PROCEEDINGS 1967

WESTERN FARM ECONOMICS ASSOCIATION

Fortieth Annual Meeting
July 19-21, 1967
Las Cruces, New Mexico

SOME OBSERVATIONS ON AGRICULTURAL CONSERVATION PROGRAMS

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Nearly forty years ago H. H. Bennett preached to the American public that "an era of land wreckage destined to weigh heavily upon the welfare of the next generation is at hand" and exhorted it to proceed immediately with soil erosion control programs "to help the present generation of farmers and to conserve the heritage of posterity."[1/] The evangelism of Bennett and others was given vitality and meaning by economic and climatic conditions in the 1930's and public programs to protect agricultural soil resources were enacted. Today we must measure the cumulative public expenditures through these programs in many billions of dollars.

Statistics regarding the extent of participation and the physical accomplishments of agricultural conservation programs are impressive. The Soil Conservation Service has made soil surveys of nearly nine hundred million acres. Under its technical assistance program over one and one-half million basic farm conservation plans have been developed.[2/] The Great Plains Conservation Program, administered by the Soil Conservation Service and designed to stabilize soil resources and the agricultural economy of the Plains, has nearly twenty-four thousand participants and over forty-five million acres under contract.[3/] In 1966 over a million farms participated in the Agricultural Conservation Program through which most of the cost-sharing for establishment of conservation practices is implemented. This program is commonly known as the ACP and is administered by the Agricultural Stabilization and Conservation Service. Since 1936 it has assisted farmers in the establishment of more than one and one-half million miles of terraces that protect nearly thirty million acres, contour farming of nearly one hundred and forty million acres, drainage of nearly forty-seven million acres of farmland, and the leveling of nearly nine million acres of land to control erosion and conserve irrigation water.[4/]

This writer has little doubt that these agricultural conservation programs have significantly reduced the erosion of soil from wind and water forces. But in addition to the physical effects of these programs, there are undoubtedly many associated nonphysical externalities. These also are important to the public interest and form the main subject of this paper.

This paper will discuss (1) the nature of the soil conservation problem and the public interest in it, (2) the relationship of agricultural conservation programs to the contemporary problem of agricultural surpluses, (3) the income distributive effects of agricultural conservation programs, and (4) the relationship of agricultural conservation programs to national economic progress. Reference is made

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1/ H. H. Bennett and W. R. Chapline, Soil Erosion A National Menace, USDA Circular No. 33, April, 1928 (U. S. Government Printing Office, 1928) pp. 22-23.

2/ U. S. Department of Agriculture, Agriculture Statistics 1966, (U. S. Government Printing Office, 1966) pp. 556, 559.

3/ Unpublished data from the files of the Budget and Finance Division, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C.

4/ Agricultural Stabilization and Conservation Service, U. S. Department of Agriculture, January 1967, Agricultural Conservation Program--Summary Fiscal Year 1966, pp. 2, 125, 126.

to only three public conservation activities: (1) the Agricultural Conservation Program, (2) the Great Plains Conservation Program, and (3) the technical assistance given to farmers in connection with these programs. The scope of this paper is confined to the traditional soil conservation aspects of these programs. Broader objectives of conservation programs, including flood control, water pollution abatement, recreation development, wildlife habitat improvement, rural community development, and the guidance of development on rural-urban fringes, are not considered.

Nature of the Soil Conservation Problem and the Public Interest

An optimum public level of conservation of a fund resource such as soil is achieved by a rate of use which maximizes the net social product from the resource overtime. 5/ It follows from this concept that the word "conservation" means the wise intertemporal use of a resource. The optimum use rate is affected by changes in the intertemporal rates of substitution in consumption between other products and the products of the resource, and in production, between the resource and other alternative resources. Changes in consumption substitution rates are largely due to changes in consumer preferences and values. Changes in production substitution rates occur principally as the result of the development of new production techniques.

Achievement of an optimum public level of conservation is a practical impossibility as this level is dependent upon current and prospective aggregate demands for all products by all consumers, including those not yet born, and present and future production possibilities. Conservation investment decisions would have to be based upon perfect knowledge into perpetuity of future changes in consumer preferences and values and production techniques. Certainly such clairvoyance is not possessed either by those people who make conservation investment decisions or by economists who attempt to assess the validity of them.

Private and public objectives in the conservation of fund resources are quite different. These differences stem from the short planning horizons of individuals versus the longer and perhaps infinite planning horizon of society.

An individual's planning horizon tends to be limited by his life expectancy. Consequently, his rate of use of a fund resource under his control is likely to be consistent with maximizing the net returns to this resource over a relatively short period of time. Conservation investments usually will be borne by the individual only to the extent that a positive payoff is likely to accure to the investment within his planning horizon. Whether or not the resource is available to future generations often is of little real consequence.

Although society is a collection of individuals, its planning horizon is long-run. Society is concerned with population growth, increased consumer demands and the relatively fixed supply of fund resources. It does feel a responsibility for assuring that future generations are not deprived of production resources. Its time preference in resource use is oriented not only towards the present but towards the future as well. Accordingly, the social objective in resource use tends to be less exploitive than the private. The eminent economist Pigou succinctly summed up this social interest in conservation of resources when he stated:

> There is wide agreement that the State should protect the interests of the future in some degree against the effects of our irrational discounting, and of our preference for ourselves over our descendants.

5/ The term "net social product" is used in preference to other more explicit terms to reflect all direct and indirect outputs and costs accruing to resource use, including those which are market-valued as well as those which are not.

> The whole movement for 'conservation' in the United States is based upon this conviction. It is the clear duty of Government, which is the trustee for unborn generations as well as for its present citizens, to watch over, and if need be, by legislative enactment, to defend the exhaustible natural resources of the country from rash and reckless spoliation. 6/

Public concern over future aggregate demands for food and fiber resulting from an increased population coupled with uncertainties regarding the ability of new production technology to endlessly and easily meet these demands provide the rationale for public expenditures to conserve the Nation's soil resources. There seems to be little disagreement among those who have written on the subject that soil conservation is a prudent public policy objective. There is considerable disagreement, however, over the level of conservation that should be supported with the expenditure of public funds.

In view of uncertainties regarding the future, the long-run public interest probably is served by expenditures inducing a level of conservation that maintains the inherent productive capacity of soil. Certainly, society with its long-run perspective can ill-afford to permit physically or economically irreversible soil erosion processes to take place. Maintenance of productive capacity will permit conservation investments to enhance the productivity of soil if and when need for products arises. 7/ Considering that production technology has tended to produce more food and fiber than domestic and export markets could absorb during most of the entire history of soil conservation programs and that prospects are for a continuation of this imbalance for at least the intermediate future, it is much more difficult to develop a rationale for past and present expenditures that enhance the productivity of soil. 8/ The extent of such investments under present conservation programs is the subject of the next section of this paper.

Productivity Enhancement Aspects of Soil Conservation Programs

Although it is not possible to neatly and accurately classify each of the fifty cost-shared practices under the Agricultural Conservation Program according to whether they enhance the productivity of the soil or merely conserve the present productivity, some generalizations seem appropriate. There would seem to be little doubt that the eight cost-shared practices that deal with drainage and irrigation are output-increasing and that their contribution to the maintenance of soil

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6/ A. C. Pigou, The Economics of Welfare (The Macmillan Co., London. 4th ed., 1932) p. 29.

7/ The concept of "conservation" accepted in this paper does not preclude investments that would enhance the productivity of soil. It merely requires that there be a demand for the products and that such investments represent an economic alternative in satisfying this demand. For an elaboration of this view see: John F. Timmons, et. al., Committee on Soil and Water Conservation of the Agricultural Board, Principles of Resource Conservation Policy, With Some Applications to Soil and Water Resources (Washington: National Academy of Sciences--National Research Council, 1961), Publication 885.

8/ Several studies have suggested that we will continue to have excess agricultural production capacity in the future in the United States. One of the more notable is a 1962 study by the U. S. Department of Agriculture in which it was estimated that 1980 food and fiber requirements could be met with a net reduction of 51 million acres of cropland from the 1959 base. These results may be found in: U. S. Department of Agriculture, Land and Water Resources--A Policy Guide (U. S. Government Printing Office, May, 1962).

productivity is dubious. These practices include: permanent open drainage; underground drainage; shaping or land grading to permit better drainage; reorganization of irrigation systems; leveling of irrigable land; construction of dams, pits or ponds to conserve water for irrigation; lining of irrigation ditches; and construction of spreader terraces or dikes to permit beneficial use of runoff. Over seventeen percent of all ACP cost-share payments to farmers were made for these practices in 1966. 9/

Two studies of the Agricultural Conservation Program have included a number of other practices as principally output-increasing and have concluded that a much higher percentage of ACP payments to farmers are made for practices that have a negligible effect upon maintaining the present productive capacity of the soil. Cotner, when considering fertilizer materials for establishing cover along with irrigation and drainage practices as output-increasing found that slightly more than half of the ACP payments to farmers enhanced the productivity of soils. 10/ Clawson and Held in their recent book on soil conservation assert that cost-sharing for liming materials, phosphate materials, control of competitive shrubs on rangeland, the various measures for improved livestock water, improvement of established stands of trees, and the various kinds of drainage and irrigation improvements all result in the building of new productive capacity and found that in 1961 nearly one hundred million dollars or about forty percent of the ACP payments to farmers were made for these practices. 11/

Irrigation practices, including construction of spreader ditches and dikes, reorganization of irrigation systems, leveling of land, construction of dams and pits to hold irrigation water, and the lining of irrigation ditches also are eligible for cost-share payments to farmers under the Great Plains Conservation Program. These practices accounted for more than twelve percent of cost-share payments to farmers in 1966 and nearly sixteen percent of all cost-share payments since the program began. 12/ Unlike the Agricultural Conservation Program, drainage practices are not eligible for cost-sharing under the Great Plains Conservation Program.

It seems evident that a large share of the public expenditures under the Agricultural Conservation Program and a smaller but nontheless significant share under the Great Plains Conservation Program cannot easily be supported by a conservation rationale based upon maintenance of present productivity. Presumably, the output-increasing effects of some cost-shared practices have contributed to the excess of agricultural production that other costly public programs have sought to correct. If this is true, there has been a certain amount of inconsistency among the several agricultural programs, and some portion of the agricultural surplus problem may be rooted in the operations of conservation programs. Verification of this apparent inconsistency and its measurement needs to be further researched as a guide to future conservation policy.

Distributive Effects of Agricultural Conservation Programs

Frequent concern has been expressed over the likelihood that a significant share of the benefits from public agricultural programs are capitalized into the

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9/ Agricultural Stabilization and Conservation Service. Op. cit., p. 2.

10/ Melvin L. Cotner, The Impact of the Agricultural Conservation Program in Selected Farm Policy Problem Areas, Agricultural Economics Mimeo 943, March, 1964, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, p. 4.

11/ Marion Clawson and R. Burnell Held, Soil Conservation in Perspective (The Johns Hopkins Press, Baltimore, Maryland, 1965) p. 181.

12/ Unpublished data from the files of the Budget and Finance Division, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C.

value of land resulting in landowners being the principal beneficiaries. Most of this concern and empirical studies of the phenomenon have been focused upon price-support and acreage-allotment programs wherein the right to produce is tied to particular tracts of land.13/ Studies have yielded results which quite convincingly show that this does in fact happen in the case of price-support and acreage-allotment programs for at least some commodities.14/ It has also been hypothesized that conservation payments and conservation technical assistance services are capitalized into land values.15/ This writer believes that although some of the practice payments are of the type that may be capitalized into land values, the general hypothesis that agricultural conservation program benefits are substantially capitalized into land values certainly needs strong empirical verification before acceptance.

Benefits from public programs are capitalized into land values when the programs provide reasonable assurance of increased future net returns to identifiable units of land and prospects of these increased returns are evident to perceptive buyers and sellers. Price-support and acreage-allotment programs rather fully meet these conditions. Allotments, or the rights to produce, are tied to historical production on particular units of land. Returns for alternative uses of the land usually are much lower in nonallotment crops and this is common knowledge to prospective buyers and sellers. And certainty of expectations is provided both through price-support and the long history of allotments.

In contrast, the effects of many of the cost-shared conservation practices on net returns over a period of time are much less evident to the land buying and selling public. Many of these practices resemble short-run production inputs and cost-sharing takes on the characteristics of supplementing production capital of farmers. Fertilizer and lime materials, for example, may have an immediate output-increasing and cost-decreasing effect, but little or no residual effect beyond a few years. Cost-shares for these practices could hardly be expected to be significantly reflected in land values that are derived from capitalizing expected future net returns over a long period of time. This is also true for those practices which have neither an output-increasing nor long-run cost reducing effect. Such practices may account for as much as half of the cost-share payments to farmers.

13/ For a good review of literature concerned with the effect of price-support and acreage-allotment programs upon farmland values see W. B. Back, James L. Hedrick, and W. L. Gibson, Jr., "Effects of Acreage-Allotment, Price-Support Programs, Upon Farmland Values," Incidence of Benefits and Costs of Selected Public Programs Affecting Agriculture, Bulletin 576, September 1966, Virginia Agricultural Experiment Station. Blacksburg, Virginia. pp. 53-67.

14/ See for example John E. Mason, "Acreage Allotments and Land Prices," Journal of Land and Public Utility Economics, May, 1946. Frank H. Maier, James L. Hedrick, and W. L. Gibson, Jr., The Sale Value of Flue-Cured Tobacco Allotments, Bulletin 148, April, 1960, Virginia Agricultural Experiment Station, Blacksburg, Virginia. Marion Clawson and Burnell Held, "Demand for Rural Resources in the Context of Long-Range National Needs," Journal of Farm Economics, Vol. 46, No. 1, February 1964. Walter E. Chryst "Land Values and Agricultural Income: A Paradox?" Journal of Farm Economics, Vol. 47, No. 5, December 1965.

15/ For example, W. B. Back and J. Dean Jansma, "Some Distributional Effects of Public Investments to Develop Farmland," Incidence of Benefits and Costs of Selected Public Programs Affecting Agriculture, Bulletin 576, September 1966. Virginia Agricultural Experiment Station, Blacksburg, Virginia, pp. 11-30.

The eligible practices for cost-sharing under the Agricultural Conservation Program and the Great Plains Conservation Program which could be expected to be capitalized into land values are those which somewhat permanently enhance the productivity of land or become permanent and beneficial attachments to the land. These practices would include all of those relating to irrigation and drainage as well as facilities such as wells for livestock water, fences, and so forth. Returns from these practices may be expected to accrue throughout a period long enough to significantly affect the capitalized value of land.

Clawson and Held in their recent book observed the lack of a positive relationship between the adoption of soil conservation practices and land values when they stated:

> The land market, as nearly as we can tell, places relatively little value on soil conservation measures, or on a farm's conservation health or lack of it. That is, a well kept farm, with a practical minimum of soil erosion, is likely to sell for somewhat more than a rather run-down one in the same locality with similar basic soil conditions; but the difference in price is not likely to be anywhere near as much as it would cost to rejuvenate the poorer land. 16/

Of course, neither casual observations such as this nor hypotheses regarding why agricultural conservation program benefits should not be capitalized into land values are very convincing or shed much light on the subject. Research similar to that which has been conducted on price-support and acreage-allotment programs is needed for a better understanding.

There are, however, strong indications that agricultural conservation programs have resulted in income transfers from nonagricultural sectors of the economy to agriculture, although perhaps not principally via the land market. Such income transfers have taken place to the extent that practices have been subsidized which would have been adopted by farmers in the absence of subsidies. It has been noted before that some practices have a dubious effect upon maintenance of land productivity but closely resemble supplements to annual production expenses. Certainly included among these practices are payments for seed, fertilizers, liming materials and so forth.

Income transfer is the deliberate objective of many, if not most, of our public programs. Indeed, it has been suggested that "ACP payments began in 1936 as a form of a 'gentle rain of Treasury checks' upon improvident farmers" after the Supreme Court had nullified the first AAA and an "alternative form of federal assistance for the destitute farmers had to be devised." 17/ In this context, it should also be noted that the early programs of the Soil Erosion Service, predecessor to the Soil Conservation Service, were perhaps motivated as much by the need to provide employment in 1933 and 1934 as by the public concensus to control soil erosion. 18/ Today we see many specific programs designed to transfer income to particular groups. These include the Social Security Program, unemployment insurance, minimum wage, and a host of programs in connection with the "War on Poverty". That public programs, including agricultural conservation program, do involve income transfers should neither surprise anyone or imply that these

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16/ Marion Clawson and R. Burnell Held, Soil Conservation in Perspective, op. cit., p. 265.

17/ Rose B. Talbot, "The Political Forces," Land Use Policy and Problems in the United States (University of Nebraska Press, Lincoln, Nebraska 1963) p. 163.

18/ For an interesting account of the formative period of the soil conservation movement see Robert J. Morgan, Governing Soil Conservation, (The Johns Hopkins Press, Baltimore, Maryland, 1965) Chapters I and II.

programs are inconsistent with the public interest. For any program, however, it is important to know the incidence of income transfers within the intended recipient segment of society. In connection with income transfers brought about by agricultural conservation programs, the question of "which farmers are the principal beneficiaries" is posed.

Cotner, in his analysis of the Agricultural Conservation Program, concluded that "larger than average farms receive most of the conservation assistance . . . and the smaller farms which presumably have similar physical conservation problems as larger farms are not receiving a proportionate share of financial assistance". 19/ An analysis by this writer of participants in the Great Plains Conservation Program in Colorado leads to a similar conclusion.

Participation in the Great Plains Conservation Program was analyzed by classifying and grouping all participants in the thirty-five Colorado program counties according to the acreage in their farms. Acreage intervals within which the participants were grouped were identical to those reported in the 1964 Census of Agriculture thus permitting comparison of the distribution of program participants with the distribution of all farms in the thirty-five counties. The Census reported 18,507 farms in these counties in 1964 and there were 1,424 farms under Great Plains Conservation Program contract as of June 30, 1966. Comparison of the two distributions of size of farm reveals the following: 20/

1. Twenty-six percent of all farms were larger than one thousand acres compared with forty-nine percent of the farms participating in the program.

2. Forty-four percent of all farms were less than two hundred and sixty acres in size, but only seventeen percent of the participating farms were this small.

3. Slightly less than eight percent of all farms were participants in the program. However, more than fourteen percent of the farms larger than one thousand acres participated compared with less than three percent of those below two hundred and sixty acres in size.

Analysis of federal cost-share obligations under the Great Plains Conservation Program in five Colorado counties indicates that among the participants the larger farms receive the greatest share of the federal payments. 21/ Highlights of this analysis are as follows:

1. More than half of the federal expenditures went to farms greater than two thousand acres in size although these farms made up less than thirty percent of the total participants.

2. More than three-fourths of the federal expenditures went to farms greater than one thousand acres in size and these farms comprised fifty-six percent of all participants.

3. Slightly more than eight percent of all participants farms were less than two hundred and sixty acres in size. They received less than four percent of the federal payments.

19/ Cotner, op. cit., pp. 14-17.

20/ Comparisons are approximate inasmuch as data from the Census of Agriculture are for 1964 and program data were accumulated over the period 1958-66. Any farm, however, can enter into only one contract and lack of consistency in the dates is not believed to seriously distort the actual comparative distributions.

21/ These data were taken from a study in process and had been summarized for only five of the thirty-five Colorado program counties.

4. The average cost-share payment to farms greater than two thousand acres in size was approximately $8,700 compared with average payments of about $2,340 to farms of less than two hundred and sixty acres.

The apparent tendency for public conservation expenditures on private lands to be applied to the larger farms is probably due mainly to differences in socio-economic characteristics between large and small farm owners rather than to the deliberate design of conservation policy. From the viewpoint of maximizing the physical units of practices applied with a given conservation budget, current program operations are undoubtedly more efficient than they would be if smaller farms received a greater proportion of the assistance. Presumably there are administrative and technical economies realized by planning and sharing the costs of practices on fewer but larger farm units.

The income distributive effects of public programs, however, may be more important than program efficiency. If it can be assumed that the size of farm and net asset position of farm owners are positively and closely correlated, whatever benefits accrue to farm owners from conservation programs are mainly received by those people who need financial assistance the least. This would have the effect of further widening the income and wealth positions of farmers and would accelerate the trend toward larger and fewer farms in agriculture. Such an effect, although not necessarily socially undesirable, would be incompatible with some other public programs, particularly those in the agricultural credit field.

Agricultural Conservation Program Contributions to the National Economy

The agricultural technological revolution of the last thirty years has in an important way facilitated national economic progress. Adoption of production technology has resulted in the substitution of capital for labor and land in supplying the country's demands for food and fiber. These latter resources have been released from agriculture for employment in other productive sectors of the economy.

Agricultural conservation programs, it would seem, have stimulated the adoption of production technology in agriculture. Cost-sharing has reduced the farmer cost of some production and development inputs and, therefore, has served as a monetary incentive to adopt certain per unit production cost-reducing practices. The extent to which such practices would have been adopted in the absence of cost-sharing is unknown, but certainly would have been less. In addition to the direct monetary incentives to adopt cost-reducing practices, these programs may have had a demonstrational or "trickle down" effect in bringing about the adoption of more cost-reducing practices than were actually cost-shared.

A significant proportion of the farmers in the United States have used the conservation farm planning services available through the Soil Conservation Service. These services have, in effect, made available to farmers free farm management advice. Although many would argue the point, it is the belief of this writer that these services have contributed to the efficient producing agriculture that we have today. County work unit conservationists are graduates of agricultural colleges and have received training not only in techniques of production but in the efficient organization of production as well. The results of this training are embodied in conservation farm plans consistent with the physical criteria underlying recommended land use and treatment.

Another way in which agricultural conservation programs could contribute to the economic well-being of the nation is to encourage a product mix forthcoming from agriculture consistent with changing consumer demands for food and fiber. As real incomes have risen the per capita consumption of meats, dairy products, fruits and vegetables has increased and the per capita consumption of flour and cereal products has declined. These trends are expected to continue into the foreseeable future. Changes in the mix of agricultural production, therefore, consistent with changing consumer demands involve increased production of meat animals, forage and feed grains and decreased production of food grains.

It seems reasonable to believe that agricultural conservation programs have fostered changes in land use that are consistent with changing consumer demands for agricultural products. Regrassing and the improvement of vegetative cover together with the associated application of lime and fertilizer materials as well as the construction of fences and livestock water facilities have all tended to encourage livestock production. The use of land to which irrigation and drainage practices are applied tends to be toward the more intensive feed grain crops rather than wheat.

The above discussion would appear to support the conclusion that some of the principal effects of agricultural conservation programs have not been inconsistent with national economic progress. There are dangers, however, in directly attributing some small share of economic growth to these programs. It is quite possible that adoption of agricultural production technology, organization of farms into efficient units, and land use adjustments might have occurred to the same degree in response to economic forces and in the complete absence of conservation programs.

Concluding Comments

The observations in this paper are drawn from limited data and involve to a large degree conjecture and value judgments of the writer. These observations may be distilled into the following:

1. A prudent public soil conservation policy is that of maintaining the productive capacity of soil resources. Uncertainties regarding the demands for agricultural products and the extent to which technological innovations will be available and adopted dictate against permitting exploitive use of soil. Past, current and foreseeable demands for agricultural products coupled with the productive capacity of American agriculture do not provide a rationale for soil productivity enhancement as a function of current conservation policy.

2. A vast amount of conservation practices have been applied to the land as a result of soil conservation programs. These practices have been effective in reducing soil erosion from wind and water forces.

3. A significant portion of the practices cost-shared under agricultural conservation programs result in increased production and productivity enhancement of the soil. Some cost shares resemble supplements to annual production expenses, others are for enduring improvements to the land.

4. Soil conservation programs have resulted in a transfer of income to agriculture from nonagricultural segments of the economy. Within agriculture those farmers in the better economic positions have been the principal recipients of conservation payments.

5. Some probable effects of conservation programs include stimulation of the adoption of production technology, increased efficiency in farm organization, and influences on the product mix forthcoming from agriculture consistent with changing consumer demands. These effects have been compatible with national economic progress.

These observations result in an indeterminate assessment of soil conservation programs. On the one hand, we may note physical accomplishments in reducing soil erosion losses. These losses were the principal concern of the early soil conservation movement. Furthermore, it is rather likely that some of the effects of these programs are compatible with national economic growth. On the other hand, we may note that soil conservation programs likely have contributed to the surplus

production problem in agriculture and to disparity of income among farmers. Social costs have been incurred through other concurrent public programs designed to mitigate these consequences.

The net effects of soil conservation programs, therefore, are not clear as the economic costs resulting from them must be compared with the possible economic gains accruing to them. The relative magnitudes of these values are unknown. Difficulties in assessing the net effects are not unique to conservation programs but apply to all public activities that have contributed to technological innovation and adoption in agriculture and have influenced the distribution of income. Federal and State agricultural research and extension activities are good examples.

Soil conservation programs began in the 1930's with mixed objectives of erosion control, providing employment to bolster the national economy, and supplementing farm income. These program objectives were part of and consistent with broader public policy objectives of the times. The soil conservation programs of today retain many of their original features designed to contribute to objectives appropriate when they were enacted.

Perhaps a most relevant question now is "What are the public policy objectives of 1967 and how may soil conservation programs as well as other institutionalized public programs best be modified or adapted to serve these objectives?" Presumably, in a dynamic economy, public policy objectives change over time. It is doubtful, however, that institutionalized public programs exhibit the same flexibility. As goals change and programs remain rigid inconsistencies between goals and programs and among the various programs are certain to develop. The Program Planning and Budgeting System recently adopted by Federal Departments is a positive step toward clearer definition of public policy objectives and greater consistency among programs in meeting them. We can all hope that it will be effective.

DISCUSSIONS OF

CONTRIBUTIONS AND PROBLEMS IN USING LINEAR PROGRAMMING
by
Norman K. Whittlesey and Ray F. Brokken

and

THE PERSONAL DISTRIBUTION OF FARMERS' INCOME
BY SOURCE OF INCOME AND REGION
UNITED STATES, 1964
by
Joseph D. Coffey

Roger Gray
Stanford University

I judge that we may be witnessing the beginning of the transition between Linear Programming as an interesting plaything (insofar as spatial models applied to policy questions are concerned) to a useful tool in empirical analysis. We paid a high enough price, in terms of absurd results, e.g., in the early interregional studies, which had to be excused ex post, as methodological exercises.

The projections which Whittlesey and Brokken refer to add up to a rather bleak prospect. The excess capacity in crop production was not discovered through linear programming, of course, but the estimated magnitudes which have been derived have undoubtedly had a sobering effect. Major drought or massive Food for Peace expenditures would need to be envisioned in order to strain our productive capacity. If the prospect of a "good shaking down" was never very great (and may be even more remote owing to these studies); still the course of a "gradual shaking out" can be better charted (and perhaps this prospect can be deemed somewhat higher owing to linear programming).

In contemplating the magnitude of the adjustment problem it is well to remind ourselves of the causes of maladjustment and the costs of its continuance. Had linear programming been as far advanced thirty years ago as it is today we might never had had the Agricultural Adjustment Act of 1938. As efficient and useful as linear programming now promises to be in helping us visualize policy alternatives, it is well to remember that we have long known a superior system for receiving, generating, and responding to information. Heller expressed it well recently in saying:

> ". . . It is hard to study the modern economics of relative prices, resource allocation, and distribution without developing a healthy respect for the market mechanism on three major scores; first, for what Robert Dorfman calls its "cybernetics," for the incredible capacity of the price system to receive and generate information and respond to it; (Robert Dorfman, The Price System, Englewood Cliffs, N. J.: Prentice-Hall, 1964, p. 7); second for its technical efficiency and hard-headedness as a guide to resources and a goad to effort and risk-taking; and third, for its contribution to political democracy by keeping economic decisions free and decentralized."1/

Some of our agricultural programs have already had the deliberate aim of restoring influence to the marketing system. I would hope and expect that linear programming models will help to guide us along this path.

1/ Walter W. Heller, New Dimensions of Political Economy (New York, N. Y., W. W. Norton and Company, Inc., 1966, p. 8).

Turning now to the study of income distribution on which Dr. Coffey has reported, let me say first how gratifying it is to find him, like Brokken and Whittlesey, turning his considerable talents to a study of difficult and neglected economic problems. It has long been suspected, quite apart from the other economic consequences of our agricultural commodity programs, that they may have been regressive in their effects upon income distribution within agriculture. Coffey's tentative confirmation of this suspicion needs to be pursued vigorously.

Beyond this, his caveat regarding aggregation should be heeded. If there is a large viable economic segment which can be identified under the heading of commercial agriculture, and distinguished from other segments which are sustained only by governmental programs, or which have been left behind by the programs as well as by progress, this segment needs to be identified. Both of the papers which I am reviewing have relevance to this need, although neither fulfills it.

Dr. Coffey is not the first to have encountered less than full objectivity and cooperation from the U. S. Department of Agriculture--nor will he be the last--but I would not have this construed as cynicism. On the contrary, I am greatly encouraged by the likes of the papers here under review.

Comments on
SOME OBSERVATIONS ON AGRICULTURAL
CONSERVATION PROGRAMS
by
Norman E. Landgren

by
Walter E. Chryst
Director, Human and Natural Resources Division
National Advisory Commission of Food and Fiber

One would like to start with the cheery thought that the writer has brought us a paper that is both new and stimulating. Unfortunately, I find Dr. Landgren's paper depressing. This is not the fault of Dr. Landgren--indeed, he has done an excellent job of reviewing our conservation programs, their evolution and their current status. His conclusion appears handy, but it is the only one available. Given the subject, he is about as cheerful as an economist ever gets.

I am in general agreement with Dr. Landgren's presentation and his conclusion. There is a temptation to engage in the nitpicking that is customary for these occasions. His delineation of the public interest in soil conservation, which I feel is too broad, appears inviting, as is his definition of conservation (also too broad and for the same reasons) and his argument that conservation benefits are not capitalized into land values. These are minor differences, however, and the important points are Dr. Landgren's conclusions. Perhaps the best use of these few minutes is to comment on and amplify the conclusion section of this paper.

Dr. Landgren suggests that the public has bought a lot more than conservation for $10 billion plus in the past 30 years. We have gotten a great deal of production from our conservation dollars at a time when we were spending other dollars to restrain production. We have gotten some income redistribution for the money, although, in general, those who had now have more. This may turn out all right in the long run, particularly if we find an increasing marginal utility of income in our society.

We have gotten a great deal of conservation. However, there is some question whether some of the publicly supported activities in the name of conservation are not really exploitative (much of the drainage work for example) with the result that in some areas conservation has been set back. There is the further question whether conservation funds have always been directed toward the land subject to the greatest hazard. Also, we have cropped millions of acres more than a least-cost agriculture would have required, thus contributing to our own conservation needs.

The appraisal of soil conservation is difficult if not impossible, for much of the soil conservation payment is production subsidy, some activities are exploitative rather than conservation, and many of the benefits are nebulous and are diffused or intangible.

The objectives of the program are not clear--they were not clear after conservation became the primary vehicle for income transfers to agriculture, they became less clear when conservation was extended to encompass resource development activities.

The relevant question, Dr. Landgren states is "What are the public policy objectives of 1967 and how may soil conservation programs as well as other institutionalized public programs best be modified or adapted to serve these objectives?"

This question deserves the earnest attention of everyone interested in effective resource use. If, after 30 years, we are not sure of what we have accomplished, do not know where we want to go, and are uncertain what conservation is, it is time for a reappraisal of our conservation program.

This evaluation is particularly important as the agricultural economy becomes more dynamic--as demand changes, as some export markets expand and others contract, as technology offers new and cheap substitutes for the inherent powers of the soil, as land forming equipment offers new opportunities in correcting and retarding erosion, as desalinization and water conveyance may bring new areas into production, as restraints may be relaxed enabling crop production to move to regions of greater comparative advantage, and as improvement in transport and storage may change the relative advantage of the various regions. This is only to say that we are in an era of rapid change, and the changes in the era we are entering may be even more rapid than those of the era we leave. Conservation requirements change as the economic environment changes--if waste is to be avoided, the goals and programs must change apace.

This reappraisal, however, should be a part of a comprehensive national resource policy to guide resource use, conservation and development. We have no general resource policy now--we have invested billions to develop land at a time when other billions were spent to hold good land idle, we have used irreplaceable groundwater to grow crops that are a drug on the market; we conserve hilly and rolling land that would revert to grass and trees if we let production seek the areas of natural advantage. We invoke regional pride to impede the movement of water to industry and industry to water.

The need for such a comprehensive policy stands on its own merits, but it is particularly important in the matter of conservation. The appropriate level of conservation is inextricably related to policies of land use and development. If land is used efficiently, the level of productivity to be conserved is lower than if inefficient use is permitted. If fertile new lands are being developed, perhaps less could be spent in maintaining the productivity of the old. The development of cheaper nitrates reduces the importance of organic matter in the topsoil. Higher yielding new strains and varieties have stabilized yields as well as increased them so that less land is needed and more can be placed under the cheap conserving influence of natural cover.

These are some, but not all, of the factors to be taken into account in determining conservation goals, policies and objectives. In approaching the task, however, we must recognize that in recent years research into the economics of land use has been negligible and at times research on the economics of conservation has been nonexistent. We lack much of the basic information needed to develop a rational conservation policy. The resources needed to expand the economic foundation for planning and policy are minute in comparison to the funds being spent on conservation and development, but until this work is undertaken even the sophisticated schemes of developing requirements and policy will have limited utility. However, I join Dr. Landgren in the hope that programming, planning and budgeting will lead us to a more rational resource use and conservation policy.