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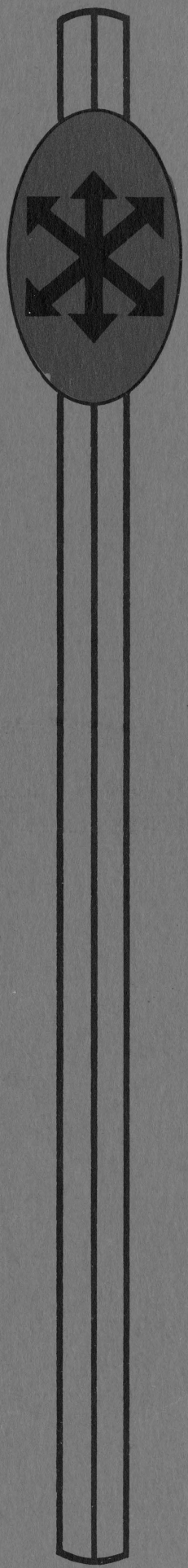

Staff Papers

Potential Effect of Small-Farm Technical Assistance Programs on Public Revenue Accounts

Eldon D. Smith, Harry H. Hall, Don Simon

AAEA paper presented at its annual meetings,
Urbana, Il. July 27-30, 1980

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ABSTRACT

This paper presents a conceptual model for considering the tradeoffs between technical assistance and public-welfare assistance for impoverished limited-resource farmers. The hypothesis is that a combination of technical assistance and welfare assistance will be more cost-effective than welfare assistance alone. For a sample of 120 limited-resource farmers in the Appalachian region of Eastern Kentucky, some on welfare assistance, the potential effect of technical assistance on public-revenue accounts is evaluated.

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Experimental programs aimed at limited-resource farms are variously regarded by lay people, researchers and extension personnel. Some regard such programs as tools for expediting farm-firm growth; others regard them as public-welfare assistance to the impoverished. Not a few characterize any interest in such programs as softheaded do-goodism.

The central thesis of this paper is that public investment in technical assistance to limited-resource farmers may be completely consistent with hard-headed taxpayer self-interest. Such investment is consistent with interests of the more affluent precisely because it provides a way for the impoverished to raise their incomes to supra-poverty levels. At supra-poverty levels, they will no longer draw public-assistance benefits, and they will contribute more to financing public services by paying additional taxes.

These possibilities are illustrated in a later section with data from a sample of full-time, able-bodied, non-retired farm operators and their families in Appalachian Kentucky. First, a conceptual framework for their analysis will be outlined.

Conceptual Framework

Eligibility criteria of some public-welfare assistance programs, such as Aid to Families with Dependent Children and Unemployed Parents (AFDC), discriminate against impoverished farm families. Nevertheless, the structure of public-assistance programs appears to be firmly established and evinces a

commitment to assist those who cannot support themselves at some minimum standard of economic welfare. With some exceptions, the official poverty threshold is the general eligibility requirement for participation in such programs.

Thus, it appears reasonable to assume that the public is committed to aid the impoverished and that the relevant questions relate mainly to what types of assistance are most effective per unit of public expenditure. If these assumptions are reasonable, the opportunity cost of public resources which might be used to increase productivity and raise incomes of impoverished farmers to supra-poverty levels is the cost of direct public assistance.[1] Such costs include costs of administration and direct benefits, both cash and in kind. Thus, the issue becomes the cost-effectiveness of alternative means for alleviating poverty.

The problem would be greatly simplified if it could be reduced to a categorical choice between public-welfare assistance and technical assistance. But resources expended on technical assistance are not exempt from the law of variable proportions. Thus, the minimum-cost means of achieving a given income may involve both technical assistance and public-welfare assistance. Moreover, the "technology" of technical assistance to limited-resource farmers is probably less developed than the physical and biological technology appropriate to their human and physical resource endowments.[2] Thus, the problem involves both designing appropriate technical assistance strategies and selecting an appropriate combination of direct public assistance and technical assistance to minimize the cost of achieving a minimum acceptable income (cash and in kind). For example, it is quite possible that, on farms with a potential net farm income of only $1,000-$1,500, the contribution of technical assistance to

alleviation of poverty is so small that 100 percent public-welfare assistance is the most cost-effective 'combination'.

Smith, et al., (1977, pp. 5-7) provide a conceptual treatment of this problem. Their logic, for a representative (limited-resource) farmer, supposes that society wants to assure an annual income of at least T, the official poverty standard. If income from farming is I, then a supplement of R = T - I is required. Figure 1 illustrates alternative ways for providing this supplement. The supplement could be provided entirely from income transfers, by an amount OR on the horizontal axis, or by various combinations of transfers and technical assistance, as curve I_0R shows.

Budget line BB' represents the minimum public expenditure required to supply the supplement. If all public expenditures are for income transfers (transfers = OB'), the supplement falls short of the required amount by B'R. If all public expenditures are for technical assistance (assistance = OB), the supplement again falls short of the required amount, this time by ZR. (Z is the intersection of the horizontal axis and the iso-income curve that passes through B.) Only by allocating ON to income transfers and OX to technical assistance can the required supplement be reached with only B = B' public expenditure. In this example, the shortfall from allocating all expenditures to technical assistance is less than the shortfall from allocating all expenditures to direct transfers ($ZR < B'R$).

Curve $I_0'S$ represents a farmer with more limited capacity to absorb technical assistance--an aged farmer with a short payoff period, for example, or one with a learning disability. With the budget restriction BB', the maximum attainable supplement is OS and the optimum combination of direct transfers and technical assistance, given by the point W, is ON' and OX', respectively.[3]

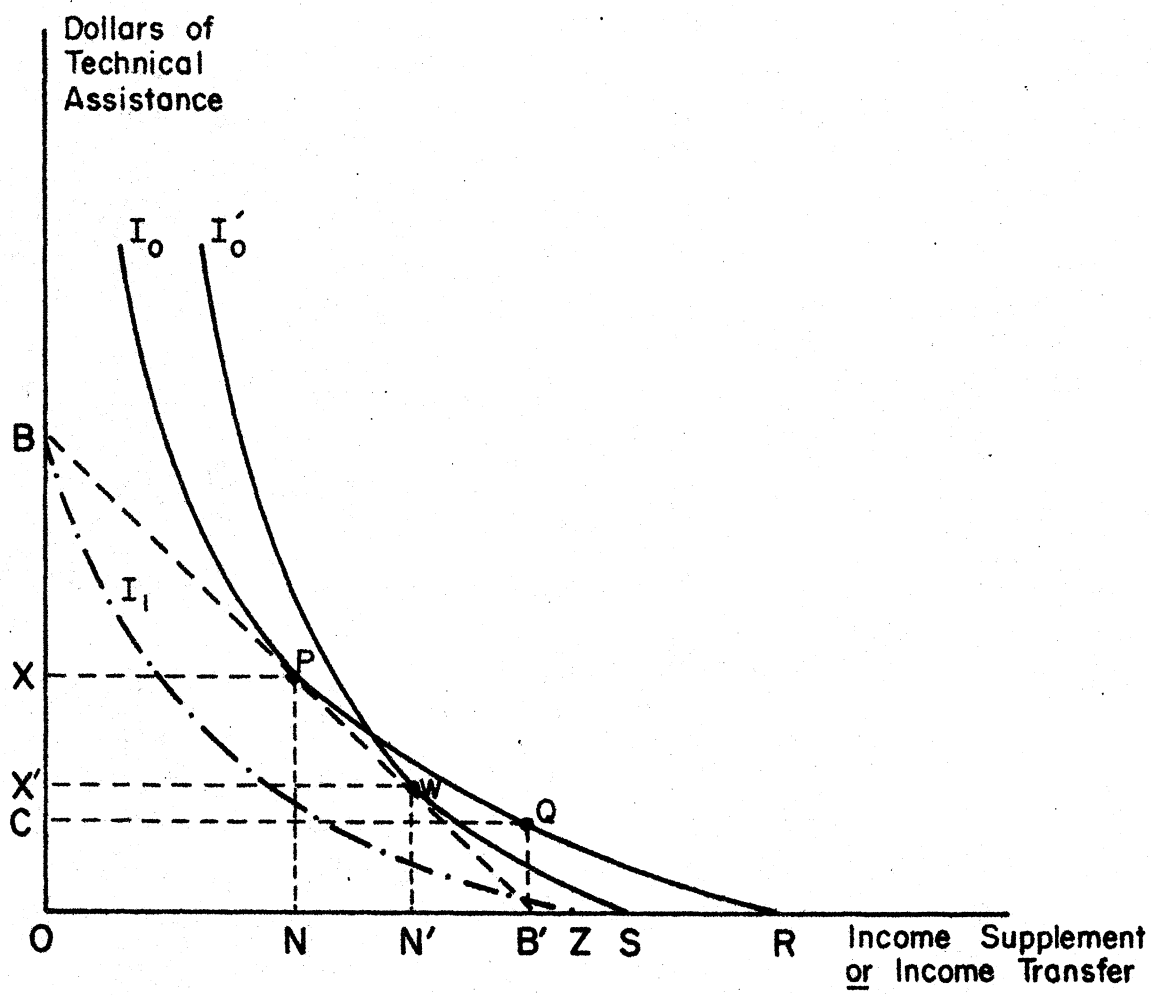
Dollars of
Technical
Assistance
I_o
I_o'
B
I_1
X
P
X'
W
C
Q
O
N
N'
B'
Z
S
R
Income Supplement
or Income Transfer

FIG. I

The configuration of the iso-income lines is determined by several factors: (1) actual public-welfare costs incurred by and tax revenues received from limited-resource farmers under present conditions, (2) actual opportunities for improving managerial efficiency (determined by available resources and present levels of management), (3) responsiveness of farmers to technical assistance, i.e., their willingness to use and their ability to learn improved management techniques, (4) appropriateness of the technical assistance, and (5) the mode of its communication.

Conventional wisdom suggests that the eligibility criteria for transfer programs create disincentives for limited-resource farmers to improve farm incomes. Purchase prices for food stamps are graduated upward as earned income increases, for example. By contrast, Medicaid eligibility is categorical: those who qualify receive full benefits; those who do not qualify receive none.[4] Conceptually, these eligibility criteria make the iso-income line steeper and discontinuous, as shown in Figure II. The generally steeper I''_0U iso-income line means that, with OB expenditure, the achievable upper limit of income reduces to OU; only slightly greater than OB', and at ON" a large additional outlay (X"X"') for technical assistance would be required to induce the individual to sacrifice his eligibility for an increment of NN" income supplement benefits. Conversely, compensating for the loss of NN" benefits requires enough additional effort and risk that he would do so only if provided additional technical assistance requiring an hypothetical higher outlay of X"X"' while still maintaining a level of utility equal to his income at OU. The optimum combination would be ON" income supplement and OX" technical assistance if the budget remains OB = OB'. I''_0 is, accordingly, smaller than I'_0 (OU < OR). Clearly, the cost of achieving income OR has increased,

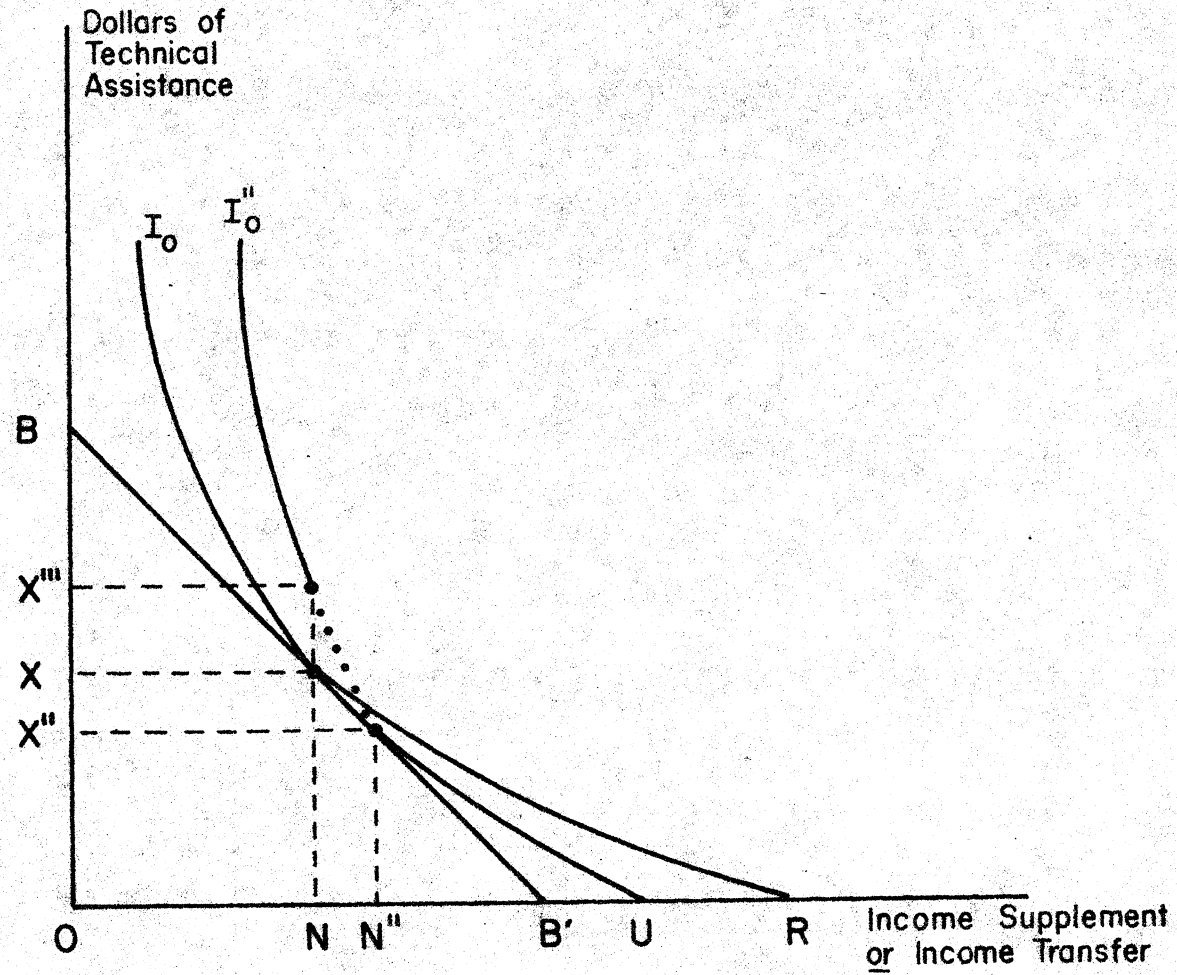
Dollars of
Technical
Assistance
I_o
I_o''
B
X'''
X
X''
O
N
N''
B'
U
R
Income Supplement
or Income Transfer

FIG. II

i.e., the budget line would have to be shifted upward and outward tangent to a higher iso-income line to compensate for the steeper slope and discontinuity in the line I''_o.

It has for many years been recognized that conventional extension technical assistance programs rarely reach under-educated limited-resource farmers. For example, Stewart et al. [p.23] report that only 12 percent of their sample of limited-resource farmers had contacted extension during the previous year, almost all of them in connection with a disease problem in a new vegetable enterprise. Apparently, the usual modes of service, e.g., responding to overt requests, holding educational meetings, and use of mass media, do not effectively reach this audience.

Contract-farming systems in the United States constitute, in part, a recognition of the complementary relationships among management and other inputs on commercial farms and the limitations of conventional technical assistance methods for small scale producers. However, only recently have extension programs in the United States recognized the special requirements for more personal, on-site instruction of our many under-educated, limited-resource farmers.

In several less-developed countries, paraprofessional aides recruited from the ranks of better-educated, more progressive farmers of the community have been used with apparent success to improve management practices. These have been especially important in the introduction of complex technologies in "package programs" of complementary practices and inputs. Frequently, demonstration techniques have been used to capture the interest of local farmers. This strategy has been a hallmark of Japanese and Taiwanese programs, among others.

In view of this limited experience with such programs in the United States, complete evaluation of their potentials is, at this time, impossible.

What follows is suggestive evidence from a survey of limited-resource farmers in four Appalachian Kentucky counties.

Appalachian Kentucky Survey Results

Subsequent results in this paper are based on data from a sample, taken in 1977, of 120 limited-resource farm families. Thirty such families were selected from each of four counties in the Appalachian area of eastern Kentucky: Jackson, Lee, Owsley, and Wolfe. Every farm operator in the sample was under 65 years of age, had gross farm income below $10,000 (1977 dollars), was physically capable of regular farm work, and had fewer than 100 days (or 800 hours) of off-farm work in 1977.

Sixty-three of the 120 families in the sample received public-welfare assistance in some form. Average benefits per recipient family were $2,122, hence, the total public cost was $134,000 (Table 1). An additional 26 families were eligible for public assistance totaling $20,000. Thus, the sample was eligible for $154,000 of public assistance.

Potential Welfare Cost Savings - Good Management

Any increase in farm incomes among the population would reduce public-welfare costs. Using 1972 data, Stewart (1976) found that, with small increases in operating capital ($3,000 and $2,000, respectively), tractor-powered farms could increase net incomes by roughly $3,600, animal-powered farms by roughly $3,900. Based on 1977 data, the present study finds that the potential increase in income ranges from $2,000 to $7,000, similar on the average to Stewart's estimates in constant-value dollars.[5]

Public-welfare benefits for which the sample farms would be eligible if

they achieved 100 percent of their potential incomes were estimated. The estimated number of farmers eligible for welfare benefits decreases to 35, a 61% reduction from the 89 farms formerly eligible (Table 2). Benefit eligibility decreases from $154,000 to $51,000.

Potential Added Tax Contributions - Good Management

"Short form" procedures, which allow standard deductions for certain family expenses, were used to estimate state and federal taxes on the computed potential incomes. These, plus sales taxes were estimated to be $196,000 on the potential incomes for the sample. This compares with taxes of $62,000 on actual 1977 incomes. For actual 1977 incomes, net public-assistance benefits exceeded income and sales tax contributions by $72,000; for computed potential incomes, taxes would exceed welfare benefits for which the sample families would be eligible by $145,000 (Table 2). Note, however, that this is a conservative estimate of the probable change in fiscal accounts in view of the fact that average benefits per recipient would be reduced sharply. Evidence from the sample establishes that farm families eligible for only small benefits tend to forego them. Moreover, no allowance is made for administrative costs of welfare programs and none for changes in ad valorem taxes which might result from capital improvements associated with achieving higher levels of efficiency.

Fiscal Effects of Moderate Quality Management

While the estimated potential incomes under good management should be attainable by any reasonably intelligent, motivated farmer, it is probably realistic to expect somewhat less under actual conditions. Therefore we have

estimated tax contributions and welfare payment eligibility under two reduced levels (Table 2, columns 3 and 4).

In column 3 we compute taxes and benefits assuming that the level achieved is at the midpoint between present and computed potential income. In effect, we assume that half of the gap between present farm income and potential farm income is closed by a technical assistance program. The estimates shown in column 4 assume that the gap is reduced by a modest 25 percent.

Clearly, the welfare cost savings and increases in tax revenues are more modest under these less optimistic assumptions. The estimated change is from -$92,000 to $145,000, a change for the better of $237,000, if the full potential were achieved. This is reduced to $151,000 and $89,000 for the 50 and 25 percent attainment levels, respectively.

Do Public Assistance Programs Stifle Incentives?

We have no direct evidence of the improvement in management which could be achieved under actual field conditions. However, comparisons of public welfare recipient and nonrecipient farms suggest that the hypothesized reductions in incentives to farm efficiently are not, in fact, evident in actual performance. First, shown in Table 3, recipients have nearly the same net farm income as nonrecipients, but recipients appear to have achieved a higher proportion of their income potential. Second, 20 percent who qualified for public assistance did not claim it! Farmers are not completely unaffected by the structure of welfare programs. Indeed, long run effects on morale and attitudes may be very adverse. However, there is no evidence from this sample to support contentions that managerial inefficiency among limited-resource farmers is significantly explained by the availability of public assistance benefits.

Conclusions

Several conclusions follow from the results: (1) genuine opportunities for improving net farm incomes exist which could make more than half of the present welfare recipients ineligible for benefits; (2) even with much improved management, a substantial number of farm families would remain eligible for some public assistance; (3) a 50 percent improvement in the net public-sector accounts position would justify expenditures on technical assistance well above the average annual costs of roughly $220 per farm (in 1977 dollar equivalents) incurred in the Missouri small-farm program even if potential demonstration effects on other low income farms and farm families are ignored. In fact, if costs per farm were $500, under the assumed 25% attainment level the ratio of current year public sector benefits to costs would be about 2.0:1 (if each small-farm aide served 25 farms). If these gains were assumed to continue until retirement age but program participation were limited to four years the ratio would be much higher.

This discussion has focused on public sector costs and revenues, a necessarily important concern of both legislators and administrators of the public exchequer. However, it is evident that the usual (private sector) benefit-cost ratio would be substantially higher than the ratio of benefits (revenues generated and welfare cost savings) to program costs. This results because net income in excess of that required to reach the poverty threshhold does not reduce public welfare costs. Only added tax revenues resulting from the added income is counted as a public sector accounts benefit. A very conservative private-sector benefit/cost ratio estimate would be 4.8:1.[7]

The evidence here strongly indicates that there is a substantial public interest in improving the productivity of full-time limited-resource farms.

While productivity gains will not be large in absolute terms, they are relatively very important to the economic well-being of the families involved. Moreover, if moderately effective technical assistance programs are developed, they will benefit other taxpayers by reducing public costs and, hence, taxes. To these authors, to support the development of such programs would represent a most enlightened form of self-interested economic action on the part of the affluent who bear a majority of the costs of public welfare assistance.

Footnotes

1 The same applies to programs which prevent farm families from descending to poverty status. This more complex issue will not be discussed here.

2 Only in Missouri are specialized relatively comprehensive programs for limited resource farmers considered to be integral, permanent parts of extension programs in relevant areas. Myer [1976] and West, et al. [1975] report preliminary evaluations of the early experience with these programs. Other small-scale programs in Texas [Ladiwig and Edmonson, 1972], Tennessee [Conner and Woodworth, 1976] are more limited, and evaluations may not be generalizeable to broader populations. Recent efforts in other states have not yet been systematically evaluated.

3 For simplicity, this conceptualization ignores administrative costs of transfer programs. If administrative costs are deducted, the achievable maximum incomes for total outlays of OB = OB' will be less than OS and OR for the two hypothetical farmers.

4 Personal-asset criteria also apply in determining eligibility. However, in the short run these would affect incentives only insofar as they affect annual income.

5 Both Stewart's and the present estimates are linear-programming estimates. Stewart made estimates for only two representative farms; the present study made estimates for every farm in the sample.

6 Adjusted by the U.S.D.A. index of family living expense. Average 1972-74 costs were $161 per farm.

7 Assumes a discount rate of 6.0 per cent, no benefits for the first four years of program participation, no benefits to program nonparticipants, no demonstration effects and no increase in rate of diffusion of technology to nonparticipant families and 25 per cent of potential net income increases actually achieved over the period year five through year fifteen following program initiation.

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TABLE 1

ESTIMATED AVERAGE PUBLIC-WELFARE ASSISTANCE BENEFITS
RECEIVED BY LIMITED-RESOURCE FARM FAMILIES, 1977

	Food Stamps	Medicaid	AFDC	SSI	COE	Total Programs[a]
Welfare recipient families						
Number of families	53	24	5	10	10	63
Percent of all families	44%	20%	4%	8%	8%	53%
Average annual benefits per recipient family	$1,527	$240	$2,126	$2,074	$1,558	$2,122
All farm families[b]						
Average annual benefits	$675	$48	$89	$173	$130	$1,114
Total public cost	$80,930	$5,760	$10,630	$20,740	$15,580	$133,640

a. Individual program participation levels do not sum to total; recipients may participate in more than one program.

b. Sample consists of 120 limited-resource farm families.

TABLE 2

Computed Income and Sales Tax Contributions and Public Assistance Benefits of 120 Sample Farms Under Present Management and Various Levels of Management Improvement, 1977

(Assumed Management Level)

Benefit or Tax Estimates[a/]	1. Present Management	2. Potential Income Under Improved Management (100% Achieved)	3. Income Increased by 50% of Difference Between Actual & Potential[b/]	4. Income Increased by 25% of Difference Between Actual & Potential[b/]
1. Tax Contributions (F.I.C.A. + Sales + Income Taxes)[c/]	$ 62,000	$196,000	$123,000	$ 94,000
2. Actual Benefits:				
a. Present Participation	$134,000	--	--	--
b. No. of Beneficiaries	63	--	--	--
3. Benefit Eligibility:				
a. Total amount	$154,000	$ 51,000	$ 64,000	$ 97,000
b. No. of Farmers Eligible	89	35	40	53
4. Net Tax Contribution in Excess of:				
a. Actual Benefits	-$ 72,000	--	--	--
b. Benefit Eligibility	-$ 92,000	+$145,000	+$ 59,000	-$ 3,000

[a/] Estimates rounded to $1,000's

[b/] Example: If present income = $2500 and potential income = $7500, the income level assumed = $5,000 in Column 3 and $3,750 in Column 4.

[c/] Excludes ad valorem, inheritance, tobacco, gasoline, and alcoholic beverage taxes.

TABLE 3

Comparative Management Performance of Public Welfare Recipients and Non-Recipients

Means	Recipients	Non-Recipients
Observed Net Farm Income (Average)	$1931	$1945
Potential Net Farm Income[a] (Average)	$5928	$8734
Number of Farms	63	57
Percentage of Potential Net Farm Income Realized	33%	22%

[a]Potential Net farm income is the linear-programmed solution for available resources under conditions of improved technology and management. Labor utilized in off-farm work by family members is not included in the available labor supply in computing potential net farm income.