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AN EVALUATION OF SOUTHERN COOPERATIVE EXTENSION  
PROGRAMS AIMED AT SMALL FARMERS

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AAFA 8/8/80

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(Presented as Contributed Paper, American Agricultural Economics Association Annual Meeting, Washington State University, 1979.)

## ABSTRACT

### AN EVALUATION OF SOUTHERN COOPERATIVE EXTENSION PROGRAMS AIMED AT SMALL FARMERS

Results of a model developed to explain farm sales changes of participants in Southern Extension small-farm programs indicate that sales revenue increases are affected by the initial level of farmers' resources, the extent of their program participation, characteristics, training, supervision, and workload of the field staff, and output price changes and environmental effects on yields. Policy implications are considered.

## AN EVALUATION OF SOUTHERN COOPERATIVE EXTENSION PROGRAMS AIMED AT SMALL FARMERS

### Introduction

During the past decade, new Cooperative Extension programs have been developed for the purpose of aiding small and limited-resource farmers. Implementation has occurred primarily in the South, a region in which the 1890 land grant colleges have historically focused their attention on disadvantaged minorities, and in which small farms remain relatively concentrated. Program goals have been to expand educational assistance to individuals not reached by other extension programs, improve farm productivity, increase farm sales and raise family living standards. Farmers have generally participated for a period of two to four years.

Early pilot programs in Texas (1968) and Missouri (1971) involved the experimental use of indigenous paraprofessionals working with small farmers on a one-to-one basis [Strickland and Soliman; Wiggins]. Alabama (1968) directed professional agricultural agents to allocate part of their time to similar activities [Maddox, Jones and McDaniel]. The success of these programs provided reinforcement for the concept of assisting small farmers on an individual basis, and for the approach of employing paraprofessionals. Additional federal funds became available in the mid-1970's and programs began in other states. By 1978, Southern small-farm programs employed over two hundred and thirty full time field workers, primarily paraprofessionals, to work specifically with selected

small farmers. Almost two hundred counties were participating and annual program expenditures exceeded 2.2 million dollars.

### Research Objectives

This paper presents partial results of an inventory and evaluation of Cooperative Extension programs directed at small-farm operators in the South.\* Although several states have summarized or assessed their own small-farm efforts, no comprehensive regional inventory of resources, or evaluation of program strategies or effectiveness, has been undertaken [Atkinson; Enlow, et al.; McAfee; Strickland and Soliman; West, et al.]. A number of recent studies have also examined opportunities for raising incomes derived from small farms, but these studies have provided no empirical evidence that extension assistance program can induce suggested increases. For example, Stewart, Hall, and Smith, comparing realized with potential incomes on limited resource farms in Eastern Kentucky, concluded that "the potential for increasing income exists", but that "The possibility of achieving this potential needs to be explored in greater depth."

In this light, two purposes of the present study were to identify, categorize, and describe Southern Cooperative Extension small-farm programs, and to evaluate the impact of selected program and non-program characteristics on achievement of stated program goals. Findings provide information relevant to defining program priorities and objectives, determining expected program outcomes, identifying characteristics of effective programs, extracting concepts and principles that may enhance future program implementation, and determining the extent to which

further commitment of resources to small-farm programs appears justified.

#### Data Sources and Initial Inventory

Twenty-three programs in which field staff provide intensive assistance to individual small farmers were selected for inclusion in the study. Data was provided by personal interviews with 43 administrators and state specialists responsible for the programs at both 1862 and 1890 land-grant institutions, and by survey questionnaires completed by county program supervisors and field staff. One hundred and eighty-seven field workers and one hundred and thirteen of their county supervisors furnished information concerning their background, training and activities, and perceptions of program operation. Since the programs studied are based on the principle of one-to-one contact, field staff were also able to draw on their records, progress reports and personal familiarity with each participant to provide information on the socio-economic characteristics, resources, program participation level, and improvement of farm management and sales revenue of over 4500 farmers with whom they worked intensively. Data were subsequently tabulated so that responses for each farmer were linked to responses of the appropriate field worker, county supervisor, and state program leaders.

Our initial inventory suggested that participants in small-farm programs typically have low incomes, limited farm resources and moderate educational levels. To illustrate, off-farm income amounted to less than \$5,000 for 62 percent of the participants, yet 70 percent were estimated to make less than \$5,000 of farm sales. The size of

farms held by participants averaged 108 acres. Although less than 20 percent of the participants were over 65 years of age, only 22 percent held full time, off-farm jobs. Educationally, approximately 37 percent had completed less than eight years of schooling. Three-fourths of the farmers had ten or more years of farm experience, but less than a third had received extension assistance prior to their involvement in the small-farm program. The majority of participants (58.8 percent) were black, reflecting, in part, the higher incidence of low income among minority as opposed to white small-farmers.

While most small-farm programs emphasized similar long-term goals, cited previously, they often differed with respect to short-term objectives. For example, some concentrated on upgrading production practices, while others emphasized marketing, and still others improvement of home gardening. States, programs, and often counties within a program, also varied widely in formal and informal administrative processes, commitment of professional staff and fiscal resources, and characteristics of field staff.

#### Method of Analysis

Analysis of program effectiveness was complicated by the diversity of short-term objectives enunciated by state and county level personnel, by the wide range of program characteristics that could affect success measures, and by the equally large number of factors extraneous to the programs that could also influence outcomes. Our analysis focused on changes in farm sales revenue of each participant since the beginning of their association with the program. Although this measure is directly

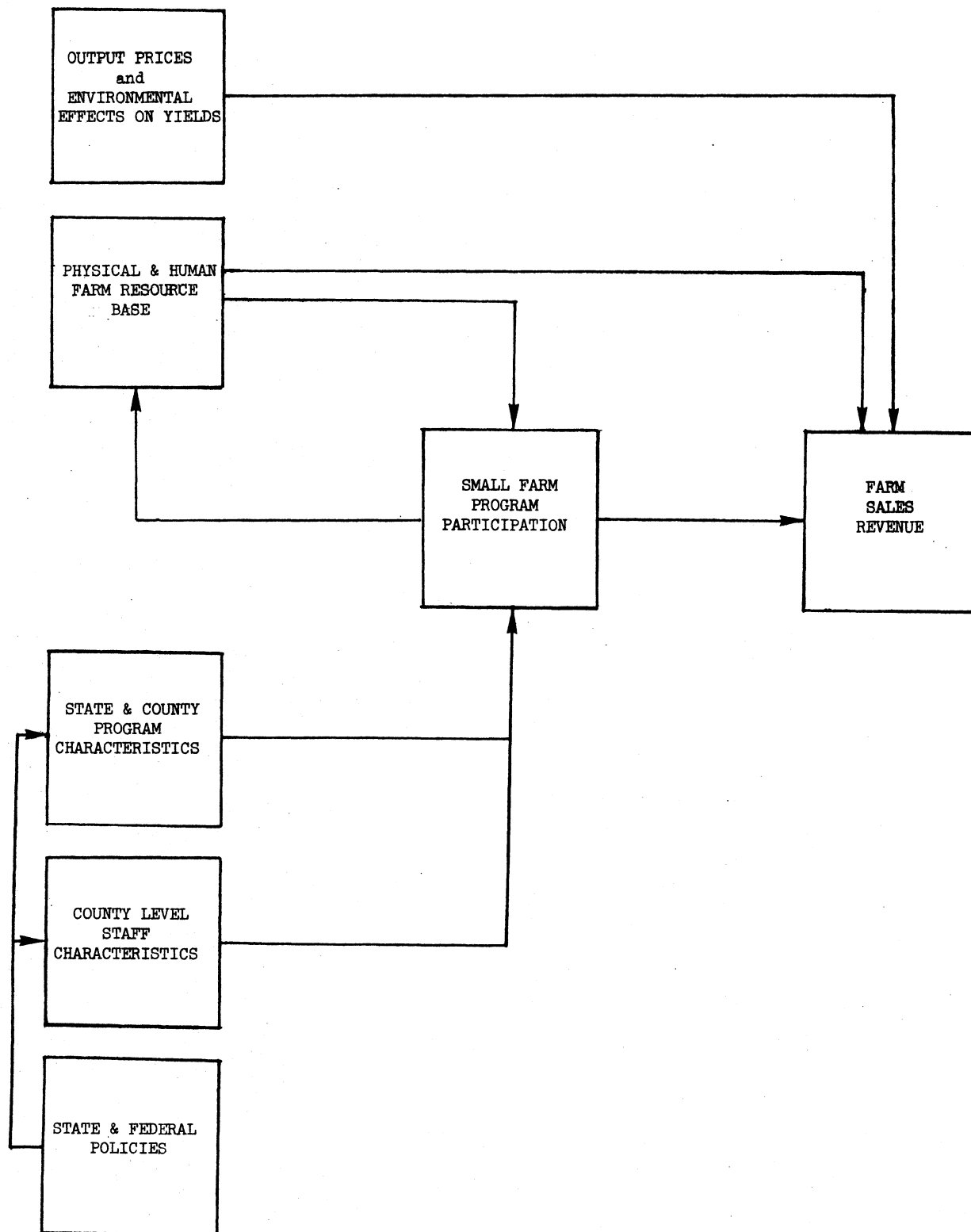


related to long-term program goals, it is not the only indicator of success, and some activities (for example promoting home gardening) were not reflected in examination of this outcome.

One view of the determinants of sales revenue improvements experienced by program participants is provided in Figure 1. Farm sales volumes are responsive to such non-program factors as output price levels and environmental effects on per-acre or per-animal yields. Sales revenue is also determined by the level of a farmer's resource base. Small farm program participation may affect sales revenue, either as a direct result of technical assistance provided by program field staff or through inducing changes in farmers' resource levels. The extent of farmers' involvement is, in turn, partly determined by their receptivity to assistance, which may be affected by their initial farm resource levels. Participation is also influenced by the programs' availability and attractiveness. These factors are largely controlled by the ability of supervisory and field staff, and by program design and fiscal resources, which are related to federal and state administrative decisions and commitments.

To assess the magnitude and significance of the effects of various factors on small-farm program participants' farm sales revenue, it would be desirable to utilize cross-sectional data to regress changes in each farmer's sales volume against all the measured factors hypothesized to determine these changes. This approach would preclude specification bias resulting from exclusion of relevant variables. On the other hand, the large quantity of factors that Figure 1 indicates would affect sales revenue implies that such a strategy would result in extensive colinearity among regressors, and hence unduly wide standard errors for some or all coefficient estimates [Kmenta, pp. 338-39].

FIGURE 1. DETERMINANTS OF FARM SALES REVENUE OF PARTICIPANTS IN EXTENSION SMALL FARM PROGRAMS.



As an alternative two approaches were followed. In the first approach, sales volume determinants were divided conceptually into blocks of variables and observed changes in participants' sales volume were regressed against each of these blocks of variables separately. The blocks utilized were: (a) the farmer's physical and human resource base, (b) the extent and types of participation in small-farm extension programs, (c) characteristics of local program staff, and (d) local and statewide program characteristics. Measures of output price and environmentally-affected yield changes were retained in each equation. In the second approach, factors having especially important implications for program implementation or policy formulation were selected from each block and combined in a single, unified regression model. This approach allowed the effect of each selected factor to be measured in the presence of variables from other blocks.<sup>1/</sup>

### Results

A summary of results of the second approach is shown in Table 1, where variables are grouped according to the blocks discussed above. The mean value of the dependent variable (\$1169) is consistent with expectations of program supervisory and field staff that many participants would improve farm sales revenue, but that the increase would be modest in most cases. The initial "control" group of variables accounts for the impacts of increases and decreases in output prices, and adverse weather conditions, on observed changes in farm sales volume. The second group, comprising participants' initial farm sales and off-farm income, represents the farm resources block. Increases in participants' farm sales

Table 1. Effect of Output Prices, Environmentally-Related Yield Fluctuations, Farm Resources, Program Participation, Staff Characteristics, and Program Characteristics on Farm Sales Revenue Increases of Participants in Small Farm Programs.<sup>a/</sup>

VARIABLES	UNIT	COEFFICIENT <sup>b/</sup>	(t-VALUE)
<i>Price and Environmental Block</i>			
Farm sales revenue significantly affected by...	:neither price changes nor weather (base group)	.....	
	:output price increase	97.10	( 1.76)
	:output price decrease	-489.43	(- 4.00)
	:weather	-418.29	(- 5.67)
<i>Farm Resource Block</i>			
Farm sales volume (prior to participation)	(\$1000)	69.39	( 16.31)
Off-farm income of family members	(\$1000)	26.82	( 4.51)
<i>Program Participation Block</i>			
Group activities			
Farmer participated in...	:neither meeting nor events (base group)	.....	
	:meetings only	xxxx	
	:events only	169.12	( 2.14)
	:meetings and events	214.39	( 3.24)
Individual assistance			
Farmer assisted with...	:gardening, home repairs and/or use of social service agencies only (base group)	.....	
	:crop or livestock production practices	336.88	( 4.02)
	:farm records and/or farm planning	382.16	( 7.73)
	:use of agricultural agencies	132.97	( 2.62)
	:marketing	201.04	( 4.10)
Participants' interest in program	index 1 through 5 (1=poor, 5=excellent)	160.64	( 5.73)
Duration of participants' program association		79.98	( 4.20)
<i>Field Staff Characteristics Block</i>			
Age	years	xxxx	
Formal Education	years	-25.49	(- 3.62)
Farm experience	years	13.88	( 6.54)
<i>Program Characteristics Block</i>			
Agricultural training of field staff	days per year (1977)	1.76	( 1.66)
Supervisory and advisory assistance received by each field worker	days per year (1977)	61.22	( 5.90)
Influence of field workers ability on the effect of assistance they receive	interaction term*	-15.85	(- 5.92)
Field staff ability	index 1 through 5 (1=poor, 5=excellent)	277.61	( 5.76)
Length of employment of field worker	months	3.46	( 4.29)
Equipment and demonstration funds	dollars per year (1977)	xxxx	
Farmers assisted per field worker	number of farmers	-5.56	(- 3.90)
Intercept		-1729.47	

<sup>a/</sup>  $R^2 = .316$ ; t-values are reported in parentheses. There were 1874 degrees of freedom for the t-tests. Observations were deleted from the sample if missing values were present for any of the independent variables.

<sup>b/</sup> Mean value of dependent variable (expressed in dollars): \$1169; range of dependent variable: \$-1000 to \$3750.

\*This variable is a cross-product of the second and fourth variables listed under Program Characteristics Block.

xxxx Not significant at the .05 level in initial regressions and excluded from the model reported.

revenue were, on average, greater among farms with relatively high initial sales levels and among farmers with relatively high off-farm incomes. In our earlier analysis, when only farm resource variables were included in the regression model (not shown here), sales increases were also greater for younger farmers and for those with relatively more education. Thus, participants' sales improvements are partially determined by their resource characteristics, implying attributes of the selected target audience should be considered in setting realistic program goals.

In the third or program participation block two sets of discrete variables are used to reflect the nature of a farmer's involvement in a small-farm program. The first set addresses group activities. Results indicate that farmers who participated only in educational meetings did not experience greater sales revenue increases than a base group participating in no group activities, while farmers participating only in events, such as farm tours, were associated with sales revenue gains averaging \$169 greater than in the base group. Farmers participating in both meetings and group events were associated, on average, with sales increases nearly \$215 greater than those of farmers participating in neither. This implies that exposure to diverse group activities enhances the influence of these activities. The second set of discrete variables addresses types of individual program assistance. Farmers receiving assistance in farm production practices or farm planning were associated with farm sales increases approximately \$337 to \$380 greater than the base group which received only such nonfarm assistance as garden production or house repair. Those receiving assistance using agricultural agencies or to improve marketing also earned greater sales volume

increases than in the base group, but only in the magnitude of \$133 to \$201. Regardless of the type of participation, the level of a farmer's interest in the program (as perceived by the field worker and rated on a scale of 1 to 5) strongly affected the outcome associated with that farmer. Sales revenues increases were also positively affected by the length of a farmer's participation in a small-farm program.

The fourth group of variables in Table 1 describes characteristics of the field staff contacting the farmer. A field worker's success in inducing farm sales volume increases appeared to diminish with formal education, but to increase with years of farm experience. In the field staff characteristics block model (not shown here) significant relationships were also found between field workers age, sex, and ethnic background and their success at inducing sales revenue improvements. Together these results suggest that selection of field staff provides program leaders an important mechanism for influencing program success.

The final group of variables, taken from the program characteristics block, reflects the influence of local program resources, and field staff training, supervision, and work-load on participants' farm sales improvements. Agricultural production training received by a field worker in the past year, and assistance provided by county supervisors and other extension professionals, were positively associated with farm sales improvements realized among farmers contacted by the field worker. Impact of supervisory assistance varied negatively with field workers' ability (as evaluated on a scale of 1 to 5 by his county supervisor). That is, another day of professional assistance to a field worker with a very low rating (1) was associated, on average, with \$48.37 greater

farm sales improvements among farmers assisted by that worker. But another day of assistance to a field worker with the highest rating (5), was associated with a \$15.04 decrease in farm sales improvements, implying that, at the margin, direct professional assistance may interfere with efforts of higher quality field staff. This suggests that the level of supervisory input into small-farm programs ought to be determined at the local level and related to the needs of individual employees. Field workers' ability itself was positively associated with program success, as was months of staff experience on the job. However, no significant relationship was found between program effectiveness and availability of fiscal resources to purchase equipment or demonstration supplies. Finally, field staff performance declined only slightly with increasing workload. For every additional farmer assisted by a field worker, average annual sales increases experienced by the farmers associated with that worker declined by only \$5.56. This implies that within the work load range reported by field staff, program funds might be more effectively utilized if the number of farmers assisted by the average field worker were increased.

#### Summary and Discussion

This paper summarizes partial results of an evaluation of Cooperative Extension programs in the South aimed at small-farm operators. A five-component model was developed to explain changes in farm sales revenue experienced by farmers during their period of program participation. Variables in each of the five components were statistically significant, indicating that program success is influenced by a wide number of factors.

The analysis implies that sales revenue improvements depend partly on the characteristics of small-farm program participants. For example, after accounting for the effects of output price and environmentally-related yield changes, sales revenue increases were higher among farmers with greater initial resources. Sales revenue improvements were also associated with a farmer's level of program involvement. Both group activities and several types of individual assistance enhanced program outcomes. Finally, improvements realized by participants were related to program attributes such as selected field staff characteristics, and staff training, supervision and workload.

These results illustrate the importance to program outcomes of policy decisions regarding program location and target audience orientation. The results also provide guidelines relevant to administrative policies concerning staff employment and availability of fiscal and professional support, each of which can significantly affect program achievement.

Based on survey responses and earlier examination of Census of Agriculture data, extension small-farm programs involve an audience representative of approximately 200,000 southern small farmers with low total incomes. Currently the programs serve only a limited proportion of these farm operators. Further research is needed to compare small-farm program costs and benefits to those of alternative assistance approaches. However, the present evaluation suggests that expansion of small-farm programs merits consideration as a means of raising low farm family incomes.



Footnotes

\*Research project entitled "An Inventory and Evaluation of Cooperative Extension Programs in the South Aimed at Small and Part-Time Farmers," funded by the Science and Education Administration, U.S. Department of Agriculture. States included in the study are Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

1/ Test of several models including interaction terms (measuring the effect of participants' resources on the responsiveness of farm sales revenue to program participation) provided some additional information on program strategies but did not basically alter results of the model presented here. Colinearity problems are amplified by inclusion of interaction terms (see test).

### References

- Atkinson, R., "Georgia Small Farm Program: A Progress Report," Department of Agricultural Economics mimeographed release, University of Georgia, July 1976.
- Enlow, G.; C. George; J. Holik and E. Wiggins, "Missouri Small Farm Family Program: 1977 Preliminary Progress Report", Missouri Cooperative Extension Service, mimeograph release, 1978.
- Kmenta, J., Elements of Econometrics, New York: Macmillan Publishing Company, Inc., 1971.
- Maddox, C. L.; R. F. Jones and C. H. McDaniel, "Demonstrations on Limited Resource Farms in Alabama", R-14, Alabama Cooperative Extension Service, 1969.
- McAfee, D. H., "Farm Opportunities Program", North Carolina Agricultural Extension Service, mimeographed release, September 1975.
- Stewart, F. J.; H. Hall and E. D. Smith, "Potential for Increased Income on Small Farms in Appalachian Kentucky", American Journal of Agricultural Economics. 61(1979):77-82.
- Strickland, C. L. and M. Soliman, "Nonprofessional Aides in Agriculture, An Evaluation of a Program in Cooperative Extension Education for Small Farm Families", Bulletin B-1165 (PV), Prairie View A&M University, 1976.
- Wiggins, E. R., "Small Farm Development Programs", Department of Agricultural Economics Paper 1972-8, University of Missouri, July 1972.
- West, J.; V. R. Harrold; K. C. Schneeberger and L. Williamson, "Missouri Small Farm Program, An Evaluation with a Control Group", SR176, University of Missouri, Columbia, October 1975.