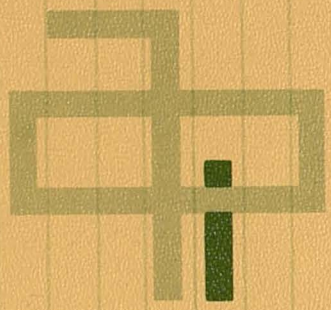

Policies Affecting Rural People

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COSTS AND BENEFITS OF PAST AGRICULTURAL PROGRAMS

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There are two major difficulties in discussing costs and benefits from agricultural programs. First is the practical problem of defining a "program." Congress has been prolific in terms of funding and administrative techniques so there are diverse operating programs. Second, and perhaps more important, is the problem of defining costs and benefits.

In dealing with these problems I will use the following procedure: First, definition of the two major types of agricultural programs considered; second, definition of what I believe to be the three major goals or benefits which the American public seeks to achieve through these programs; and last, discussion of each of the two major types of farm programs and appraisal in terms of their apparent costs and benefits as related to the three major goals.

Major Types of Farm Programs

In its summary of realized costs of agricultural and related programs, the U. S. Department of Agriculture has delineated seven major program areas according to function. They are: (1) Stabilization of Farm Prices and Incomes, (2) Storage, Handling and Transportation of Commodities, (3) Special Foreign Disposal Programs for Foreign Assistance, (4) Conservation of Resources, (5) Credit and Related Programs for Electrification, Telephone Facilities and Farm and Home Purchases and Operations, (6) Research, Education, Marketing and Regulatory, and (7) School Lunch and Donations.[1]

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[1]See Office of Budget and Finance, U. S. Department of Agriculture, B&FR-2321, and B&FR-2322, October 12, 1964.

For the purposes of this paper, I have chosen to deal with two major types of programs. The first is Agricultural Research and Education. In discussing taxpayer costs, I will include only appropriate parts of federal funds assigned to the U. S. Department of Agriculture area 6, plus state and local funds, and to vocational agricultural education. For the most part, this type of program consists of inhouse research by the U. S. Department of Agriculture, research by state agricultural experiment stations, the educational activities of the federal-state Cooperative Extension Service and vocational agricultural education.

The second major type of program I refer to as Farm Price and Income Support and Stabilization. In computing the federal costs to the taxpayer I combine costs which the Department of Agriculture has divided among program areas 1, 2 and 3. Storage and handling costs are obviously a part of price and income support and stabilization effort. Similarly, the costs of foreign assistance are net costs above market value and as such are costs of surplus disposal necessary to support farm prices and incomes. It might logically be argued a sizable portion of Department of Agriculture program areas 4 and 7 are also "surplus resource" disposal necessary to support and stabilize farm prices and incomes. They are excluded here because they may reasonably be expected to serve some social purpose in their own rights. Some indirect reference will be made to the conservation area in the discussion of costs and benefits from farm price and income support and stabilization.

Major Goals or Benefits from Farm Programs

Our farm programs are developed in the political arena. Debate, discussion and public hearings which accompany this process commonly reflect views of a variety of interest groups. Nevertheless, from a wide range of observations on the development of farm and other public policies, I conclude there are three major benefits which the American people expect to derive from the nation's farm programs.

Low Cost Food and Fiber, Economic Efficiency and Rapid Progress

Man's first urge is to acquire greater mastery of the material world about him. Historically, this urge has been concentrated heavily upon improving the output of food and fiber in relation to population since mankind has been plagued with the threat of famine through all of history. Fortunately, this country has never faced such a threat, but there has been an awareness that at some future time, population

increase could raise the real cost of food and fiber if agricultural efficiency were not improved.

In recent years there has been increased intercourse among nations and a growing interdependence of one nation's political security upon that of others. Under these circumstances, it has become clear it is not enough to provide for national food and fiber needs. Minimum food and fiber needs must now be planned for all free nations and ultimately for all nations. [2]

Aside from the need for efficient production of food and fiber for its own sake, there is the need for increased agricultural adjustment to release resources to produce nonagricultural goods. Western man has long since ceased to accept adequate food and fiber consumption as fulfilling the needs for a good life. Increased intercourse among nations has raised the ambitions of the teeming billions in the developing nations of the world, and political reality requires preparations be made to meet these wants. In order for the total world economy to be efficient in the future, agricultural technology and organization in the world as a whole must advance rapidly enough for resources to be freed for nonagricultural pursuits to raise the level of living throughout the world. Only in this way can reasonable international political stability be achieved and a long-run peaceful existence assured to ourselves and future generations.

Last but not least among the urgent reasons for desiring rapid material progress, is war and threat of war. The contest continues for the minds of men and military control. Technological and organizational progress which assures both an adequate food and fiber supply and an adequate arsenal are a must.

In summary, I would argue for the variety of reasons advanced, one of the most important goals which the American people expect agricultural programs to help achieve is low cost food and fiber, economic efficiency and rapid material progress.

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[2]This anticipates an eventual successful completion of or stalemate in the cold war so that we can concentrate on providing a minimum level of food and fiber consumption necessary to political stability throughout the world. It also assumes that we will solve the problems of international payment and distribution of food and fiber. For an excellent discussion of these problems, see Lester R. Brown, Man, Land and Food, Foreign Agricultural Economic Report No. 11, November 1963, and Increasing World Food Output, Foreign Agricultural Economic Report No. 25, U. S. Department of Agriculture, Washington, D. C.

A Secure Food and Fiber Supply

Despite long years of abundant and cheap food and fiber in the United States, the belief persists there should be public programs to insure against the possibility of extreme conditions of demand or production which might threaten the adequacy of our food and fiber supply. Social costs of a food and fiber shortage in the event of war or a drought similar to that of the mid 1930's are prohibitively high in the minds of most Americans. Of course it would be difficult to arouse much concern from the man on the street about such an eventuality. He simply takes for granted national programs are designed to attain the goal of a secure and cheap food and fiber supply. However, I would list a secure food and fiber supply as a second important goal which Americans expect their farm programs to help achieve.

A Healthy Total Economy through Minimizing and Sharing of Fortuitous Social Costs

It is the nature of our largely free enterprise market economy that a part of the social costs of progress and of natural and economic peril is distributed in a random or fortuitous manner. That is, the rewards and losses to resource owners are not always related to their contributions to social welfare. It has gradually come to be accepted by the public economic characteristics of agriculture are such that it (a) bears an unusual burden both from the effects of a national program of cheap food and fiber supply and from instability in the economic and natural environment, and (b) cannot remain a healthy, viable industry in the absence of positive programs through which society helps to share these costs. Although the idea is not valid, there has long been a belief lack of agricultural prosperity will eventually precipitate a general recession or depression. More recently, there has been increasing concern generally for those who are disadvantaged by social and economic adjustments. Part of this concern is human compassion, and part of it grows out of political pressure from distinct disadvantaged groups. Part of it grows out of a belief economic growth and development will be speeded by helping the disadvantaged to adjust. Consequently, I would list assurance of a healthy total economy through minimizing and

sharing of fortuitous social costs as a major goal which Americans expect agricultural programs to help achieve.[3]

Agricultural Research and Education

Investment in Agricultural Research and Education

From 1932 to 1965 an estimated $3.4 billion in federal funds was appropriated to the Department of Agriculture for agricultural research and education.[4] Over the same period, states, local governments and other nonfederal sources contributed an estimated $5.0 billion to agricultural research and education at land-grant institutions. Total costs of vocational training in agriculture from both federal and nonfederal sources amounted to an estimated $0.4 billion over this period.[5] Total funds for agricultural research and training in the United States from all sources and expended by all agencies over the 34 years might have amounted to as much as $10 billion, or an annual average expenditure of $0.3 billion. In recent years, annual expenditures have been somewhat higher than the average for the total period. Total expenditures for all

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[3]In America there has been a strong faith in the ultimate justice and maximization of welfare to be derived from a free enterprise exchange economy. This faith has been so great that it has tended to create the attitude that under this system "a man earns what he gets and gets what he deserves." Even poverty and privation side by side with wealth and opulence and great booms followed by depression, though socially undesirable, have in the past been accepted as necessary evils to be tolerated in order that the ultimate fruits of a free enterprise market economy might be achieved. It is hoped that we have advanced to the point that a more moderate view can prevail while maintaining the great advantages which the free enterprise market economy provides.

[4]Estimate based on U. S. Department of Agriculture B&FR-2321 and B&FR-2322 which includes federal payments to state experiment stations and extension services.

[5]The 5.0 billion and 0.4 billion dollar estimates are quite crude. Published statistics on nonfederal contributions commonly omit many operating cost items.

agricultural research and education are estimated to have averaged approximately $0.5 billion annually over the past five years.[6]

Returns to Public Investment in Agricultural Research and Education

Numerous efforts have been made to measure returns to investment in research and education. In 1955, R. H. Newell estimated the annual rate of return to investments in all research to be in the neighborhood of 100 to 200 percent. In 1960, Becker investigated the "internal" returns to investment in college education and concluded they approximated returns to industrial investment. He noted there were possible additional "external" returns to society, i.e., increased income to other resources than the persons educated which resulted from working with the upgraded human resource.[7] In a 1958 study, Griliches estimated the annual returns to public agricultural research to be 400 to 700 percent on specific research investments such as hybrid corn and sorghum development and returns to agricultural research in general to be 35 to 171 percent.[8] In another study in 1964, Griliches estimated joint returns to public agricultural research and education expenditures to be approximately 300 percent after having discounted his initial estimate by three-fourths to account for the contribution of industrial research and education to agricultural productivity and for the contribution of government price and income supports to farm income.[9] Tweeten and Tyner arrived at an estimated annual rate of

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[6]A joint State Agricultural Experiment Station-U. S. Department of Agriculture Committee is currently making a study of current agricultural research and future research needs. A part of this study includes a comprehensive inventory of research by major classes and amount of funds expended by source. It may well show that agricultural research expenditures are larger than I have estimated. In addition, it will be possible to separate agricultural production technology generating from social adjustment and marketing research so as to deduct out research which is not properly chargeable against agricultural research as the term is used herein. See the later subsection "Agricultural Research and Education Not All Production Oriented."

[7]Gary Becker, "Underinvestment in Education," American Economic Review, Vol. L., 1960, pp. 346-354.

[8]Z. Griliches, "Research Costs and Social Returns: Hybrid Corn and Related Innovations," Journal of Political Economy, Oct. 1958, pp. 419-431.

[9]Z. Griliches, "Research Expenditures, Education and the Aggregate Agricultural Production Function," American Economic Review, Vol. LIX, Dec. 1964.

returns to public agricultural research investments of approximately 100 percent.[10] Accumulated evidence clearly suggests direct returns on public investment in agricultural research and education have been large relative to market rates of interest and have compared favorably with returns in other segments of the economy.

All of the preceding estimates were made under certain assumptions about other things being given. For example, the estimates were under the assumption of existing agricultural price and income programs. As noted, Griliches suggested an arbitrary discounting of his estimated returns to account for the direct income effect of this factor. It appears there are at least four other factors in the "other things" category which deserve attention and may alter estimated returns. First is the impact of stable (supported) prices on farm efficiency. This factor will be discussed in the next section on "price and income support and stabilization." It is sufficient here to note a proper accounting for this factor might reduce somewhat the estimated return. Other factors are: (1) the level of investment in research, development and education in the nonfarm sector of our economy, (2) foreign food and fiber needs and (3) external returns.

Investment in nonfarm research and education. Table 1 shows research expenditures in all sectors of the economy and from all sources increased by almost 240 percent from 1955 to 1963. Over the same period, agricultural research expenditures increased by an estimated 128 percent. Total federal research expenditures increased by almost 320 percent. Since 1963 federal support of nonagricultural research has increased by an additional 30 percent, while federal funds for agricultural research have little more than kept pace with the increase in price level. Stated differently, from 1955 to 1963, federal appropriations for agricultural research and development have increased by 160 percent while federal appropriations for other research and development activities have increased by almost 500 percent. In 1963, 65 percent of national expenditures for research and development were from federal sources. The percentage is higher today.[11]

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[10] Luther G. Tweeten and Fred H. Tyner, "Toward an Optimum Rate of Economic Change," Journal of Farm Economics, Dec. 1964, pp. 1075-1084.

[11] There is no easy way to determine what part of the industry research and development expenditures are truly technology creating. It seems reasonable to expect that a sizable share of the total industry research expenditure is not of this nature. If this is the case, then the industry research expenditures in Table 1 are overestimated and the percentage of total research funds from federal sources is an underestimate.

Table 1. Estimated expenditures for research and development in the United States, 1955 and 1963, by source of funds and using agency, in millions of dollars[a]

Source of funds and using agency	1955	1963
Total funds from all sources	5,100	17,350
Federal funds used by:		
Federal agencies	950	2,400
Colleges and universities	260	1,300
Other nonprofit institutions	60	300
Private industry	1,430	7,340
Total federal funds	2,700	11,340
University and college funds used by:[b]		
Universities and colleges	120	120
Industry funds used by:		
Industry	2,200	5,380
Universities and colleges	20	65
Other nonprofit institutions	20	120
Total industry funds	2,240	5,565
Funds from other nonprofit institutions used by:		
Universities and colleges	20	75
Other nonprofit institutions	20	110
Total other nonprofit institution funds	40	185

[a]Source: Statistical Abstract of the United States, 1965; p. 546, Table No. 759.

[b]Includes state appropriations, endowments, gifts, etc.

Of comparable importance is the congressional commitment in recent sessions to new educational and development efforts. The Area Redevelopment Act, the Manpower Development and Training Act, the Economic Opportunity Act, the State Technical Services Act, the Higher Education Acts of 1963 and 1965, the Housing and Urban Development Act which created the Department of Housing and Urban Development, and the Act creating the National Foundation of Arts and Humanities, to mention only a few, will pour vast sums of federal funds into research,

education and development which will be concentrated largely in the nonfarm sector of our economy.

These large investments in nonagricultural research and education should eventually have a beneficial effect on the rural economy by stimulating a more rapid rate of growth in the nonfarm economy and boosting consumer incomes. The beneficial effect on agriculture and on returns to investment in agricultural research and education will be of two kinds. First, although the income elasticity of demand for farm commodities is low, the resulting more rapid growth in consumer incomes will provide some stimulus to domestic demand for farm products. Given the low price elasticity of demand for farm products, the effects may be quite significant. Second, rapid growth and development in the nonfarm economy should expand nonfarm employment opportunities for those underemployed farm people who are in a position to make the adjustment. These developments would tend to increase the returns to both past and future investments in agricultural research and education.

Foreign food and fiber needs. Potential foreign demand for farm products and/or for the farm technology created by research is a largely unknown quantity. The studies previously cited on returns to investment in agricultural research and education reflect expected market value of farm production. In an objective analysis, there are all the returns one may justifiably include. However, there appears to be good reason to place an additional value on agricultural know-how as a form of insurance. We must always be ready to provide increased food and fiber either from our own agriculture or from increased productivity of foreign agriculture through improved technology. Food and fiber may well be more important than guns in the long-run effort to promote political stability and economic growth on an international scale.

Some external returns. Society has enjoyed sizable external investment returns in agricultural research programs. One of these is the development of a supply of well trained scientists in the biological and related sciences whose competence is of value to fields of endeavor other than agriculture. Approximately one-half of total agricultural research funds are expended in the state agricultural experiment stations on the land-grant campuses. These state research programs are closely integrated into the graduate training programs in the biological sciences. It is generally agreed there is a complementary relationship between graduate training and research so this is a mutually advantageous arrangement. But the point which I wish to make here is the agricultural research program has provided the nation a training ground for many scientists who have been available for nonagricultural pursuits. This argument is supported by the large amount of grant funds which the greatly expanded nonagricultural federal research agencies have located in schools of agriculture in the last ten years.

Farm Resource Use Effects of Research and Education

Statistics in Table 2 provide some clear insights into the direct impact of agricultural research and education on resource use in the economy. Total farm output has increased by more than 50 percent since 1940; at the same time total cropland has decreased 9 percent and total man-hours worked has decreased almost 60 percent. These changes have been made possible by sharp increases in output per acre of cropland, per livestock breeding unit and per man-hours worked, all of which result primarily from increases in purchased farm inputs and the use of improved technology acquired through research and education.

The almost 60 percent reduction in man-hours is also reflected in a reduction of the farm labor force from 11.0 million in 1940 to 6.1 million in 1964. There are two sides to this reduced farm labor force. On the one hand, it provided an expanding nonfarm industry with a large influx of labor for other uses. On the other hand, it displaced people from agriculture who might have preferred not to move and some of whom have had social adjustment problems. It disadvantaged those whose skills or flexibility were not such that they could find nonfarm employment at relatively advantageous remuneration.

Food Cost Effects of Research and Education

Efficiency on the farm has been passed on in large measure to the consuming public (Table 3). Consumers are spending 16 percent of disposable income today for the retail cost of their food as compared to 25 percent in 1929 and 20 percent as recently as 1950. Thus, in only 15 years there has been a 25 percent reduction in consumer disposable income expended for food.

The greater share of this reduction has been in payments to farmers for the raw products at the farm. The percentage of consumer disposable income paid to the farmer for the raw food products has decreased from 8.5 to 5.4 or 36 percent. The percentage paid for food marketing services dropped from 11.5 to 10.6 or 8 percent. The percentage decrease of consumer income spent on food marketing services was all accomplished from 1960 to 1965. During this period the actual volume of marketing services which the consumer purchased with a unit of his food supply increased considerably.[12]

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[12]For a very interesting discussion on agricultural marketing research and research in general, see Harry C. Trelogan and Norman Townsend-Zellner, "On Benefits of Agricultural Marketing Research," Journal of Farm Economics, February 1965, especially pp. 45-46.

Table 2. Some indexes of farm production and productivity in the United States,[a] (1957-59 = 100)

Year	Total farm output	Total cropland	Crop production per acre	Livestock production per breeding unit	Purchased inputs	Man-hours used in all farm work	Farm production per man-hour	Persons supplied per farm worker
1910-14	52	94	69	--	47	217	24	(1910) 7.07
1930-34	60	107	64	68	58	210	29	(1930) 9.75
1940	70	103	76	75	72	192	36	10.69
1945	81	104	82	79	76	177	46	14.55
1950	86	106	84	86	91	142	61	15.47
1955	96	106	91	93	97	120	80	19.49
1960	106	99	109	105	103	92	115	25.85
1964[b]	111	94	116	112	114	79	141	33.25

[a]Source: Changes in Production and Efficiency, U. S. Department of Agriculture Statistical Bulletin No. 233, Revised July 1965.

[b]Preliminary.

Table 3. U. S. civilian food expenditures as a proportion of disposable income, 1929-1965[a]

Year	Total	Farm value	Total marketing bill
1929	25.0	b/	b/
1940	23.0	b/	b/
1950	20.0	8.5	11.5
1955	18.3	6.7	11.6
1960	17.7	6.0	11.7
1965[c]	16.0	5.4	10.6

[a]Source: 1929 and 1940 estimates computed from Supplement for 1956 to Consumption of Food in the United States, 1909-1952, U. S. Department of Agriculture, Washington, D. C., September 1957. Estimates for 1950 and later from Handbook of Agricultural Charts, 1965, U. S. Department of Agriculture, Washington, D. C., October 1965.

[b]Not available.

[c]Preliminary.

Agricultural Research and Education Not All Production Oriented

The preceding discussion on reduced cost of agricultural marketing services as a percentage of the consumer's income illustrates an important point. Agricultural research and education are not entirely directed toward creating improved farm organization and technology.[13] A considerable amount is directed toward improved marketing and utilization of farm products, improved marketing of farm supplies and social and economic adjustment. These types of investment should not be included in an analysis of returns to research and education when farm income is the return being measured. Their exclusion might well increase the estimated returns to agricultural production research and

[13]For a discussion of this point see Dana G. Dalrymple, "Public Investment in Agricultural Research and Education," Journal of Farm Economics, November 1965.

education above those previously cited, but returns to these types of research and education deserve analysis in their own right.

Agricultural research and education on social and economic adjustment have not been a large part of the total research package. However, it has made some contribution to adjustments farm people have made to fortuitous costs of growth and adjustment. Guidance and assistance from cooperative extension education programs have been particularly important. The major deficiency of these programs other than their limited size, has been the relationship between the farm and nonfarm sectors of the economy has not been fully exploited.

Stability and Responsiveness of Production

Research and education have provided considerable insurance against natural adversities. Through the application of modern technology, many destructive weeds, diseases and insect pests may now be controlled. Likewise, under current management practices, crops, range and pasture will tolerate much wider variation in weather conditions.

In a given stock period, agricultural production technology will not extend the existing stock of food and fiber to meet emergency demands. However, modern cultural methods and soil management would permit intensive use of the soil over a longer period without impairing yields and soils productivity if emergency demands required.

Price and Income Support and Stabilization

From 1932 to 1965, direct federal costs of supporting and stabilizing farm prices and incomes totaled approximately $50 billion. This is an average annual cost of approximately $1.5 billion. In recent years these costs have run somewhat higher, or at an average annual rate of approximately $4.4 billion.[14] As noted earlier, total costs of surplus disposal operations are not included in this figure. Price and income support and stabilization operations have been credited with the market value of domestically diverted and foreign relief commodities and with

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[14] Walter W. Wilcox has estimated the annual CCC costs of price and income support operations in the period 1961-65 to be 4.8 billion dollars with present programs. See Farm Program Benefits and Costs in Recent Years, Committee Print, U. S. Congress, 88th Session, 2nd session, October 6, 1964.

the dollar value of collections on P. L. 480 disposals. It should also be noted the program is credited with the value of transfers from surplus stocks during World War II and the Korean conflict.

Total costs to the public of price and income supports and stabilization exceed these direct costs.[15] Since the relevant characteristics of demand and supply for American agricultural products are not known, these additional costs cannot be estimated in any probability sense. However, I would venture a crude estimate these indirect costs equal 50 percent of the direct costs. Under this assumption, total economic costs of farm price and income support operations to the American public would have been $75 billion from 1932 to 1965 or an average of approximately $2.25 billion annually. In recent years these costs would have been approximately $6.6 billion annually or just under 1.5 percent of national income.[16]

Methods and Income Effects of Support and Stabilization

American farm prices and incomes have been supported primarily by limiting production and by direct market price supports through a government surplus management program. To a smaller extent, farmers have received direct benefit payments to supplement income received from the sale of farm products.[17] Farm price supports are intended to achieve two immediate objectives. The first is to eliminate highly unstable farm prices and payments for farm products and the hardships which this instability imposes on consumers and farmers. The undesirable instability in free market prices and payments for farm products results from an unstable and inelastic farm demand and supply in the

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[15] For a detailed discussion of theoretical considerations in measuring social costs of farm programs, see T. D. Wallace, "Measures of Social Costs of Agricultural Programs," Journal of Farm Economics, May 1962.

[16] These direct costs to the taxpayer in recent years of farm price and income supports are approximately 10 percent as large as the costs of conventional national defense programs. If indirect costs of farm programs are added, farm price and income supports are about 15 percent as large as conventional national defense expenditures.

[17] The National Wool Act Program and feed grain programs of recent years are major examples. At some time since 1932 many other commodities have received such benefit payments.

short run.[18] The second objective is to transfer income from the consuming public to the farmer through the mechanism of the inelastic demand for farm products to compensate for the downward pressure on farm incomes resulting from the relatively rapid increase in farm production in relation to demand.

If production controls were restrictive enough relative to the support price, government storage could operate as a "surplus-deficit" program, with little or no taxpayer costs. Products purchased in years when marketings from current farm production tended to force the market price below the support price could be sold in years when short production tended to force market prices above the support level. Support prices and production controls actually used have been such that large surplus storage and diversion programs have been necessary. The greatest percentage of the taxpayer costs described above has been incurred in this way.

Magnitude of income transfer. A number of estimates have been made of the size of the income transfer to agriculture through the mechanism of farm price and income supports.[19] Generally, these estimates indicate annual realized net income of farm operators would have been $5 to $6 billion or roughly 40 to 50 percent lower in the absence of these programs. The drop in realized income of farm operators would have been much more drastic than for other farm resource owners sharing in the gross receipts from farm marketings other than for rental payments to landlords not operating farms.[20] This results from the fact that realized net income of farm operators is a residual payment to equity in farm capital and managerial labor. In fact, to the extent farm outputs would be larger in the absence of price supports and production

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[18]It would be difficult to improve on the discussion on this point presented in T. W. Schultz, Agriculture in an Unstable Economy, McGraw-Hill, New York, 1945. See especially pages 10-43. See also Henry A. Wallace, "A Charted Course Toward Stable Prosperity," U. S. Department of Agriculture G-23, issued September 1934.

[19]See, for example, G. Brandow, "Direct Payments without Production Controls," Economic Policies for Agriculture in the 1960's, Joint Economic Committee Print, November 1960; Walter W. Wilcox, op. cit., and Luther G. Tweeten and Fred H. Tyner, "Excess Capacity in U. S. Agriculture," Agricultural Economics Research, January 1964.

[20]Rental payments to nonoperating landowners have historically been approximately 9 percent as great as realized net incomes of farm operators. Realized net incomes of farm operators have been in the 12 to 13 billion dollar range over the past decade.

controls, employment of and payments to owners of other farm inputs would likely be increased. This distribution of the income effects of price and income stabilization is a product of the method of controlling production and supporting prices and incomes.

Restricting production, supporting prices and incomes and distribution of income benefits. The major mechanism used to limit farm production has been some form of land use restriction. Under these programs, the limited right to produce has been allotted to the landowner on the basis of some historical production period. Further, the production right has been attached to particular parcels of land so the production right could only be transferred jointly with the land.[21] In addition, income payments to farmers have been made by supporting market prices of farm products produced and through conservation and/or diversion payments. Thus the benefits of restricting production and supporting prices and farm income have largely accrued to the landowner. Those people who earned their livelihood from agriculture but who owned no land were largely excluded from the benefits of price and income supports. Further, the benefits have in general been proportional to the size and net worth of the farm ownership unit.[22, 23]

In summary, it might be said the protection provided by price and income support and stabilization programs against fortuitous social costs imposed upon the farm population by agricultural adjustment has been highly selective. Those who had no equity or small equity in government rationed production rights have received little income protection from farm price and income stabilization and have born the brunt of agricultural adjustment costs. This fact is reflected to some extent in the income statistics of Tables 4 and 5. Although farm families constituted only 7 percent of the total population of families in 1962, they accounted for 16 percent of all families having less than $3,000 income. Further, a higher percentage of farm families were in the less-than-$3,000 class

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[21]Short-term transfers through leasing and releasing and reapportionment have been allowed to some extent.

[22]Some provisions have been made to pay larger benefits and/or higher support prices to small farmers. The cotton program provided for under the Food and Agriculture Act of 1965 is an example.

[23]There has been considerable purchase and sale of land since the price and income programs began. As a result, the present owners of land who have purchased since the program began might have received little or none of the income transfers being received by landowners as a group. Their gains, or lack of them, depend upon the extent to which these income transfers had been capitalized into the price of land at the time of purchase.

Table 4. Residence of farm families having less than $3,000 income in 1962[a]

Residence	Number of families (millions)		Percent of national total	
	All families	Less than $3,000 income	All families	Less than $3,000 income
Rural farm	3.3	1.5	7	16
Rural nonfarm	9.9	2.7	22	30
Urban	31.9	5.0	71	54
All	45.1	9.3	100	100

[a]Source: Health Education and Welfare Indicators, February 1964, p. viii, U. S. Department of Health Education and Welfare, Office of the Secretary.

Table 5. Incidence of poverty[a] by occupation of family head, 1962[b]

	Percent
All civilian workers	12
Farm owners or farm managers	45
Farm laborers or foremen	56
Laborers, except farm and mine	23
Domestic workers	74

[a]Percentage of families having incomes of less than $3,000.

[b]Source: Health Education and Welfare Indicators, February 1964, p. xii, U. S. Department of Health Education and Welfare, Office of the Secretary.

than any other occupational group except domestic workers. Farm laborers and foremen fared less well than did farm owners and operators.

Program Effects on Resource Use Efficiency in Agriculture

It has been estimated present price supports and production restrictions have allowed a 7 to 11 percent excess production of farm products in recent years.[24] This is a part of the indirect costs of the farm price and income support programs discussed earlier. This represents a diversion of resources to farm production and away from nonfarm uses. No further discussion of this inefficiency will be included. In addition, it is commonly argued restricting the land input through a land input restriction falsifies input prices and encourages an uneconomically large use of other factors; labor, fertilizer, machinery, etc.; per unit of land,[25] has prevented the reorganization of farm operating units to achieve improved efficiency and has prevented geographic shifts in production in response to changes in regional competitive advantage. On the other hand, efficiency might have been improved to some extent by the stabilization of prices as guides to production.[26] There might also have been a social gain from the improvement in soil conservation incentives.

Effects of land restriction. Land restriction as a means of controlling production has provided an incentive to economize in the use of land or to increase yields.[27] It is difficult to estimate the effects of this factor on resource use efficiency. It is not possible to determine the extent to which this incentive has encouraged research over time to produce yield increasing technology as opposed to research to economize in the use of other resources. In addition, the rates of substitution between land and other inputs at any given level of technology are not

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[24] See Tweeten and Tyner, op. cit.

[25] See, for example, T. D. Wallace, op. cit., and J. C. Williamson, Jr., "Quantity Quotas," pp. 252-262, Southern Agriculture, Its Problems and Policy Alternatives, Series 1, Agricultural Policy Institute, July 1961

[26] For a discussion of the effects on cost of output instability, see George Stegler, "Production and Distribution in the Short Run," Journal of Political Economy, June 1939, pp. 305-327, and A. G. Hart, Anticipation, Uncertainty and Dynamic Planning, University of Chicago Press, November 1940.

[27] See, for example, F. H. Maur, J. L. Hedrick and W. L. Gibson, The Sale Value of Flue-Cured Tobacco Allotments, Tech. Bul. No. 148, Virginia Agricultural Experiment Station, 1960.

generally known.[28] It is my own estimate unwarranted encouragement of yield increasing research as a result of the land restriction has not been large in agriculture as a whole. Likewise, I would expect for most controlled crops, other inputs are not a good substitute for land over the relevant range of prices. Consequently, I would not expect land restriction to have had an appreciable adverse effect on resource combination within agriculture. It should be noted, however, that use of a quantity quota rather than a land input restriction would have eliminated this incentive for inefficiency.[29]

The effect of attaching crop production rights to particular parcels of land has discouraged reorganization of farm ownership units into efficient operating units. For example, a farmer with too small an allotment to operate efficiently could not sell his rights and use the capital acquired to expand other enterprises. Undoubtedly, this has produced some inefficiency. However, adverse effects of this restriction can be overestimated. Leasing arrangements and other legal tenure arrangements to achieve efficient sized operating units have been used extensively. Published statistics do not reflect the extent of such arrangements. A shortage of entrepreneurship and managerial capacity in the farming community has probably limited the use of these techniques more than has the difficulties involved.

Over time, changes in the most efficient geographic distribution of farm production occur because of differential effects of technological change, demand and market structure. Allocation of production rights on a historical basis tends to prevent the change from being accomplished.[30] Adverse effects of this restriction are limited sharply by the relatively

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[28]Hartman and Tolley have estimated that the rates are low for flue-cured tobacco. See L. M. Hartman and G. S. Tolley, Effects of Federal Acreage Controls on Costs and Techniques of Producing Flue-Cured Tobacco; Tech. Bul. No. 146, North Carolina Agricultural Experiment Station, 1961.

[29]For crops where quality characteristics are highly correlated with yield, this conclusion might not hold. Flur-cured tobacco seems to be such a crop.

[30]E. O. Heady and his colleagues have made some estimates of the extent of such unrealized geographic shifts. See, for example, E. O. Heady, "Potential Shifts in Commercial Agriculture Relative to Technological Change; Policies for Long-Run Solution to Surplus Problems," in Our Stake in Commercial Agriculture, Rural Poverty and World Trade, Center for Agricultural and Economic Development Report No. 22, Ames, Iowa, 1965; and A Programming Analysis of Interregional Competition and Surplus Capacity of American Agriculture, Iowa Agricultural and Home Economics Experiment Station Research Bul. 358, Ames, Iowa, July 1965.

small share of total agricultural production which is restricted in its geographic mobility by control programs. While the cost of this inefficiency is not negligible, it is probably fairly small in magnitude.

Effects of price stability. Improvement in farm price stability over a free market situation has been an important factor affecting farmer decisions. Farmers have been able to risk capital investments to pursue efficiency without regard for the larger degree of output flexibility needed in an unstable price situation. Given the nature of the farming operation, I would expect costs of acquiring flexibility to be large. Therefore, I would argue a sizable share of the increase in farm efficiency in recent years is attributable to stabilized prices. It is even possible that in a free market the average price of farm products over a period of several years would approximate the current support level as a result of the resulting upward shift in the agricultural supply schedule. As noted in the section on "Agricultural Research and Education" a part of the increased returns attributed to research and education might have resulted from the increased efficiency induced by stable prices.

Effects on conservation. An explicit objective of farm programs since the early 1930's has been to encourage conservation of the land's productivity. Benefit payments and even eligibility for price supports have been contingent upon meeting soil conserving goals. These efforts have undoubtedly raised the average level of productivity of the nation's land resources above what it otherwise would have been. Further, the land would sustain a higher level of production over a period of a few years under adverse weather conditions. It is doubtful whether this level of conservation is actuarially sound with expected peacetime market demand and probable weather conditions. Its major value is as insurance against emergency conditions of war or extreme drought as discussed earlier in the section on "Research and Education."

Price Support Stocks as Emergency Demand Insurance

One of the major costs of price and income supports and stabilization is the storage, transportation and carrying charges on surplus stocks. These costs amount to approximately 15 percent of total cost of these programs. These stocks are obviously far in excess of national needs under any expected emergency. However, they must be given some credit as social insurance against extreme conditions of wartime demand. Stocks available at the beginning of World War II did make a sizable contribution to the war effort. It is not clear whether the advent of nuclear war increased or decreased this insurance value of surplus stocks. On the one hand, the possibilities of an extended disruption of production have increased; on the other, the possibility storage stocks may be rendered unusable has also increased.

Conclusions

Costs to the American public of the two major types of farm programs, research and education and price and income support and stabilization have been large. Direct tax outlays alone have been sizable. There have been additional indirect costs. Food and fiber costs have been increased by price and income support and stabilization programs and these programs have created some resource use inefficiencies both within agriculture and between agriculture and other sectors of the economy. Further, the adjustment in agricultural resource use arising from technological advance created by research and education have imposed sizable fortuitous social costs upon some parts of the farm population.

Benefits the American public has received from these programs have also been large. A low cost food and fiber supply for ourselves and allies, increased economic efficiency and rapid overall economic progress have been promoted by research and education. Stabilization of farm prices has also helped to promote farm efficiency. Improved technology, storage programs and improved farm resource conservation have helped to insure a secure food and fiber supply against emergency conditions of demand and supply. Price and income programs have been effective in transferring large sums from society at large to some of the owners of farm resources who were adversely affected by agricultural adjustment.

There are two major deficiencies in these programs. First is the highly selective nature of income transfer into agriculture--a transfer largely accrued to landowners. Other resource owners in agriculture have received little assistance from the nonfarm sector in minimizing or adjusting to the change in demand for resources in agriculture.

The second major deficiency is the narrowly conceived nature of programs to help rural people who are disadvantaged by technological advance and social adjustment. Solution to the problems of agriculture's disadvantaged does not lie in agriculture alone. Stability in economic activity, a rapid rate of growth in the nonfarm economy and in nonfarm employment opportunities and programs to help fit people for new jobs are essential parts of a total farm program.[31] Development of programs of this kind plus programs to achieve international economic development are essential if we are to reduce the costs of and realize the full benefits

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[31] With an effective total program of this kind, income transfers to landowners might be defensible since land would be the resource specialized to agricultural production.

from programs of research and education and price and income support and stabilization in agriculture. Fortunately, public support for such programs has developed rapidly since the 1946 Employment Act established a firm policy that government has a direct responsibility for maintaining a high level of employment. Recent legislation confirms support for such broad programs to assist in making economic and social adjustment.

Past programs of agricultural research and education and farm price and income support and stabilization could have been improved; but the benefits which they provided the American public would appear to greatly exceed their costs.