,006

[a]Includes bulbs, plants and trees.

[b]From table 16H.

[c]Includes short-term interest, pesticides, ginning, electricity and telephones (business share), livestock marketing charges, containers, milk hauling (1946 to date), irrigation, grazing, binding materials, tolls for sirup, horses and mules, harness and saddlery, blacksmithing and hardware, veterinary services and medicines, net insurance premiums (crop, fire, wind and hail) and miscellaneous dairy, nursery, greenhouse, apiary, and other supplies.

[d]From table 15H.

Source: The Farm Income Situation, ERS, USDA, FIS-183, July 1961, p. 46.

future is uncertain; but they constitute one means for controlling the supply of livestock, particularly hogs, which depend largely on feed grains.

Fertilizer

One of the most directly output-increasing capital inputs is fertilizer. The rapid increase in the quantity of fertilizer since 1944, together with the increase in plant nutrients per ton, is shown in the earlier section on land in table 6. The number of acres fertilized, and the percentage of each crop acreage, as shown herewith in table 14. Table 15 presents similar data for the State of Iowa for 1960. Figure 15 illustrates regional and national trends in use of commercial fertilizers, 1940-1959.

Increased applications of fertilizer have been one of the chief causes of the increase in agricultural production in recent years. It is estimated that if no fertilizer had been used, the total production of crops, hay and pasture in 1954 would have been 30 percent less than it actually was.[42] Accordingly, a reduction in fertilizer use of about one-third would have been about enough to eliminate excess production, estimated at about 8 percent.[43]

One of the main reasons why the use of fertilizer has increased so rapidly is that the price of fertilizer has risen less than the prices received by farmers for the products they sell. Fertilizer prices have declined relative to the prices received by farmers. Table 16 shows the index of the price of fertilizer since 1944 and the index of prices received by farmers. Table 6 earlier showed how the plant-nutrient content of these fertilizers has increased since

[42]D. B. Ibach and R. C. Lindberg, "The Economic Position of Fertilizer Use in the United States," USDA, ARS, Ag. Inf. Bul. No. 202. November 1958.

[43]The reduction in fertilizer would need to be proportionately greater than the reduction in production to be expected, because the application of fertilizer encounters diminishing returns.

TABLE 14-USE OF FERTILIZER ON CROPS AND PASTURE, 1954[a]

Crop	Acreage fertilized	Percentage of harvested acreage fertilized	Plant nutrients used	
			Total	Rate per acre fertilized
	1,000 acres	Percent	1,000 tons	Pounds
Corn	46,873	60	1,888	80
Cotton	10,948	58	572	105
Tobacco	1,515	97	226	298
Sugar beets	776	92	49	127
Sugar cane	299	96	14	92
Soybeans	3,075	18	102	69
Drybeans	838	54	23	58
Peanuts	1,001	62	43	86
Potatoes and sweetpotatoes	1,144	78	171	299
Vegetables	3,642	63	381	209
Fruits	2,422	58	182	151
Grain sorghums	2,719	27	54	40
Intertilled crops	75,252	51	3,705	98
Wheat	14,034	28	452	64
Oats	11,559	31	402	71
Barley	3,222	27	82	52
Rye	322	25	12	76
Rice	2,055	84	59	64
Close-growing crops	31,192	28	1,007	65
Hay and pasture[b]	18,235	11	748	82
All crops and pasture	124,679	30	5,460	88

[a]Based on census data supplemented by estimates made by State committees. Crops included account for about 98.5 percent of all fertilizer used on farms in 1954.

[b]Includes hay and rotation pasture in all regions and permanent pasture in the humid regions.

Source of table: Ibach and Lindberg, op. cit., p. 8.

TABLE 15-ESTIMATED USE OF PRINCIPAL PLANT NUTRIENTS, BY CROPS, STATE OF IOWA, 1960[a]

Crop	Acreage fertilized (acres)	Percentage of harvested acreage fertilized (percent)	Plant nutrients used Totals (tons)	Plant nutrients used Rate-Acre (pounds)
1. Corn	6,356,049	51	251,336	60
2. Wheat	47,526	29	776	40
3. Soybeans	72,673	3	530	15
4. Hay and cropland pasture	325,023	5	11,107	80
5. Other crops-totals	567,828	13	13,443	21
a. Sorghum	31,700	35	850	57
b. Oats	450,790	10.7	11,508	54
c. Barley	2,778	10	70	58
d. Rye	890	10	23	58
e. Flax	1,172	10	16	26
f. Potatoes	2,946	100	146	84
g. Sweet Potatoes	395	100	30	160
h. Popcorn	5,345	35	47	20
i. Vegetables for sale	19,363	100	213	42
j. Vegetables for home use	40,845	75	326	21
k. Small fruits	0	0	0	0
l. Tree fruits	2,171	25	11	10
m. Nursery-green house	6,609	100	125	51
n. Miscellaneous, unspecified	2,791	50	39	30
6. Items 1 to 5, include	7,374,099	29	277,192	75
7. Permanent open pasture	45,678	1		
a. Improved permanent open pasture	45,678	13	684	30
8. Totals (items 6 and 7).	7,419,777	25	277,876	75

[a]Source: Data collected and provided by Agronomy Department, Iowa State University, October 1962.

TABLE 16-INDEXES OF PRICES PAID FOR FERTILIZER AND OF PRICES RECEIVED BY FARMERS, 1944-1961

(Base Period 1910-1914 = 100)

	Prices paid for fertilizer	Prices received by farmers
1944	118	197
1945	120	207
1946	121	236
1947	134	276
1948	146	287
1949	150	250
1950	144	258
1951	152	302
1952	156	288
1953	157	255
1954	158	246
1955	155	232
1956	152	230
1957	153	235
1958	153	250
1959	152	240
1960	152	238
1961	154	240

Source: Agricultural Statistics, 1961 U. S. Department of Agriculture, pp. 474, 475.

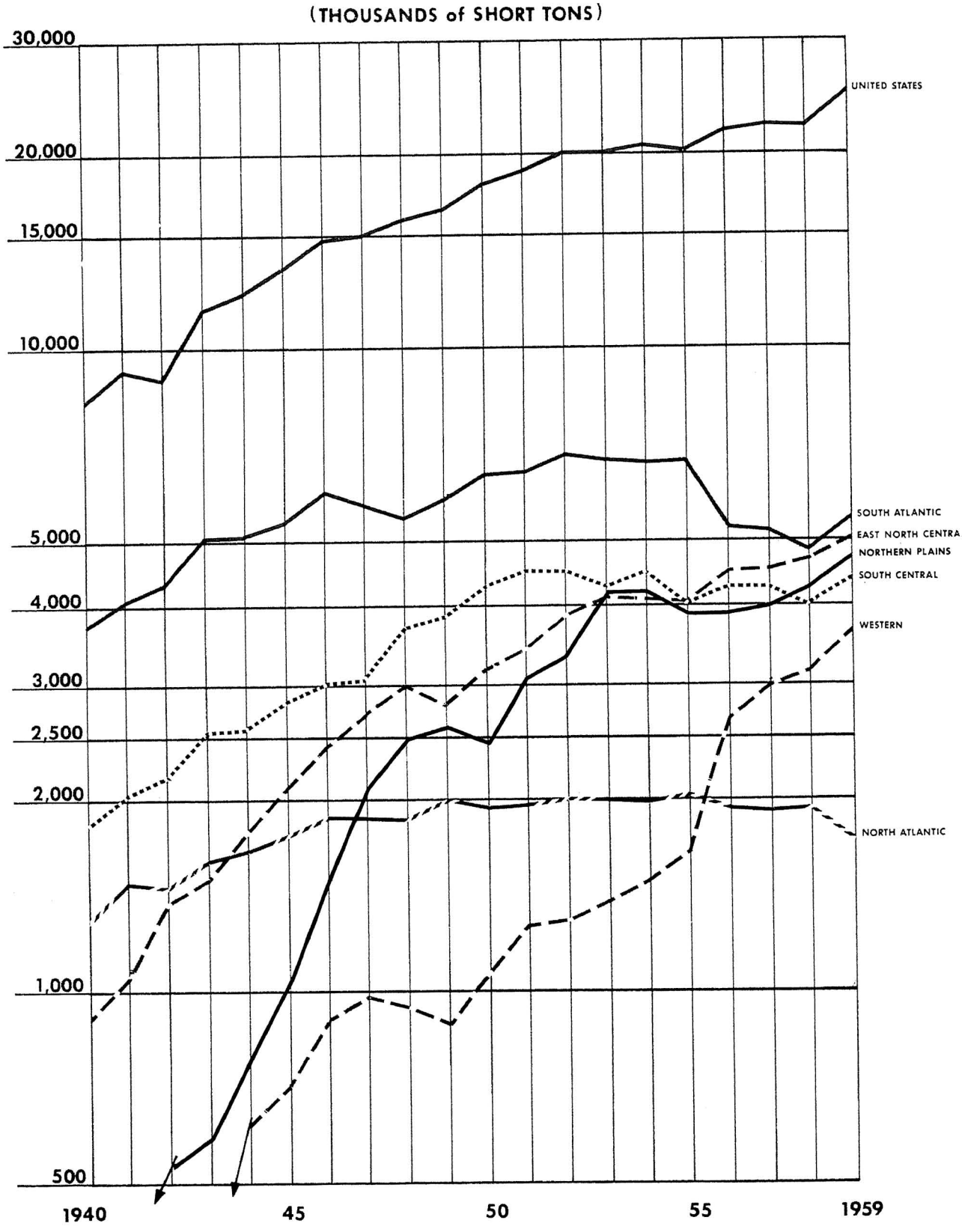
1944. It showed that the percent of phosphoric oxide in all fertilizers has remained almost constant, but that the percent of the other nutrients has risen 50 percent for some and more than 100 percent for others. It is evident from these tables that fertilizer prices per ton of plant nutrient have declined substantially relative to the prices that farmers receive for their products, since 1944. The ARS, USDA, estimates that the average cost of fertilizer per unit of plant nutrients declined from about $2.02 in 1945 to $1.92 in 1961; this is a decline of 5 percent. Meanwhile the index of prices received by farmers rose 13 percent. Thus the price of fertilizer declined, relatively, 18 percent.

This suggests that one way to reduce the use of fertilizer would be to raise its price. This increase in price, however, would have to be quite substantial. The marginal return per dollar of fertilizer input in 1954 averaged nearly $3.00.[44] On that basis, for most crops, the price of fertilizer would need to be more than doubled before its use would become uneconomic.

More fertilizer is being applied now than in 1954, so the marginal return now, probably, is not so high as it was in 1954. If the price of fertilizer rose, say 50 percent,

[44]Ibach and Lindberg, *op. cit.*

Fig. 15—Fertilizer Consumption in the U. S. by Regions, 1949-50.



SOURCE: Agriculture Research Service, U.S. Dept. of Agriculture

and if farmers found that this made its use uneconomic at the margin, the use of fertilizer would decline, and crop production would decline along with it. This reduction in application of fertilizer would reduce agricultural production directly and quickly.

A Tax on Fertilizer

One of the simplest ways to raise the price of fertilizer would be to put a tax on it.

If the *demand* for fertilizer were completely inelastic —completely unresponsive to changes in price—the tax would all be passed on to farmers. That is, farmers would pay the price plus the tax, and use as much fertilizer as before. Production would therefore continue as great as ever.

At the other extreme, if the *supply* of fertilizer were completely inelastic, the tax would all be absorbed by the fertilizer manufacturers. In this case, also, fertilizer production and use would continue as great as before.

These, of course, are unrealistic "ifs", brought in here only for clarity, to establish two bench marks, two extremes. It seems likely that the truth lies between these limiting cases—between the two extremes; probably, the demand for and the supply of fertilizer both have considerable elasticity. In this situation, the production and consumption of fertilizer would decline, and the burden of the tax would be divided between the fertilizer producer and the consumer, inversely in proportion to the relative elasticity of the supply and the demand.

Under these conditions, a stiff tax on fertilizer would reduce production. But the application of a tax of this sort would undoubtedly run into political difficulties. A tax that was heavy enough to reduce fertilizer consumption and therefore, production substantially would be strongly opposed by the fertilizer companies. Farmers also would object; each farmer would fear that his profits would decline along with his declining use of fertilizer. The fertilizer tax plan could reduce agricultural production, but it probably would run into severe political objections, which we as economists do not know how to solve.

Table 17 shows that if no fertilizer had been applied in 1954, the estimated total cost per bushel of producing corn in the Corn Belt in 1954 would have been $1.18 per bushel. With fertilizer applied at the rate actually used

TABLE 17-ESTIMATED YIELDS AND COSTS PER ACRE AND PER UNIT, WITH NO FERTILIZER, AND WITH FERTILIZER APPLIED AT 1954 RATES AND AT RATES CALCULATED TO RESULT IN MINIMUM UNIT COSTS, FOR SELECTED CROPS AND REGIONS

Crop and region	Rate of plant nutrients per acre		Estimated yield per acre[a]			Estimated total cost per acre[b]			Estimated total cost per unit of yield[c]		
	1954	For minimum unit cost[a]	With no fertilizer	At rate applied in 1954	At rate for minimum unit cost	With no fertilizer	At rate applied in 1954	At rate for minimum unit cost	With no fertilizer	At rate applied in 1954	At rate for minimum unit cost
	Pounds	Pounds	Bushels	Bushels	Bushels	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Corn:											
Corn Belt	86	265	34.4	60.2	101.8	40.48	49.68	70.66	1.18	0.83	0.69
Mississippi Delta	85	260	9.3	27.2	50.1	38.05	47.64	67.35	4.09	1.75	1.34
Oats:											
Corn Belt	83	137	32.3	67.5	84.3	20.85	30.18	36.21	.65	.45	.43
Appalachian	89	220	11.1	45.8	81.7	19.66	31.32	47.76	1.77	.68	.58
Wheat											
Corn Belt	78	213	10.3	32.2	57.4	37.33	46.95	63.77	3.62	1.46	1.10
Soybeans:											
Mississippi Delta	25	150	14.1	17.2	29.2	28.59	31.29	44.87	2.03	1.82	1.54
Hay			Tons	Tons	Tons						
Corn Belt	80	235	1.36	3.54	7.46	25.11	36.14	60.07	18.46	10.22	8.05
Mississippi Delta	50	178	.88	2.33	4.93	28.04	35.15	52.82	31.86	15.09	10.71

[a]Based on generalized estimates of response to different rates of fertilizer.

[b]All costs except fertilizer based on surveys undertaken to characterize farm organization, income, and costs on type-size farms in different areas.

[c]Costs per acre divided by yield per acre.

Source of table: Ibach and Lindberg, op. cit., p. 20.

in 1954, the cost would have been only 83 cents. Higher rates of application would reduce the cost to a minimum of 69 cents. Costs in the Mississippi Delta would have been reduced from $4.09 to $1.34.[45]

The reductions in cost of production for other crops are similarly great. They range up to two-thirds in some cases. Figure 16 illustrates the extent to which use of fertilizer might profitably be carried in planning for highest net return per acre.

Accordingly, a program to reduce the use of fertilizer, if it succeeded, would be very uneconomic. It would increase the cost of producing corn, for example, substantially. This is not the direction in which economic progress lies.

Machinery and Repairs

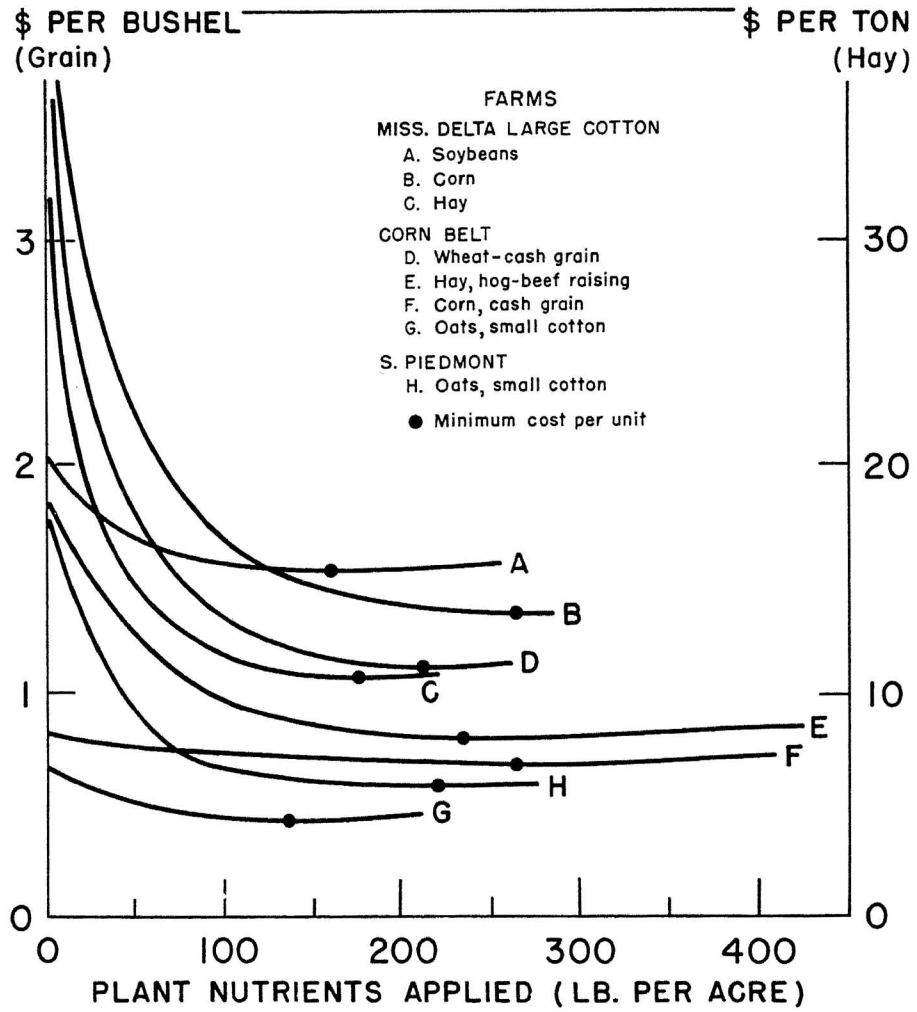
The problems involved in controlling the purchase and use of farm machinery, and repairs to keep it opera-

[45]Estimates of yields, production, acreage-fertilizer and minimum cost combinations for indicated production levels are based partly on estimates of response to fertilizer contained in U. S. Dept. Agr., Agr. Handbook No. 68, *Fertilizer Use and Crop Yields in the United States,* December 1954.

Estimates of response assume average weather and some improvement in other practices. These estimates are preliminary; they are subject to revision pending availability of more complete information on yield response.

We are endeavoring to develop relationships of this nature on the basis of more recent data, so far, without success.

Fig. 16—Fertilizer Use and Unit Cost—Selected Regions.



tive, are similar to those for controlling the use of fertilizer.

A tax on farm machinery and repairs would be highly unpopular with farm machinery manufacturers and with farmers as well. Manufacturers would resist anything that would reduce their sales, and most farmers feel that farm machinery prices are already too high.

Gasoline and Diesel Fuel

The problems involved in controlling the use of gasoline and diesel fuel differ in one important respect from those involved with fertilizer and machinery.

Gasoline and diesel fuel for use in tractors on farms and ranches at present is exempt from the tax that is applied to gasoline sold at regular filling stations. If, therefore, a program of reducing the capital inputs into agriculture were extended to motor fuel used in agricultural production, the program would not need to be implemented by imposing a tax on the motor fuel; it could be implemented simply by removing the existing tax exemption.

The removal of the existing tax exemption on tractor fuel would undoubtedly be strongly opposed by farmers and ranchers. It might get some support from other business or manufacturing groups who use fuel in their business operations, but it is problematical whether this support would be great enough to overcome the resistance of farm groups. In any case, the farm demand for tractor fuel probably is so inelastic that removing the tax exemption would not have much effect on production. It would not do much more than rouse farmers' ire.

EFFECTS OF REDUCING THE INPUT OF CAPITAL ON ECONOMIC EFFICIENCY.

The preceding discussion has pointed out the personal and political problems involved in reducing the input of capital into agriculture. The purpose of the present section is to outline the economic effects if these problems were solved and the inputs of capital were substantially reduced.

It is apparent on the face of it that in one important respect, reducing the input of capital would be similar to reducing the input of land. Even if reducing the input of capital were not offset by an increased input of other factors, and it did reduce agricultural production, it would do so in a way that would conflict with long-run goals of efficiency in agriculture.

Capital is mobile; or more accurately, the flow of new capital is mobile, so that it tends to flow wherever the return to capital is the highest. Reducing the flow of capital into agriculture would make capital in agriculture relatively scarce, and this would increase the return on the capital in agriculture above its present levels. This in turn would make the problem of reducing the flow of capital into agriculture more difficult; it would increase the pull on capital to flow into agriculture.

In concrete terms: If capital had been earning a marginal rate of return of 4 percent in agriculture, and the flow of capital into agriculture were reduced so that the marginal rate of return in agriculture rose to 5 percent, that would make it more attractive for capital to flow into agriculture; correspondingly, that would make it more difficult to reduce the flow.

This would be similar to the present situation with land, where the reduction in the input of land into agriculture is one of the things that has raised the price of land 83 percent over the past 12 years and made it more expensive and difficult to keep it out of agricultural production.

The effects on production efficiency in both cases are serious.

Reducing the input of capital into agriculture would be a step backward, toward the hand plow, the hoe, and the flail. More labor would be required in agriculture, since the physical productivity per man would be reduced. It is an open question whether the depressing effect of the low physical productivity on farm incomes would be offset by the higher prices that would result if the program were successful in reducing production. If it were not, then the program would conflict with the chief goal in agriculture—to increase income per farmer.

REDUCE RESEARCH IN PRODUCTION TECHNOLOGY.

Another possibility, which has actually reached the form of a proposal in some instances, is to curtail or eliminate the investment in farm technological research and education.

"This would mean the elimination of funds for technological research and education such as those of the land-grant universities. Since much of the research is now carried on by commercial companies, however, it also might be necessary to remove the research expenditures of these companies from income tax exemption or to remove patent protection involving farm technology. Since much educational work also is done privately, it would be necessary to establish a tax on farm magazines, radios, television, and other sources which disseminate new ideas."[46]

This would not only be impractical; it would run directly counter to the underlying economic policy of the

[46]Eber Eldridge, "The Farm Problem . . . What are the Choices?" No. 8. "Restricting Capital and Technology?" Iowa State University. 1961.

whole country, which is to increase production by the application of new research at as high a rate as possible.

CONFLICT WITH LONG-RUN NATIONAL GOALS.

Reducing the input of capital into agriculture, thereby retaining more labor in agriculture, would reduce efficiency in the rest of the economy as well as in agriculture.

One of the measures of the standard of living, in a closed economy, is the percentage of the people who are engaged in agriculture. If most of the population is engaged in agriculture, only a small part of it is free to produce the nonfarm products—bathtubs, radios, automobiles, education, etc.—that make up the standard of living. Conversely, the fewer the people in agriculture, the more can be producing the other things which together with food and clothing make up a high standard of living.

It needs to be emphasized that the same thing is true, only less obviously, when the input of land is reduced. Reducing the input of land also lowers returns to farm labor (including management) in agriculture, and lowers efficiency in the rest of the economy as well as in agriculture. Programs that reduce the input of land in agriculture are more feasible than programs to reduce the input of capital. Both kinds of programs, however, reduce the efficiency of production in agriculture and in the economy as a whole, and therefore conflict with the long-run goals of the nation.

Programs to reduce the input of capital, like programs to reduce the input of land, would be (or in the case of land, are) spectacular and impressive, in the short run. But they are both like a habit-forming drug that only covers up the real disease, and adds the problem of getting off the drug to the problem of the fundamental disease, which runs on unchecked or is made worse by the drug.

There is no reason to believe that even if the inputs of land or capital, or both, could be controlled, that this would solve the farm problem. This becomes clear if we look at the problem analytically, in terms of economic principles.

Prices are the results of supply and demand. They are the evidence or symptoms of a disease of supply or demand or both. When prices are deemed unsatisfactory (a "problem") the reasons for this problem lie in the relationship between the supply and the demand. The price program set up to implement the price policy deals with the *results* or effects of supply or demand, not with the supply or demand itself. The price program may temporarily alleviate the symptoms, but it makes the causative supply or demand disease worse.

This disease is not cured even by production-control programs to back up the price-support programs. These production-control programs may seem to be getting at the disease better than price-support programs, because they deal with production rather than with prices. But even they do not deal with supply (the whole curve); they deal only with production (a point on the supply curve) leaving the position of the supply curve unaffected. The over-production problem is only pushed back, not solved. And the program works against itself; the more it pushes production back and raises prices, so that production becomes more profitable, the more it has to pay farmers not to produce.

There is a still more basic point. Production-control programs deal only with the production of farm products. Evidence is accumulating that this is really not the basic problem; it is becoming clear that the chief problem is not an excessive supply of farm products; it is an excessive supply of some of the factors of production, principally farm labor and management.

This evidence is somewhat complicated and diverse. It is presented in the next section, or labor.

C. LABOR AND MANAGEMENT

Labor is the next most important input into agriculture after capital. Table 1 and figure 3 early in this report show that the input of labor (30 percent of total inputs) is only about half as high as the input of capital, but it is about twice as high as the input of the third factor, land.

Table 1 and figure 3 also show that the input of labor in agriculture has been declining rapidly. This is shown also directly by the farm population statistics in the following table.

FARM POPULATION, 1940-60 (REVISED)

Year	1,000	Year	1,000
1940	30,547	1951	21,890
1941	30,118	1952	21,748
1942	28,914	1953	19,874
1943	26,186	1954	19,019
1944	24,815	1955	19,078
1945	24,420	1956	18,712
1946	25,403	1957	17,656
1947	25,829	1958	17,128
1948	24,383	1959	16,592
1949	24,194	1960	15,635[a]
1950	23,048		

[a]Includes Alaska and Hawaii.

Source: USDA, "Farm Population, Revised Estimates for 1941-1959," Economic Research Service, Washington, D. C., August 1962, p. 8.

These farm population data show the decline that has been taking place in the demand for farmers, as improved technology such as larger implements, better seed, more fertilizer, herbicides, pesticides, etc., enable farmers to increase their production per man more rapidly than the demand for farm products has increased.

The number of farmers in the United States now is only half as great as the number in 1920.

Fewer and fewer farmers are needed; yet the farm birth rate is higher than the rate required to maintain a constant farm population. The supply of farmers continues to exceed the declining demand for them. A tremendous out-migration of farmers from agriculture and into urban jobs has been taking place, but it has not been fast enough; farm incomes remain depressed below nonfarm incomes. Farm labor and management is a factor, an input, that surely needs to be reduced.

Early Heady in fact regards the continuous oversupply of farmers as the chief problem in agriculture. "Agriculture's fundamental problem is not supply of product but supply or quantity of factors,"[47] chiefly labor and management.

The supply of cropland was reduced by the Conservation Reserve, feed grains, wheat and other programs in recent years, and this had some reducing effect on crop production. The initial effect of this reduction was to increase *gross* farm income. But the distribution of this increase in farm income among the factors of production, land, labor, and capital, was determined by what had been done to decrease the supply of each one. And since only the supply of land had been reduced, and nothing had been done to reduce the supply of the other factors, labor and capital, economic theory would lead one to expect that most of the increase in income in the short run, and all of it in the long run, would go to land, and none to labor and capital.

Table 18 and the accompanying charts show what has actually been happening.

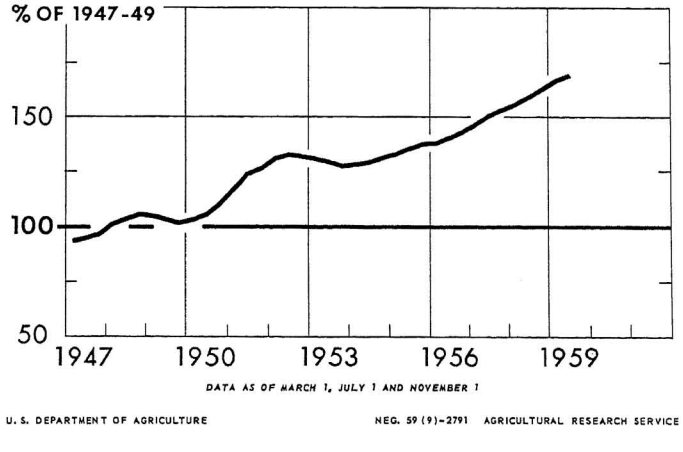
TABLE 18-VALUE OF FARM REAL ESTATE PER ACRE, UNITED STATES, 1947-1962[a]
(1947-49 = 100)

Year	Index numbers
1947	94
1948	101
1949	105
1950	103
1951	119
1952	132
1953	132
1954	128
1955	133
1956	138
1957	147
1958	156
1959	168
1960	173
1961	177
1962	183

[a]Farmland and buildings as of March 1.

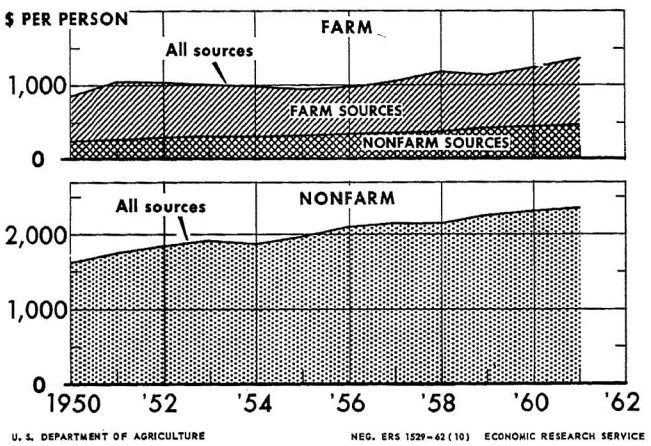
Source: Farm Real Estate Market Developments. June 1962, p. 26. USDA.

Value of Farm Real Estate Up Sharply During 1950's.



[47]Earl Heady, Need for Land and Resource Adjustment, Chapter I, Dynamics of Land Use. pp. 2-3. Center for Agricultural and Economic Adjustment, Iowa State University, Iowa State University Press, Ames, Iowa, 1961.

Farm and Nonfarm Personal Income per Person.



This table and chart show that the value of land per acre rose in a steady climb from an index base of 100 in 1947-49 to an index of 183 in 1962.

Table 19 and figure 16 show that the average per capita personal income of the farm population, from farm sources, rose from $640 in 1947-49 to $899 in 1961; this is a rise of 40 percent. Another measure of farm income is realized net income per farm, which rose from $2,708 in 1947-49 to $3,360 in 1961, a rise of 24 percent.

Thus, the value of land rose nearly twice as much, in percentage terms, as per capita farm income rose; the value of land rose nearly more than 3 times as much as farm income per farm. And this was in the short run.

In the computation of these net farm income data, the interest which farmers pay for the funds they borrow to run the farm is deducted from the gross farm income as one of the costs. But the imputed interest which farmers could realize on their own funds that are invested in the farm, if they were invested elsewhere, is not deducted as a cost. Thus, a farmer who had $100,000 of his own money invested in his farm might have a net income of $6,000. But if he sold his farm and invested the proceeds in government bonds, he could get an income from them of $3,000 or more without working at all. His labor and management return on his farm was actually only $3,000. His net farm income rose from 1947-49 to 1961 partly because the value of his land and buildings rose. His actual net income from his farm labor and management rose less than the 24 percent shown above.

The shortcomings of these United States average per capita farm income data have frequently been pointed out. The United States farm income includes the very small farm incomes from the 1.3 million "farms" that are not really farms at all, but only country residences, with small acreages, for urban people earning their main income from urban jobs and for retired people who like to live in the country. These small "farm" incomes add very little to the numerator, total United States farm income, but the 1.3 million small "farmers" add a great deal to

TABLE 19-TOTAL PERSONAL INCOME, PERSONAL INCOME OF THE FARM AND NONFARM POPULATION, AND POPULATION ESTIMATES BY RESIDENCE, 1934-61

Year	Total personal income[1]	Personal income of farm population, all sources	Farm as percentage of total personal income	Population[2]		
				Total	Farm	Farm as percentage of Total
	(Million dollars)	(Million dollars)	(Percent)	(Thousands)	(Thousands)	(Percent)
1934	53,575	5,372	10.0	126,374	32,305	25.6
1940	78,680	7,632	9.7	132,122	30,547	23.1
1950	228,468	20,376	8.9	151,683	23,048	15.2
1951	256,692	22,840	8.9	154,360	21,890	14.2
1952	273,071	22,267	8.2	157,028	21,748	13.8
1953	288,259	20,036	7.0	159,636	19,874	12.4
1954	289,825	19,001	6.6	162,417	19,019	11.7
1955	310,196	18,314	5.9	165,270	19,078	11.5
1956	332,943	18,582	5.6	168,176	18,712	11.1
1957	351,423	18,829	5.4	171,198	17,656	10.3
1958	360,259	20,507	5.7	174,054	17,128	9.8
1959	383,936	18,976	4.9	176,912	16,592	9.4
1960	398,714	19,598	4.9	179,811	15,620	88.7
1961	414,281	20,308	4.9	182,777	14,788	8.1

[1]Department of Commerce series, excluding Alaska and Hawaii.

[2]Farm population as of April 1 and total population as of July 1 are taken as the closest readily available approximations of their respective annual averages. Estimates exclude Alaska and Hawaii.

Source: "Farm Income Situation" ERS, USDA, FIS-187, July 1962, p. 41.

the denominator. Thus, the average per capita farm income shown by the USDA is substantially smaller than the actual average farm income per *regular commercial farm.*

An article published just as this bulletin was going to press analyses the situation by farm income groups. "Average operators' net cash income per farm increased by a fifth during 1949-59 and showed a slight gain even after an adjustment for changes in the cost of living. These and related averages, however, convey the false impression that incomes of individual farmers have made similar gains. The rationale for this interpretation is that fewer farmers mean a larger farm resource base for those who remain in agriculture; thus, the farm income 'pie' can be divided into fewer pieces.

"Actually, the income and farm resources that were contained in the farms that went out of agriculture, even if transferred to the farmers that remain, are too meager to affect appreciably either their farm resource base or their net income. To illustrate this point, the decrease of more than 1½ million in the number of farms marketing less than $2,500 of farm products during 1949-59 was associated with a decrease of only $1 billion in the value of farm products sold from this group. The decline in number of farms in all economic classes of less than $10,000 decreased the value of farm products sold from these economic classes of farms by only $2.5 billion. Due to the wide range and extreme right skewness of the farm income distribution, reductions in number of smaller farms over time can cause the mean income to increase even though incomes of the remaining farmers declined. All that is required is a greater proportionate decrease in number of farms (the denominator) than in farm income (the numerator).[48]

"During 1949-59, neither the substantial decline in the number of farms nor the rapid growth in business size of the remaining farms increased real net cash farm incomes. Real income shrank from two fifths to a fourth of gross receipts because of increased inputs and the decreased value of the dollar. Merely to maintain their farm incomes, farmers had to increase output by two thirds. Thus, despite the increase in farm size, real net income probably declined for all classes of farms. On smaller farms this decline was apparently offset by the increase in all off-farm incomes; but the total income of operator families on farms that marketed products valued at $5,000 or more probably declined sharply. Clearly. unadjusted statistical series on the number of farms of different economic classes are not always reliable indicators of farm income. As this article interprets the data, real net cash farm incomes on the larger commercial farms have decreased rather than increased."[49]

Income data for commercial family farms are compiled by type of farming areas, in another branch of the USDA; they show, for most types of farms, actually, a *decline* in net farm income since 1947-49. The data are shown in table 20.

These results confirm what one would expect on the basis of economic theory—that the benefits of a reduction in agricultural production achieved by reducing acreage went chiefly to the factor reduced, in this case land. This was true even in the short run; it is likely to be more true in the long run—and not a very long run, either.

The kind of supply control program that *would* benefit farmers rather than acres would be one that would be achieved by reducing the number of farmers rather than reducing the number of acres.

OVERSUPPLY OF THE HUMAN FACTOR IN AGRICULTURE.

Programs for controlling the input of land in agriculture, even if they were completely successful in bringing production in line with consumption, could not solve the farm income problem; for they would leave the supply of farmers as great as ever, and this large supply would continue to depress per capita farm income.

This situation may be represented in a supply and demand curve diagram with income per farmer (the "price of farmers") plotted up the vertical axis, and numbers of farmers plotted along the horizontal axis.

The demand curve, representing the demand for farmers, is inelastic, much as the demand curve for farm products is inelastic. And the curve has been moving to the left as production per farmer has been increasing more rapidly than the demand for farm products has been increasing.

The supply curve for farmers is more complicated than a simple straight or moderately curved line. It has a kink in it at the point of intersection with the demand curve, so that it is elastic upward to the right, but inelastic downward and to the left. As the demand curve moves to the left, the number of farmers in agriculture tends to remain large, because farmers engaged in farming find it difficult to pull out. Yet if the demand curve were to move to the right—if for example the flow of new technology were cut off—farmers would benefit very

[48]McElveen, Jackson V., "Farm Numbers, Farm Size and Farm Income" in *Journal of Farm Economics,* Vol. 45, No. 1, February 1963. pp. 9-10.

[49]For an analysis of capital gains as income, see Dale M. Hoover, "The Measurement and Importance of Real Capital Gains in United States Agriculture, 1940 through 1959," *Journal of Farm Economics,* Vol. XLIV, No. 4, November 1962, pp. 929-941.

TABLE 20-RETURN TO OPERATOR AND FAMILY LABOR, 1956-1961. (using current charge for capital).

Type-of-farming area	1947-49	1956	1957	1958	1959	1960	1961 (preliminary)
Dairy farms:							
Central Northeast	2,926	2,509	2,700	2,227	2,102	1,771	2,100
Eastern Wisconsin	1,883	1,098	1,038	436	919	386	1,203
Western Wisconsin	1,684	2,013	2,150	1,989	1,866	1,763	2,553
Dairy-hog farms:							
Southeastern Minnesota	2,960	2,496	2,013	1,892	1,190	559	1,748
Corn Belt farms:							
Hog-dairy	4,037	2,638	3,464	4,173	2,002	1,410	2,884
Hog-beef raising	2,504	1,376	1,693	2,541	599	123	873
Hog-beef fattening	8,199	3,075	4,181	5,791	2,322	619	2,888
Cash grain	6,388	5,660	2,083	1,854	153	937	2,896
Poultry farms:							
New Jersey (egg producing)	4,626	255	-320	-636	-4,336	2,570	1,989
Cotton farms:							
Southern Piedmont	2,781	656	600	1,595	734	332	991
Texas:							
Black Prairie	2,336	-314	286	1,244	526	-54	663
High Plains (nonirrigated)	5,137	815	4,169	5,818	3,923	5,410	9,856
High Plains (irrigated)	8,637	8,798	6,222	12,250	7,270	6,923	15,614
Mississippi Delta:							
Small	1,645	1,468	822	611	1,495	871	1,172
Large-scale	15,081	14,914	3,453	4,509	20,049	10,918	17,297
Peanut-cotton farms:							
Southern Coastal Plains	2,013	2,173	1,594	2,604	1,486	2,110	2,866
Tobacco farms:							
Kentucky:							
Tobacco-livestock (inner)	3,768	2,385	1,200	1,515	246	1,255	2,228
Tobacco-dairy (intermediate)	1,858	1,863	1,459	1,610	1,408	1,128	2,449
Tobacco-dairy (outer)	2,715	3,100	2,582	2,906	2,409	2,100	2,417
North Carolina:							
Tobacco-cotton	2,480	2,531	1,095	1,928	1,183	1,896	1,804
Tobacco-cotton(large)	2,564	2,907	670	1,876	929	1,971	1,632
Tobacco (small)	1,965	2,391	1,421	1,935	1,536	2,212	2,714
Spring wheat farms:							
Northern Plains:							
Wheat-small grain-livestock	4,980	5,298	1,993	3,758	156	1,866	-2,619
Wheat-corn-livestock	4,694	1,594	3,402	4,095	-407	2,436	2,549
Wheat-roughage-livestock	4,150	1,335	2,776	2,504	-984	2,616	-1,397
Winter wheat farms:							
Southern Plains							
Wheat	7,628	742	2,854	8,621	3,221	4,926	5,231
Wheat-grain-sorghum	6,978	-725	1,336	6,899	5,851	6,762	7,193
Pacific Northwest:							
Wheat-pea	8,026	7,341	6,263	440	6,824	281	716
Wheat-fallow	10,470	3,251	9,219	5,600	7,637	3,326	2,826
Cattle ranches:							
Northern Plains	3,833	-661	405	2,409	1,002	19	1,579
Intermountain Region	5,918	3,216	5,401	8,911	8,054	3,649	4,863
Southwest	1,720	-5,999	-1,187	1,530	536	-2,220	-832
Sheep ranches:							
Northern Plains	4,094	2,664	7,130	8,130	3,079	1,992	1,414
Southwest	403	-5,985	-1,196	764	402	-2,391	-2,839

Note: Small discrepancies exist between some years due to revisions of the data.

Source: Costs and returns on commercial farms, long-term study, 1930-57. U. S. Stat. Bul. 297. 1961. Farm costs and returns commercial farms by type, size, and location. U. S. Agr. Inf. Bul. 230. Rev. 1961, Rev. 1962.

little, because the birth rate on farms is high and a continuous excess of farmers is being produced each year. An increase in the demand for farmers would simply be met by a corresponding increase in the number of farm boys who would decide to stay in farming in response to only a small increase in "price" (income per farmer).

In this situation, production control alone can solve only part—actually, a small part—of the problem. It can raise *total United States* farm income, but it cannot deal effectively with the other part of the problem that results from the excessive supply of farmers and keeps income *per farmer* low. This excessive supply of farmers continues to depress the return to farmers—their per capita net income—just as an excessive supply of farm products depresses the prices of those products. Dealing with this part of the low farm income problem calls for measures to reduce the number of farmers.

The large supply of farm operators relative to the demand for them results from two things: (1) the high farm birth rate and difficulties that impede movement off farms—this keeps the supply of farm operators high; and (2) the decline in the demand for farm labor, largely as a result of rapid technological advance and mechanization—this reduces the demand for farm operators and farm labor.

The farm birth rate alone is high enough to result in a continuous increase in the number of farmers if all boys born on farms stay in farming. Farm births exceed farm deaths by about 400,000 per year.

The high birth rate on farms can be measured in another way. "Replacement indexes" show the number of young children present in a population group in relation to the number needed to replace the female population of childbearing age. An index of 100 (termed "unity") would signify exact replacement and a population potentially stationary in numbers.[50] In 1950, the United States replacement index figure for "all farm-operator households" was 168.[51] (The figure for commercial farms was 171). That is to say: the number of farm children was at least 68 percent higher than the number needed to maintain a stationary farm population.

The demand for numbers of farmers is declining, and farm practices have become more labor saving. Increased mechanization and machinery size have increased the size of farm that a family can handle. The average size of farm in the United States increased from 174 acres in 1940 to 215 acres in 1950 to 302 acres in 1959. The number of commercial farms dropped 21 percent from 1947-49 to 1955-57. The most efficient size of farm in Iowa now is about 350 acres.[52]

The farm population in the United States declined from a peak of more than 32 million in 1933 to about 15 million now. But the decline has not been rapid enough to keep ahead of the decline in demand for farmers.

For every 100 farm operators between the ages of 20-64 in the United States, there were 168 boys living on farms who reached the age of 20 in the decade 1950-1960. For every 100 farm operators between the ages 25-69, 135 farm boys reached age 25 during this decade. (U. S. Bureau of the Census, "Farm Population," Series Census-AMS, P-27, No. 22, 1956).

And this does not take into account the continual decrease in the number of farms. For the last five years this decrease has been at the rate of 89,000 farms per year, or about two farms per township.

According to a recent estimate, if present trends continue, only 10 to 15 percent of the farm boys reaching 20 between the years 1954-63 are likely to find good farming opportunities on farms which can net them more than $2,500 per year.[53]

This estimate may be too low. "During 1950-59, the number of young farmers with gross incomes over $10,000 increased by 156,000, far in excess of the 54,000 units with similar incomes which were made available by the withdrawal of older operators.

"This statement should not be interpreted to mean that there are plentiful opportunities in farming for young people. But it does mean that estimates of opportunities, based on expected retirements and deaths of operators of already existing 'adequate' units, are too low. The process of creating larger farm units is in part a result of the changes in size of farm made by younger operators soon after their start in farming."[54]

Earlier in the same paper, however, (on p. 54) the same author points out that Census data on the proportion of the farm boys entering farming decreased from a third from 1939 to 1949 to a fourth or less from 1949 to 1959. A projection of this downward trend, or even a horizontal trend after 1959, would be not much in excess of Shoemaker's estimate.

[50]Farm Population—Characteristics of Farm-Operator Households by Number of Young Children, USDA AMS—118 June 1956, p. 9.

[51]*Ibid.*, p. 25.

[52]Heady, Earl O., and Krenz, Ronald D., "How Big Will Our Farms Get?", *Iowa Farm Science,* Vol. 16,. No. 5, pp. 3-5, November 1961.

[53]Karl Shoemaker, "Opportunities and Limitations for Employment of Farm People Within and Outside of Farming." USDA Federal Extension Service Mimeograph, 1958.

[54]Kanel, Don, "Farm Adjustments by Age Groups, North Central States 1950-1959" in Journal of Farm Economics, Vol. 45, No. 1. February 1963, pp. 58-60.

TABLE 21-EDUCATION BASED ON FATHER'S OCCUPATION

Father's Occupation	Percentage of high school graduates who enter college	Percentage of college entrants who graduate from college	Percentage of high school graduates who also graduate from college
Professional and semi-professional	67	60	40
Managerial	50	55	28
White colar - clerical, sales, service	48	57	27
Factory, craftsmen, unskilled, etc.	26	58	15
Farmer	24	44	11

Source: Dael Wolfe; America's Resources of Specialized Talent, Harper & Bros. New York, 1954, p. 160.

What is needed to increase income per farmer on more than a temporary basis is a program to reduce the continuing excess of farmers that results from the high birth rate on farms.

In the past, the reduction in farm population came about not so much by established farmers moving out of farming, as by young farm boys and girls—potential farmers—refraining from going into farming. They choose other occupations instead of going into farming. This is much easier than going into farming and then trying to get out. For the future, then, the chief emphasis needs to be put on programs to reduce the inflow of potential young farmers into farming, more than on helping established farmers to move out. If farm boys and girls who will not be needed in agriculture are informed about job opportunities in other occupations and given education and training for those other jobs, they can move into them much more easily than older farmers can.

OBSTACLES TO MOBILITY.

The obstacles to mobility are considerable, however, even for young farm boys and girls. They are:

Insufficient General Education

Are farm raised youth well enough trained to compete with urban youth for town and city jobs?

The answer for most of them is "No." Farm-reared adults living in nonfarm places in the United States have more than their proportional share of low status and low income occupations.

Relative to the rest of the population, few farm children who graduate from high school go on to college. And a relatively high percentage of those who do start to college drop out and do not graduate.

The data given in table 21 show the educational handicap of farmers' children in the United States.

Our society is missing an opportunity to provide college training for many bright young rural people. Few if any of us would argue that there is an inherent difference in the mental capacity of rural and urban children.

Many farm youths are handicapped by a lack of high school education. Farm-reared young men and women have far less high school as well as less college education than those living off farms.[55]

Table 22 shows that farm-reared adults working in factories, offices, and shops include more than twice their proportionate share of persons with no more than a grade school education.

TABLE 22-LEVEL OF LAST COMPLETED YEAR OF EDUCATION. (IN PERCENT)

	Grade school	High school	College	Total
Farm-reared	60	31	9	100
Nonfarm-reared	27	54	19	100

Source: Freedman and Freedman: "Farm-Reared Elements in the Nonfarm Population of the U. S. A.," Rural Sociology, Vol. 21, No. 1, March 1956, pp. 50-61.

The lack of education shows up in the earning power of farm-reared people living in towns and cities. Table 23 shows that they have more than their proportionate share of low status and low income occupations.

Insufficient Training for Urban Jobs

If as suggested above, there are good opportunities in farming for only about 15 percent of the boys growing

[55]Vocational training for rural youth, NPA Agricultural Committee, September 1960, Special Report No. 58, pp. 6-7.

TABLE 23-FAMILY INCOME OF ADULT NONFARM POPULATION IN 1952 (IN PERCENT)

	Family income						
	Less than $2,000	$2,000-$4,000	$4,000-$5,000	$5,000-$7,500	$7,500-$10,000	$10,000 or more	Total
Farm-reared	30	40	12	14	3	1	100
Nonfarm-reared	11	39	17	21	7	5	100

Source: Freedman and Freedman, ibid.

up on farms, the other 85 percent need to move into better paying urban jobs, and they need proper training for those jobs.

Yet at present, the greater emphasis is still placed on "voc-ag" training for the 15 percent who can remain in farming. What is needed is greatly expanded "voc-ind" training facilities for the 85 percent who will go into agricultural-related or industrial urban jobs.

This is not a call for less voc-ag training for farm boys; the country needs more college-trained farmers. It is a call for more voc-ind training for farm boys and girls, five to ten times greater in scale than the present voc-ag set-up.

Technical high schools which can provide this kind of training are located in most of the big cities in the United States. They are not, however, a part of the general educational systems of the states; they are set up to serve only a portion of the students in a particular city's school district. Iowa has only one in the whole state, located in Des Moines.

Other states have a variety of these and other types of technical schools, but there is need for greatly increased facilities of this type all over the country.[56]

Lack of Clarity and Unanimity of Means for Attaining Objectives Among the Different Programs.

Even the programs to help excess farmers move off farms are not clear and unanimous in the means that they are working out to attain their objectives.

Three different programs concerned with rural development have been set up:

Rural Development Program	(RDP)
Rural Areas Development Program	(RADP)
Area Redevelopment Program	(ARP)

The first of these, the Rural Development Program, was passed by Congress in the latter part of 1955. On January 11, 1959, President Eisenhower had asked Secretary of Agriculture Benson to "give special attention to the problems peculiar to small farmers." The results of this study appeared in an agricultural bulletin which was published in April 1955, and entitled, "Development of Agriculture's Human Resources." It was transmitted to Congress as House Document #149. This became the basis of the Rural Development Program.

Its main feature is the emphasis placed on self-help.

In 1961 Don Paarlberg, formerly Assistant to the Secretary of Agriculture under the Eisenhower Administration, published an appraisal of the first six years of the rural development programs.[57] In his opinion the main achievement of the RDP was the fact the problems of small farmers which previously had been glossed over were brought into the open so that they could be better understood. He listed four of the most important problems which the program faced:

1. The existence of rural poverty.
2. The poor utilization of human resources in agriculture.
3. The failure of the price support programs to help the small operator.
4. The limited opportunity which now exists in agriculture to operate farms.

His major criticism of the program were the lack of sufficiently large funds and the tendency to dilute the program's effect over too large an area.

With the change from the Eisenhower to the Kennedy Administration in 1961, the Rural Development Program was replaced by the Rural Areas Development Program in which the original plan was broadened and extended.

Rural Areas Development is a program of the USDA. It is not to be confused with the Area Redevelopment Program which is a program of the U. S. Department of Commerce. The USDA has certain assigned responsibilities in Area Redevelopment, but these responsibilities are distinct and separate from RAD. Area Redevelopment came into existence with the passing of Public Law 87-27, known as the "depressed areas bill," on May 1, 1961. Four hundred and sixty-eight (468) predominantly rural-farm counties in 38 states were designated as eligible for assistance under ARP.

There is considerable divergence of views on the appropriate means or methods of helping farmers attain higher incomes.

One of the views is reflected in the foreword to a recently published RAD handbook:

Foreword[58]

> "With the complexities and special problems of urban living, with the huge public and social costs of overcoming the problems of large-scale urban population growth, and the implications of nuclear, chemical, and biological war, it would seem sensible to direct National policy toward the maintenance of population in rural areas. In fact, these serious social and economic problems of large urban concentrations would justify renewed emphasis on the stream of thought popularized by Thomas Jefferson that rural America might be a good place sociologically for a sizable share of our population to live and work.
>
> "The job of selecting and building new industry to provide productive employment for surplus farm population is complicated and difficult. It involves many talents inside and outside of agriculture."

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[56] I. W. Arthur, "On Vocational-Technical Education," *Iowa Farm Science,* Vol. 15, No. 7, January 1961, pp. 7-8.

See also, "Education Beyond High-School Age, The Community College," Iowa State Department of Public Instruction, 60th Iowa General Assembly, December 1962.

[57] "Rural Development Achievements and Shortcomings as Seen at the Federal Level," *Journal of Farm Economics,* XLIII:5, December 1961, pp. 1511-18.

[58] "Pegs for Rural Progress," Rural Areas Development Handbook, USDA Agriculture Handbook No. 229, 1962, p.2.

This statement has some attractive features, but in practice it leads to some difficulties.

In many areas, the program proceeds to try to induce industry to move in where the farmers are, rather than help the farmers to move to where the jobs are. This is sensible enough, if the areas have other desirable features for the industry concerned—good location with respect to raw materials and markets, adequate transportation, adequate water supplies, etc. But in many cases, these other features do not exist. An industry may be induced to move in by the offer of a free site, tax privileges, etc., only to languish and fail, leaving the area worse off than before.

This emphasis on bringing industry in, rather than helping farmers out, frequently leads to an attitude naturally fostered by local business, that regards a decline in the local population in the area as a disaster—something to be resisted rather than encouraged. Thus, a move to help farmers migrate to better jobs elsewhere, generally favored by economists, is resisted rather than supported by local committees of businessmen, school boards, etc. Those who hold these divergent views find themselves working at cross-purposes in the RAD program.

FARMER ADJUSTMENT PROGRAM.

What kind of a "farmer adjustment" program might be devised to help those farmers who want to leave farming, and get a more useful job in town, to do so? And how much might it cost?

A number of years ago, T. W. Schultz proposed a "Homesteads in Reverse" program in brief general terms, under which farm families would be offered funds to help them move off farms and retrain for urban jobs.[59] A program of this sort is spelled out in greater detail below:[60]

Farmers who were interested in moving off their farms into urban employment would be offered some special services for moving, retraining, etc., and a grant of money to help them carry their plans through.

An intensive training program should be established which would help prepare the participant for a nonfarm job. This program should be directed toward three major areas: (1) training of members of family who are not now farming but who will be available for a job in the near future; (2) training of the entire family for living in a different environment concerning various social problems which might arise; (3) intensive training of each farmer who would be making a complete change in his vocation.

The education function could be administered by existing educational agencies in cooperation with employment services and private industries. The nature of the job openings would be different enough to require separate types of training programs. Actually, this phase of the program would vary a great deal, according to the family's current situation. Such training aid also could be made available to nonfarmers who are interested in changing jobs. This special training would continue until a period of time after the family became established in the nonfarm job.

Cost of Proposed Program

The cost of the program described here, of course, would vary with the size of payment to each family induced to move. Five thousand dollars average value of money and services is suggested.[61] Included in this would be a payment of $3,000 cash divided over the five-year period of the contract.

It is recommended that the $3,000 not be given to the farmer in a lump sum, but in terms of so much each year for three years—i.e.—$1,500 the first year, $1,000 the second year and $500 the third year.

It would be expected that the cost of services provided to the family for moving, for training, etc., would average about $2,000. This added to the $3,000 paid in cash adds up to the total $5,000 payment.

If this would cause 250,000 eligible farm families to move per year, the cost would be $1.25 billion per year.

Other costs such as administration, preparation of material on occupational opportunities, training, etc., would amount to a considerable sum. One might estimate an average cost of one billion dollars per year for this type of activity.

Appraisal of the Schultz and Dougan Proposals

The program outlined above is directed at the root of the farm adjustment problem. The chief obstacles that lie in its path arise from the huge sums of money and enormous problems of administration that would be involved in translating such a proposal into a program.

The cost of helping families to move from one occupation to another, in terms of money and tribulation, are high. It runs into billions of dollars. The cost of not helping them are also high, probably higher. Is there any way to get the job done at less cost?

A kind of preventive medicine could be used for this purpose. After a family has become established in farming, a major personal and financial effort is required to

[59]T. W. Schultz, "Homesteads in Reverse" Farm Policy Forum, Vol. 8, No. 5, 1956, pp. 12-15. See also his "A Policy to Redistribute Losses from Economic Progress" *Journal of Farm Economics,* XLIII:3, August 1961, pp. 554-65.

[60]This program outline is adapted from R. S. Dougan, "Resource Adjustment through a Voluntary Transfer of Human Resources out of Agriculture," Ag. Extension Service, Ohio State University, 1961.

[61]This is the same figure that Schultz suggested a few years earlier.

help them to move. The job could be done at only a fraction of that cost, however, if the program were focused not on the families that are already established in farming, but on the farm boys and girls as they are growing up, say at about high school age, before they have become established in any occupation. Only a small amount of information and money is required to help a farm boy or girl to decide which fork of the road to take—into farming, or into some other occupation—compared with the size of the job after he has already chosen the farm road and established himself and his family in it. It is far easier to reduce the flow of young people into farming than to speed up the outflow of old people.

Job Information

What is needed is a nationwide program of information concerning alternative job opportunities, salaries, and training required for them, focused upon teenage farm boys and girls before they have chosen their occupations.

If there really are good opportunities on the farm for only 15 percent of them, they should be informed about this. They need also to be informed what other occupations are in need of more men, and what training is needed for them. If the 85 percent were helped into better urban jobs, within a few years the excessive number of farmers on farms would decrease. Therefore, as the program continued, the total number of farmers would decline to that number which could make as good a living on farms as in other occupations. Those who moved off the farm would be better off. Those who remained would benefit, and the nation as a whole would have a higher level of living.

TRAINING FOR NONFARM JOBS.

The job-information service could be performed relatively inexpensively—much of it, by already existing agencies expanded in this direction for this purpose. But along with this service would need to go a substantial program of training for nonfarm jobs, both for the farm boys and girls, who were ready to start preparations for their life occupation, and for the farm men and women who were already engaged in farming but wanted to move out.

The basic importance of education and training is emphasized by Varden Fuller of the University of California. He raises the question whether the widely made appeals for accelerated off-farm migration are addressed to the proper question.[62]

In his words, "It has been commonly recommended that proper therapy for several of the pathologic conditions in agriculture required some people to move somewhere else. Various notions of income disadvantage have been the principal element of the syndrome. For some writers, the prescriptive image has been that people should not persist in agriculture if they can do better elsewhere. For others, the image has been that somebody should get out of agriculture so that *those who remain* can do better. Although the validity of these propositions (especially the latter one) is suspect, I will press on to my own allegation that both fail to address basic pathology, and if the prescription is right, it is by chance.

"The essence of demoncratic society is not maximum or equal income but equal and unrestrained opportunity to be productive. Identifiable pockets of poverty may be attributable to disabilities in an area economy or to disabilities in the population or to a combination to the two. Outmigration from such a pocket may relieve the burden upon an underpar local economy, but it is likely only to transfer elsewhere the disabilities of its migrating populace. Disabilities associated with poor education, poor physical or mental health, or discrimination should presumably be as solvable in place as elsewhere. Such problems are not actually solved by getting them out of sight or through attenuation elsewhere, regardless of whatever asepsis that may occur in the income statistics of the places of evacuation.

"Under the circumstances in prospect, it is important that a distinction be recognized between the development of capacity to be productive and therefore to be mobile as against the more superficial notion of motivating the movement of disadvantaged people to some place where it is assumed they will be better off. If primary emphasis is placed upon developing capacity, it may be found that preferred solutions can be found for many within the locale of their present domiciles. Proposing better education, of course, is not unusual. Moreover, it is usual to imply that the immediate purpose of better education is to enhance mobility. For example, D. Gale Johnson emphasizes primary and secondary education in farm areas, but he also clearly regards this education as being valuable because it will better prepare people to move somewhere else. What I am attempting to say is let us have the educational, health, and manpower policies that will result in capable, self-dependent people and leave the question of where and at what they will work to them."

The manpower Development and Training Act of 1962 is a good step in the direction of providing the kind of training that farm boys and girls need. The Act is national in scope, covering all occupations; it has important implications for agriculture.

"Basically, the act authorizes an adult education program for two classes of people: (1) those whose skills have been rendered obsolete by the advance of tech-

[62]Varden Fuller, "Factors Influencing Farm Labor Mobility," Chapter 3 of *Labor Mobility and Population in Agriculture,* Iowa State University Center for Agricultural and Economic Adjustment, ISU Press, 1961, pp. 34-35, Ames, Iowa.

nology and by dislocations in the economy, and (2) those new entrants to the labor force who with further education will be able to meet "shifting employment needs." Although the word "education" does not appear in the title of the act. Manpower development and training is conceived in broad terms to include on-the-job and vocational training, as well as formal schooling. The act specifically cites the need for better trained personnel in the professional, scientific, technical, and 'apprenticeable' fields. Normally, however, the 52-week training allowance limitation will permit only limited upgrading of educational levels of individuals qualifying for benefits under the act."[63]

"If unemployment were defined in the act according to the conventional Bureau of Labor Statistics definition, many persons engaged in farming would be ineligible for either the training priorities or the allowances because of their inability to meet the unemployment criteria. To a certain extent this problem is obviated by the crucial sentence in the act, 'Workers in farm families with less than $1,200 annual net family income shall be considered unemployed for purposes of the act.' Although there is a matter of interpretation as to the farm classification of rural-nonfarm families in the agricultural labor force and a matter of judgement regarding the precise $1,200 dividing line determining eligibility, leaders in rural areas will recognize the importance of this provision both for the welfare of farm people and for the development of rural areas. Such a provision would be of importance to any self-employed person, in or out of farming, but it is of special importance in farming because of the large number of self-employed people in agriculture and because so many of them are at the low end of the income distribution. As to rural persons not living in farm families, full benefits under the act will accrue only to those meeting the conventional BLS unemployment criterion."[64]

The success of a program to help excess farmers to move into nonfarm jobs depends upon those nonfarm jobs being available. The rate of unemployment in the United States persists in recent years at about 6 percent, and this makes it more difficult for farmers to find jobs in town.[65]

Even with over-all unemployment at 6 percent, however, the prospects for employment in nonfarm jobs are far brighter than the prospects in farm work. Table 24 shows that farming is the only occupation which is expected to require fewer workers in 1970 than in 1960. The prospects are for no change in the number of industrial laborers. For all other groups, for jobs that require considerable training, substantial increases are projected.

TABLE 24-EMPLOYMENT BY OCCUPATIONAL GROUPS, 1960 AND PROJECTED 1970 (IN MILLIONS)

Occupational group	1960	1970
Professional and technical	7.4	10.4
Proprietors and managers	7.1	8.8
Clerical and sales	13.9	17.6
Craftsmen (skilled)	8.7	10.8
Operatives (semiskilled)	12.5	14.8
Laborers, industrial	3.8	3.8
Service occupations	8.1	10.1
Farm occupations	5.9	4.9

Source: Bureau of Labor Statistics, U.S. Dept. of Labor.

REDUCING THE INPUT OF LABOR MIGHT NOT IMMEDIATELY REDUCE AGRICULTURAL PRODUCTION.

It is not at all certain that the immediate effect of reducing the input of farm labor and management would be to reduce farm production.

A part of the reduction in the input of labor would be effected by a reduction in hired labor. In most cases, however, the farmer would not produce less on that account; he would replace the labor by larger implements, automated feeding operations, and so forth. In the early stages, at least, this would be as likely to increase production as to decrease it.

The rest of the reduction in the number of farmers would be accomplished by a reduction in the number of farms, affected by a consolidation of the smaller farms into larger ones. Agricultural production then would pass into the hands of larger farm operators, presumably better managers and more efficient operators than the smaller farmers they bought out. A part of their efficiency would show up in the form of an increase in yields, so that again in the early stages, a reduction in the input of labor would increase agricultural production, not decrease it.

That is to say: Farm labor and management is so excessive in agriculture that the first effect of a small reduction in numbers would be the recombination of a good many farms into fewer, larger, and better managed farms, so that the first effect might be to increase rather than decrease production. This would be all the more likely if the farmers who moved out of agriculture were mostly the less efficient farmers.

[63]Bachmura, Frank T., "The Manpower Development and Training Act of 1962—Its Significance for Rural Areas," *Journal of Farm Economics,* Vol. 45, No. 1. February, 1963, p. 61.

[64]Op. cit. pp. 62-63.

[65]"Policies to Improve the Labor Transfer Process," *American Economic Review,* Vol. L, No. 2, May 1960, pp. 403-412.

Accordingly, the reduction in the number of farmers would need to be rather substantial. Otherwise the depressing effect of the increase in production on the numerator—United States total farm income—would not be offset by the decrease in the denominator (the number of farmers to be divided into the United States total farm income) so that average farm income would not rise.

At the end of a closely reasoned empirical study of this question, one investigator concluded:

"It has been indicated that the output effect of reducing the farm labor input depends upon the circumstances prevailing prior to the reduction. In a static situation, if the factor markets are far enough out of equilibrium, a decline in labor input could be associated with an increase in output. It was noted that a reduction in labor input in agriculture is associated with a reduction in the number of producing units and that the resource combinations resulting might actually increase output.

"A simple model was used to estimate the relationship between labor input and average earnings per farm worker. The model, which was based on an implied relationship between the average and the marginal physical product of labor, explained a very large fraction of the variance of labor earnings, whether measured in money or real terms. The model also shows that output need not be reduced absolutely as a result of a labor outflow from agriculture in order for an increase in real labor earnings to occur."[66]

Apparently, the "disequilibrium" (oversupply of labor) in this case is severe enough so that the initial stages of a reduction in the number of farmers might *increase* total agricultural production rather than reduce it.

The increasing effect of a reduction in the number of farmers upon total agricultural production (and therefore the depressing effect on total agricultural gross income) might be more than offset, however, by a more direct increasing effect on *per farmer net* income.

This direct increasing effect on per farmer net income would result from the reduction in the existing excessive competition among farmers for available farms. This competition drives farmers to bid away a large part of their per capita *gross* income in the form of high rents or purchase prices for land, so that their per capita *net* incomes remain low.

As matters stand at present, a farmer will bid a high rent for a farm, because if he does not, he knows that some other farmer will. If that other farmer were not there, the first farmer would not have to bid so high.

[66]Johnson, D. Gale, "Output and Income Effects of Reducing the Farm Labor Force," *Journal of Farm Economics,* Vol. XLII, No. 4, November 1960, p. 796.

"THE AGRICULTURAL INCOME PROBLEM" IS NOT A SINGLE PROBLEM.

It needs to be emphasized that "the agricultural income problem" is not a single uniform problem all over the country. It is worse in some areas that in others. The reasons for the problems, and therefore the remedies, differ considerably from area to area. Along with a general program for reducing the number of surplus farms and farmers in agricultural production, therefore, needs to go a supplementary differentiated program to deal separately with the different areas.

Figure 17 shows that the low farm income areas are located chiefly in the South East, with smaller areas in the northern Lake states, the far Northwest, and Northwestern New Mexico. Figure 18 is based on more recent data, including some non-farm data; it shows a similar pattern.

These charts over-emphasize the low income situation to some extent, because they are based on Census farm data which include a substantial number of farms that are too small to be considered full-fledged commercial farms.

These charts show clearly that "the farm income problem" is not a single even roughly uniform problem over the United States. It is no more sensible to refer to "the farm problem" than it is to refer to "the over-weight problem" in the United States, as if it could be solved by one remedy applied to all. Specific programs for specific areas and types of farming are needed.

Some of the land-input control programs are specific to specific commodities, such as the feed grain and wheat programs, and they affect chiefly the commercial farms. But the problems even in these areas differ greatly, and require different programs too.

These differences are clearly shown by the costs and returns data for typical types of commercial farms in over 30 different areas in the United States. These data are compiled annually by the USDA.[67] They show the gross incomes, costs, net incomes, and net returns to farm family labor and management in considerable detail, separately for each type of farm. The locations of these type-of-farming areas are shown in figure 19.

These data are not diluted by the inclusion of a large percentage of small not-really-farms, as the Census data are. In addition, they separate out from the net incomes (which include returns to the farmer's own investment in the farm, in the case of the United States average farm income data) the net return to farm family labor, leaving the net return to operator and family labor. Three rep-

[67]*Farm Costs and Returns,* Ag. Inf. Bul. No. 230, ERS, USDA, June 1931.

Fig. 17

LOW-INCOME AND LEVEL-OF-LIVING AREAS IN AGRICULTURE

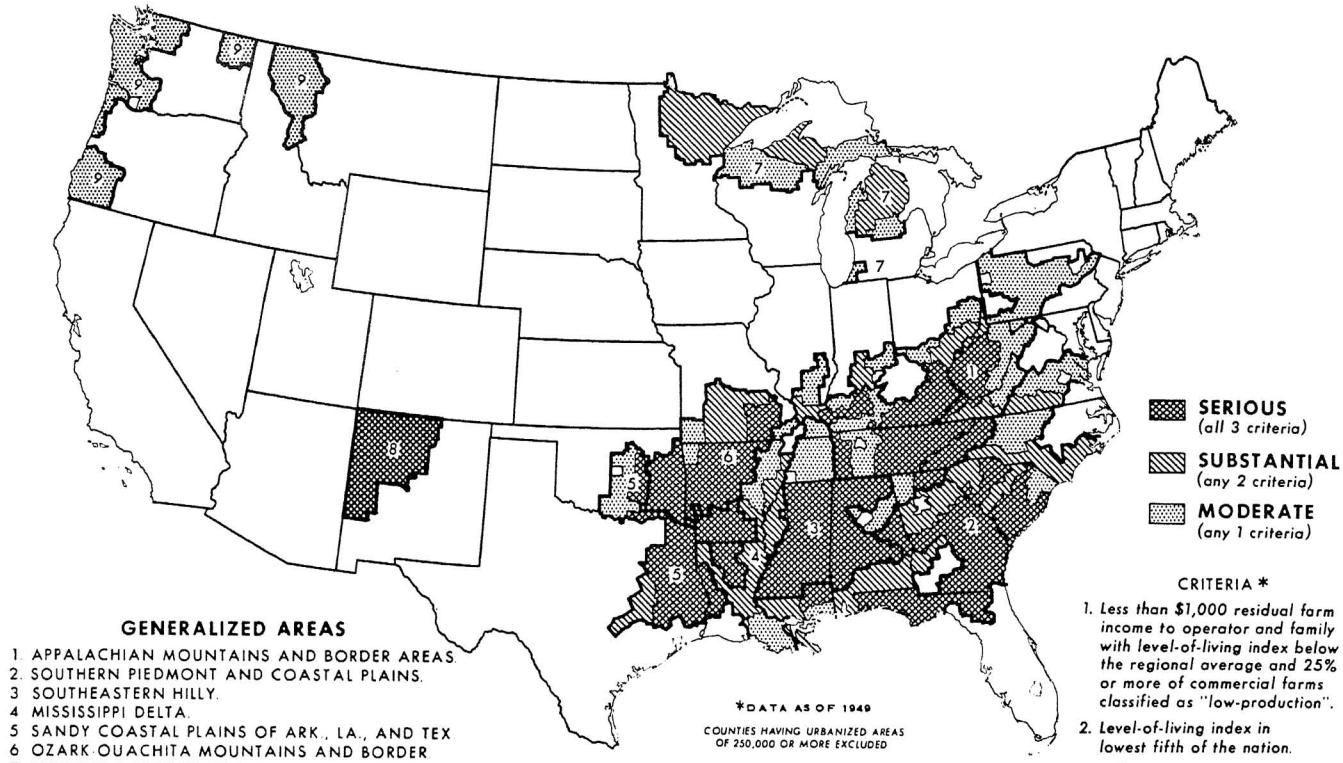

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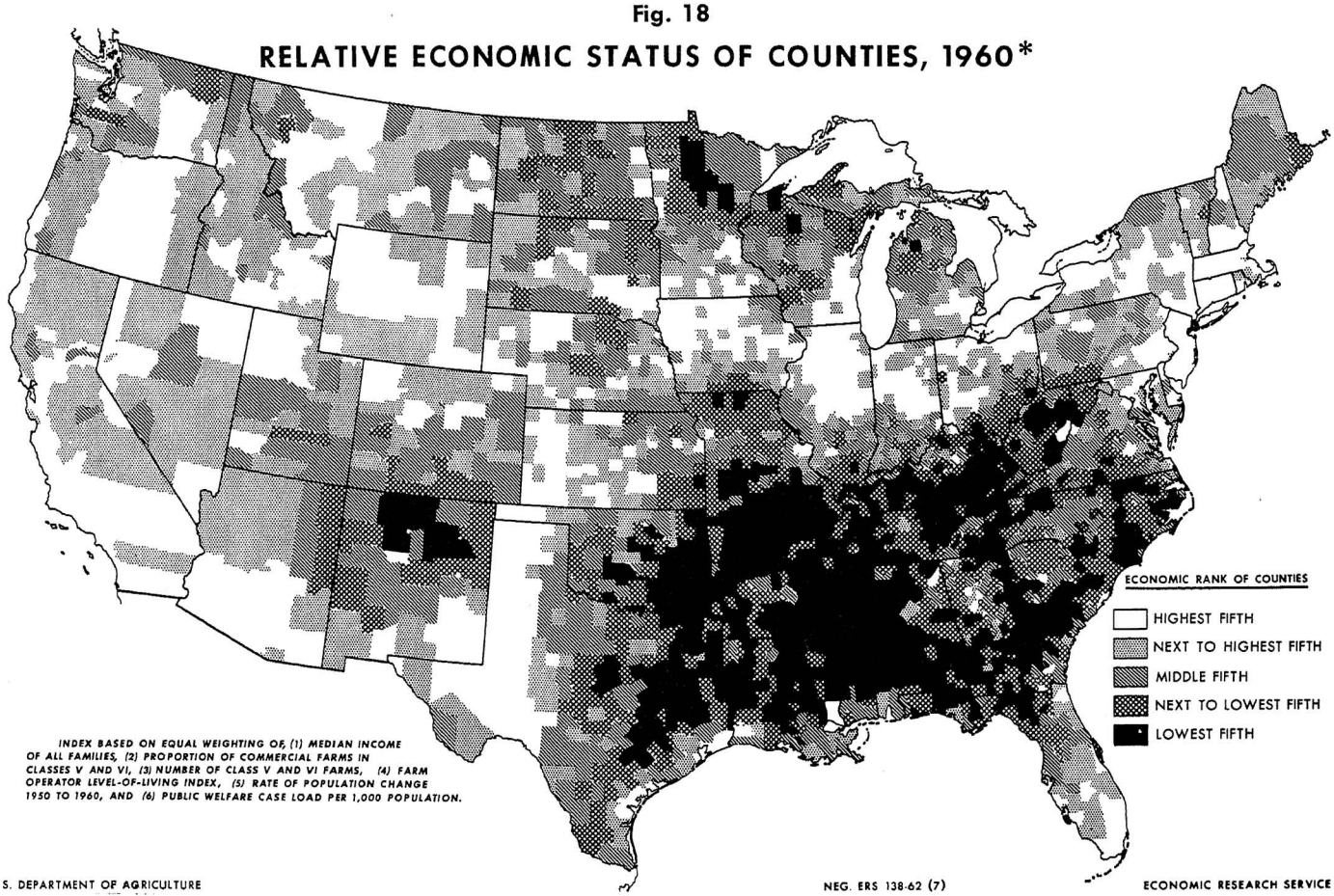
Fig. 18

RELATIVE ECONOMIC STATUS OF COUNTIES, 1960*



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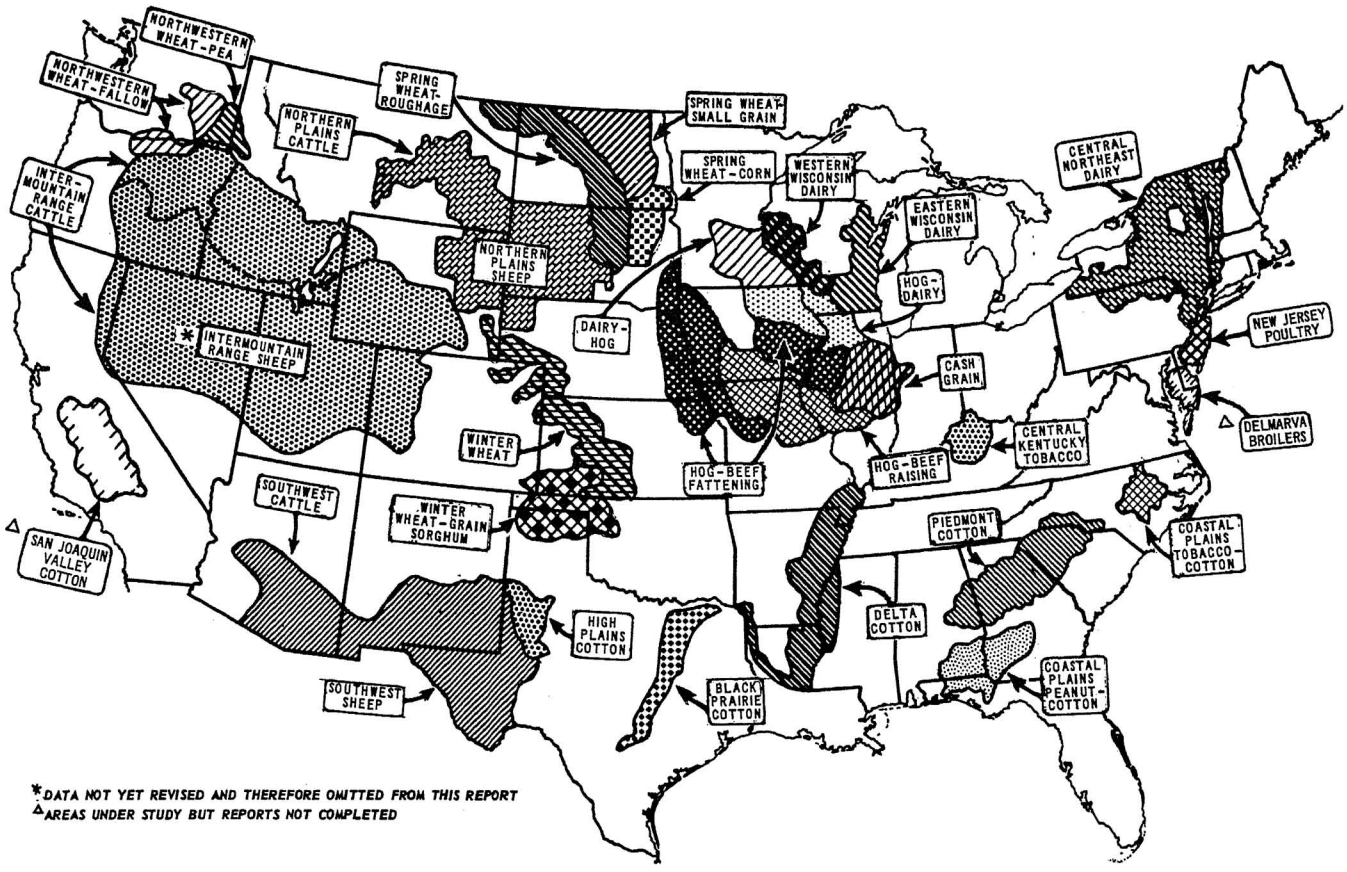
ECONOMIC RESEARCH SERVICE

Fig. 19

LOCATION OF TYPES OF FARMS STUDIED



U. S. DEPARTMENT OF AGRICULTURE NEG. 59(5)-174 AGRICULTURAL RESEARCH SERVICE

resentative charts of these data are shown in figures 20, 21, and 22.

These charts clearly show the differences in the different types of farming. The winter wheat chart shows the violent fluctuations in gross and net income and in returns to operator and family labor that result chiefly from irregular variations in weather; programs to stabilize returns, of a crop-insurance or other type, are needed

Fig. 20—Winter Wheat Farms, Southern Plains, 1930-61 (1961 Figures Preliminary).

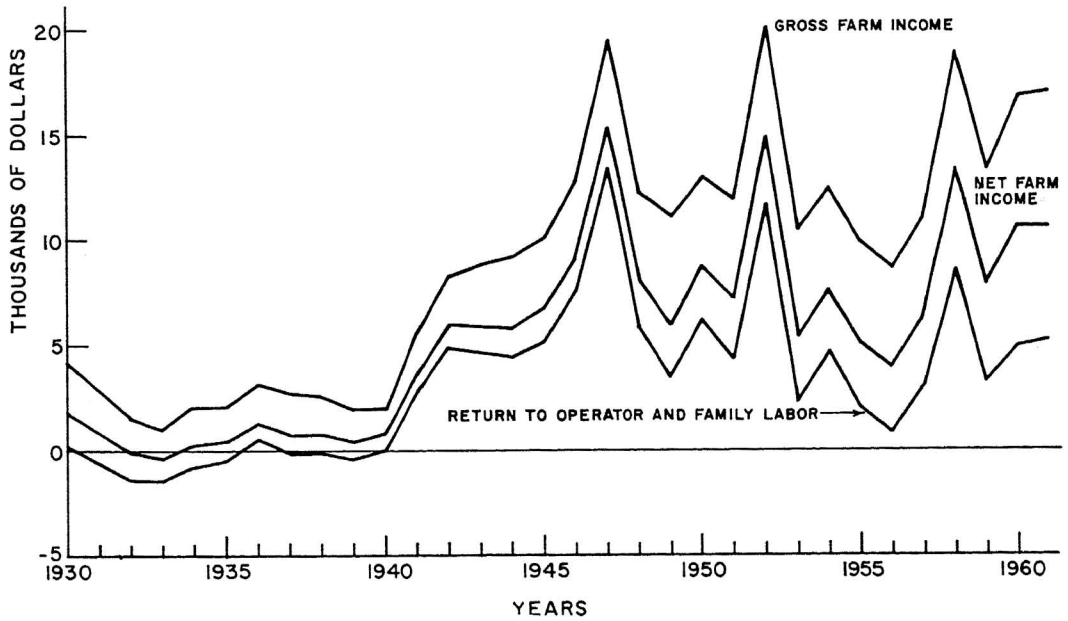


Fig. 21—Cash Grain Farms; Corn Belt 1930-1961 (1961 Figures Preliminary)

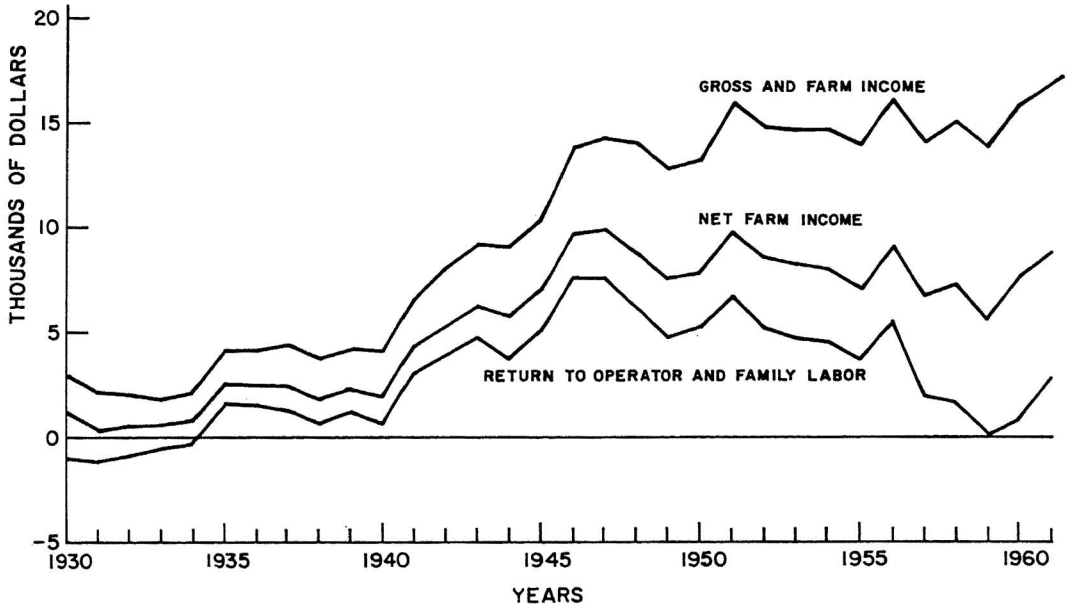
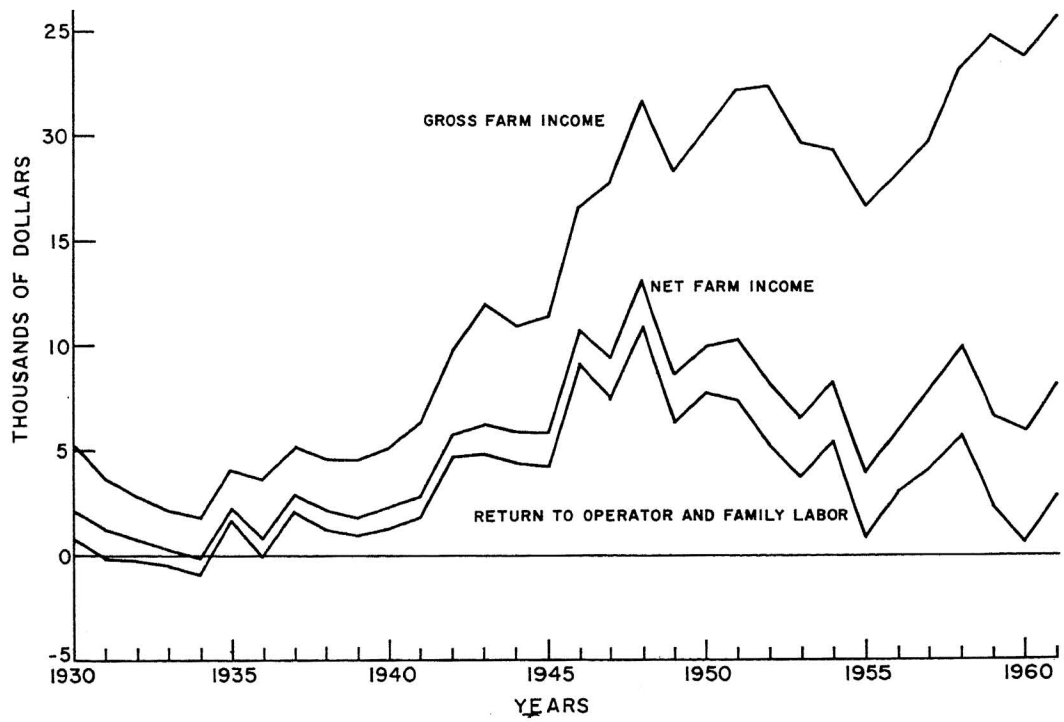


Fig. 22—Hog-Beef Fattening Farms; Corn Belt, 1930-1961 (1961 Figures Preliminary).



here. The hog-beef fattening chart shows different characteristics—less variability in returns, with the variability associated with prices rather than with weather, and costs which constitute a much higher percentage of gross incomes than in the case of winter wheat, and which have increased so much that they brought returns down almost to zero in 1955 and 1960. The cash grain corn belt farms are still different; they had very stable gross incomes after 1946, but also had a steady increase in costs and in the charge for capital which brought returns in 1960 down to zero.

Equality of Incomes

With adequate programs of job-information and job training such as those outlined above, the continuous excess of farmers could be helped to move off farms into better jobs in town. This would benefit them; it would benefit those who remained on farms; and it would benefit the nation as a whole. The farm income problem would be solved as nearly as it can be in this imperfect world, and would continue to remain solved.

Equilibrium might be reached, however, with per capita farm money incomes still lower than per capita urban money incomes. There are two reasons for this.

1. A study by Kaldor, et. al.[68] indicates that a considerable percentage of farm boys value the nonmoney characteristics of farm life highly; as many as one-third of them would prefer to farm even at money income 20 percent lower than they could earn in town. To their minds, the total psychic income—money plus such nonmoney characteristics as freedom, uncongested housing, etc.—would be equal to what they would have in town.

This comes down ultimately to a question of values, which usually are considered sacrosanct. If large numbers of farm boys prefer to farm, earning 20 percent less than they could earn in town, that is usually considered to be a kind of value-judgement to be accepted as given.

An agronomist now on the staff at Iowa State University refers to personal interviews that he has had with numbers of farmers back in the hills in southeastern United States, who profess to be quite content with their incomes of less than $1,000 a year. They work when they want to, go squirrel-hunting when they feel like it, and do a little fishing when the spirit moves them. Many a harassed businessman—or professor—luxuriates in this kind of living on vacation and plans to do it all year round when he retires. But these farmers live almost as relaxedly as this all their lives. Who will say they are making a mistake?[69]

If the number of these farmers were large enough, equilibrium would be reached with considerably lower *money* incomes on farms than in town. But part of this disparity would be made up by higher nonmoney incomes—much as professors at some Western mountain universities are reputed to take about $1,000 of their salary in mountain scenery and recreation—so that *real* incomes would be nearly equal.

2. A small disparity would still remain, even then. For there has to be enough difference between farm income and nonfarm incomes to induce the continuing excess of farmers to move off the farm and into urban jobs. The obstacles to this movement can be reduced, but it is too much to hope that they can be completely eliminated. Farm income will remain a little below nonfarm income for comparable-ability, enough for the difference to overcome the obstacles that still remain after everything possible has been done to remove them. Water will flow only downhill, unless it is under pressure; and in free-enterprise United States, governmental occupational pressure would be out of place.

To this small extent, then, equality of farm and nonfarm income in the United States is likely to remain an objective that can be closely approached but not fully attained.

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[68]Donald R. Kaldor, Eber Eldridge, Lee G. Burchinal and I. W. Arthur, "Non-income Values Important in Farm Boy's Career Plans," *Iowa Farm Science,* Vol. 17, No. 4, October 1962, p. 8-284.

[69]The senior author has gone into this subject more fully in three papers: "What can a Research Man Say About Values?" Reprinted from *Journal of Farm Economics,* Vol. XXXVIII, No. 1, February 1956, "What can a Research Man do in Agricultural Price Policy?" Reprinted from *Journal of Farm Economics,* Vol. XXXVII, No. 2, May 1955, and "Discussion" from *Goals and Values in Agricultural Policy,* Iowa State University Center for Agricultural and Economic Adjustment, Iowa State University Press, Ames, Iowa, 1961, pp. 164-170.

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