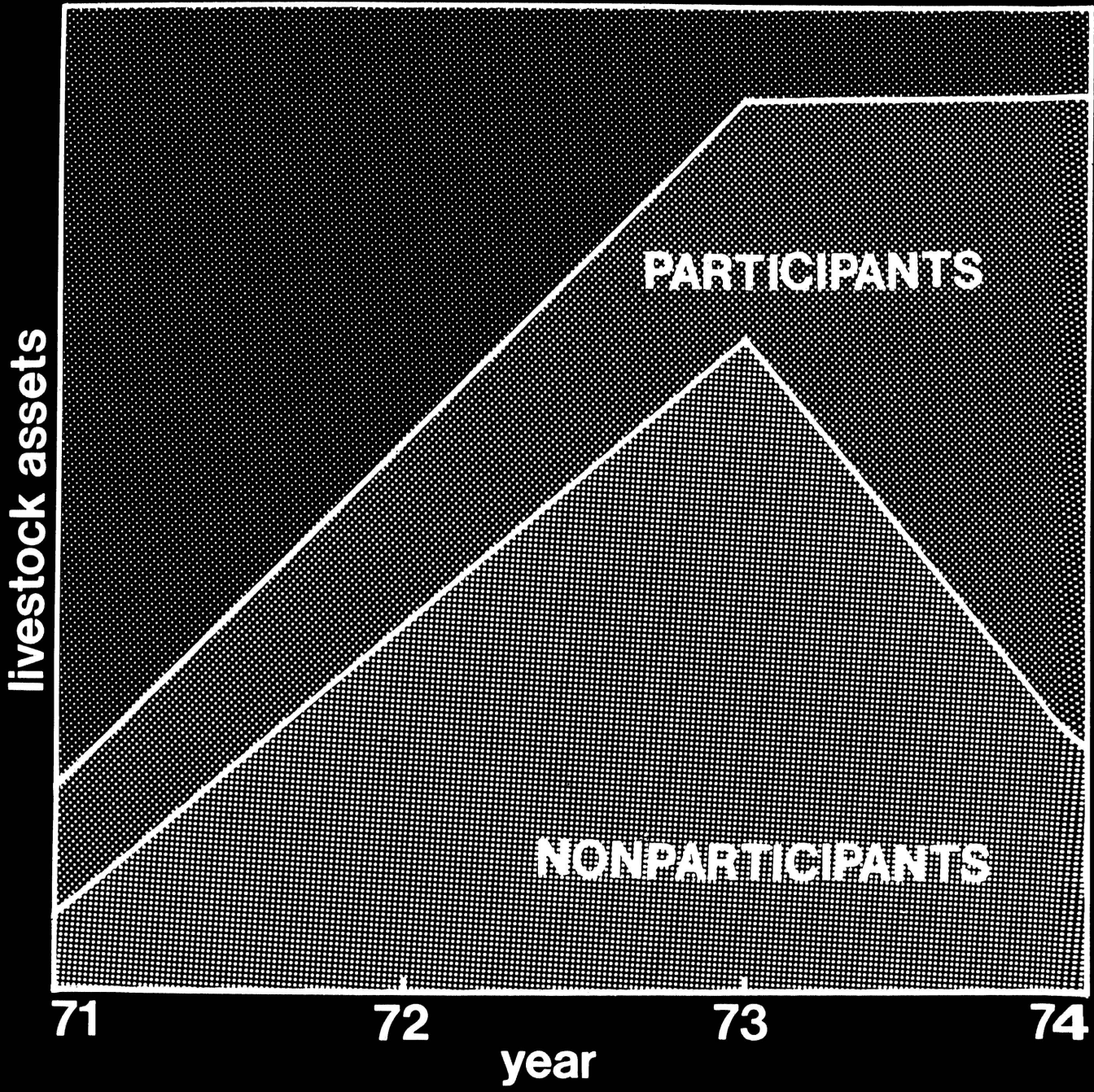


Missouri Small Farm Program

An Evaluation With a Control Group

SR176



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Small farms are a prominent feature of life in rural Missouri. Over 70 per cent of the farms in the state had less than \$10,000 gross sales according to the 1969 agricultural census. In the same year, these farms only accounted for 21 per cent of total agricultural sales in Missouri. These farms are small in terms of resources controlled, size of enterprise, sales and net income from

farming. However, this does not mean the people living on such farms or the problems they face should be ignored. In fact, the unique and rather severe problems of such farms is the focus of a sizeable research effort at the Missouri Agricultural Experiment Station.

Faculty with research responsibilities have been working closely with extension personnel in the development and conduct of a pilot educational effort with small farms. Research has been carried out to identify clientele groups within the small farm category, determine optimum

resource use and enterprise combinations, and evaluate the effectiveness of educational efforts. Jerry G. West and Kenneth C. Schneeberger along with a number of graduate research assistants have been involved in this research effort.

This research report is one part of the overall evaluation of the Missouri Small Farm Development Program. Evidence of the effectiveness of the extension effort is revealed in this comparison of changes on participant farms with changes on a sample of farms which were not involved in the program.



Cover: For a more detailed graph on livestock assets, see Figure 2, page 20.

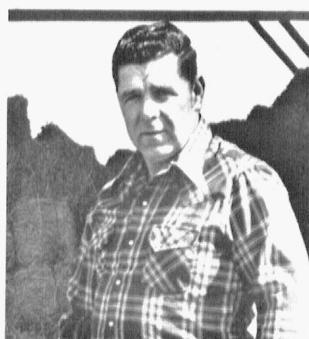
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| <p>4 Introduction</p> <p>5 Establishment of a Control Group</p> <p>7 Results of Analysis</p> <p style="padding-left: 20px;">-farm sales</p> <p>9 -net farm income</p> <p>10 -size of enterprise</p> <p>13 -resource use</p> <p>14 -production practices</p> <p>16 -information sources</p> <p>17 -credit use and availability</p> <p>18 -changes in farming operation</p> <p>19 -stability of agricultural production</p> <p>20 -improvements in housing</p> <p>22 Reality Versus Optimum</p> <p>24 -adjustments to changing prices</p> <p>25 Survey and Recommendations</p> | <p>The Small Farm Program was launched by the University of Missouri Extension in 1971.</p> <p>A sample of both participants and non-participants was selected from the approximately 1600 farmers interviewed prior to initiation of the program.</p> <p>The analysis compared changes by participants and non-participants from 1971 to 1974.</p> <p>Farm sales was used as an overall measure of changes in output or farm size.</p> <p>Evidence suggests higher income on participant farms.</p> <p>Enterprises found on small farms in Missouri are similar to those on the large commercial farms. Small farmers generally have not managed their land, labor and capital to their best advantage.</p> <p>Information was obtained from farmers on changes made during 1974 in a limited number of practices.</p> <p>Small low-income farmers tend not to use the services of professional agriculturalists.</p> <p>Use of credit on participant farms was significantly greater than on non-participant farms.</p> <p>Participants borrowed money more often and in greater quantity.</p> <p>Participant farms were in a much better position to benefit from increasing prices for feeder pigs in 1975.</p> <p>Many participants built a new home, purchased a trailer or made an addition to their home.</p> <p>Progress was made from 1971 to 1975, but was it in the right direction?</p> <p>With limited capital, higher prices for feed meant fewer hogs and more beef cows.</p> <p>Results from this analysis warrant expansion to other areas of the state as funds become available.</p> |
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5/Control Group



10/Enterprise



19/Stability



24/Adjustment

Introduction

Farms with sales under \$10,000 made up 65 per cent of all U.S. farms in 1969.

Missouri is a state with many small farms.

The 1969 agricultural census showed that 71 per cent (101,318) of the 137,067 farms had gross sales of less than \$10,000. Of that number, over one-third had sales less than \$2,500. However, this phenomenon is not unique to Missouri. Farms with sales under \$10,000 made up 65 per cent of all U.S. farms in 1969. More than one-half of the farms in each of the major geographical regions could be classified as small farms (Table 1).

they were not being reached by regular extension programs led the University of Missouri Extension to launch a pilot educational program in 1971. The educational effort was given the name "Small Farm Program." A description of the program and some of the changes made by participating farmers may be found in two earlier publications.²

The Missouri program involves the use of education assistants (local farmers) to work directly with small farm operators. The education assistants are non-professionals who work under the leadership of area farm management specialists. Other Extension specialists are called on for special training and consultant work with the assistants. Since the program was initiated in late 1971, nearly 900 different families have participated in the program.

Beginning in January 1973, an annual progress report has been completed for each of the participants in the program. The summaries of these reports indicate that participants in the program have increased the quantity of output, gross sales and net income from their farms. But the question must be raised, would the participants in the program have made as much change without the help and encouragement of the educational assistant? Phrased differently, how much of the change on participant farms should one attribute to the educational effort?

¹For example, in a study of small farms in three Missouri counties, 57 percent of the small farm operators worked off-farm less than 10 weeks during the year.

²M.P. 373 and M.P. 445, Extension Division, University of Missouri-Columbia.

Table 1: Percent of Farms by Economic Class for Regions of U. S. 1969

Economic Class	N. E.	N. C.	South	West	U. S.
	(%)	(%)	(%)	(%)	(%)
Over \$40,000	10.6	8.9	5.5	14.8	8.1
20,000-40,000	17.8	16.7	6.7	13.3	12.1
10,000-20,000	14.5	20.0	8.9	14.9	14.5
5,000-10,000	10.5	16.5	12.7	13.4	14.3
2,500- 5,000	10.5	13.2	16.5	14.0	14.5
Less than 2,500	4.6	4.0	11.0	4.6	7.0
Part-time	23.0	15.2	26.8	19.7	21.1
Part-retirement	8.5	5.5	11.9	5.3	8.4
Total	100.0	100.0	100.0	100.0	100.0

Source: U. S. Census of Agriculture, 1969.

Studies of farm costs and returns indicate that operating expenses amount to at least 60 to 70 per cent of the gross sales on the average farm. This means that most small farms have less than \$4,000 net farm income. Since many of these farm operators are full-time farmers, the income available to the family is very inadequate.¹ Even those working off-farm typically need more farm income to improve their level of living.

Concern about needs of small farms and the recognition that

Establishment of a Control Group

A control group was selected from the 1600 farm operators initially interviewed.

Conduct of controlled experiments in the social sciences is very difficult. Rarely can all of the important variables be controlled. In the evaluation of an educational effort it would be desirable to have one group of individuals (a control group) identical to those participating but who are not affected by the program.

Base data collected prior to initiation of the program could then be compared with data collected at some later point in time to assess the magnitude of change in both groups. Although it would have been desirable to identify such a control group for the program, this was not done. Therefore, an alternative approach was sought which would provide similar

information.

The first step in the initiation of the Small Farm Program was a survey of small farm operators. This survey was designed to identify different clientele groups among those farmers with gross farm sales of less than \$10,000. Information was also obtained on problems, needs, and futures plans of those interviewed.

Approximately 1600 operators of small farms were interviewed in five Missouri counties. Only 173 of these farmers have thus far been involved in the program. This left a sizeable number of farmers for which base data was available and from which a "control group" could be selected.

From those originally

Mr. and Mrs. James Crowley, Piedmont, work off the farm, but their goal is to become full-time farmers. They have 40 sows and produce feeder pigs on their 60-acre farm. They are participants in the Small Farm Program.



One objective of the study was to determine the extent to which the program influenced net farm income.

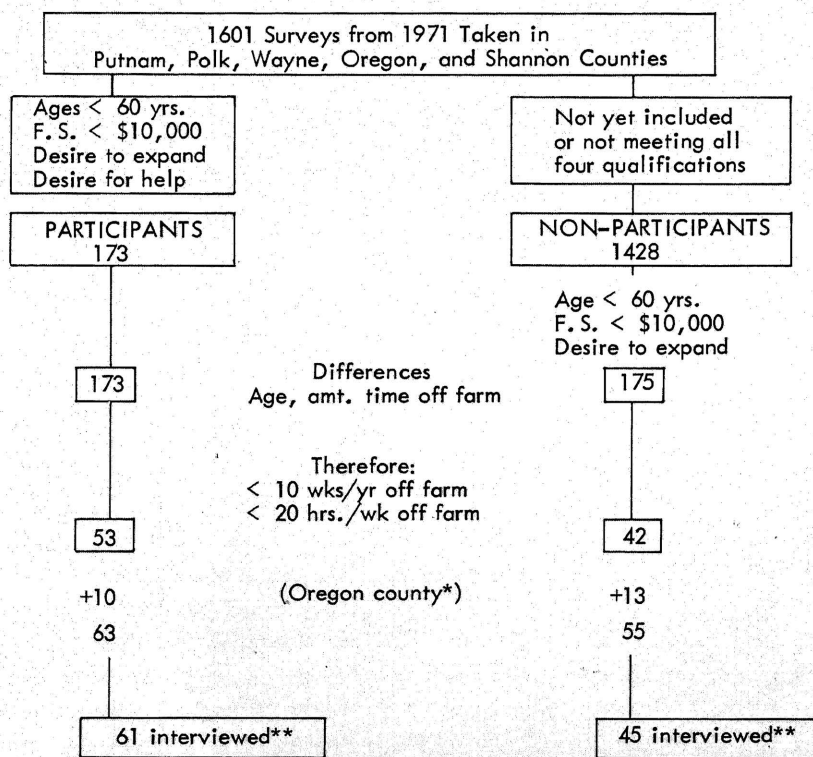
surveyed in 1971 a sample of both participants and non-participants was selected. The procedure used to select the sample is outlined in Figure 1. As indicated, several

to include them in the program.

A questionnaire was then designed to obtain information similar to that obtained in 1971 to measure changes made by both participants and non-participants. The questionnaires were completed by personal interview over a 30-day period in late 1974 and early 1975. The specific objectives of the study were as follows:

- To determine if the program had resulted in an improved quality of living as reflected by improvements in housing
- To assess the extent to which participant farms are approaching optimums in terms of enterprise selection, size of enterprise, and level of sales
- To determine the extent to which the program had influenced size of enterprise, farm sales, and net farm income
- To compare resource utilization and production practices on farms of participants and nonparticipants
- To identify credit sources used by operators of small farms and determine if the program had affected their ability to obtain credit
- To determine whether the program had contributed to stabilization of enterprise selection and production levels on small farms
- To see what effect the program has had on sources of information used by operators of small farms

Figure 1: Procedure to Select Sample



*In Oregon county the majority of small farmers work off-farm; therefore, in addition to full-time farmers, farmers that worked off-farm full-time were selected.

**Of those selected to be interviewed from participants, one (1) was not at home and one (1) had moved. Of the non-participants selected, there were two (2) refusals, four (4) not at home, and four (4) had moved.

constraints were built into the selection process so as to have a group of non-participants comparable to the group of participants. The one qualification not required of the non-participant control group was the expressed desire for help.

In some instances no desire was expressed, while in others it was, but the educational assistants had not yet been able

Results of Analysis

The change in sales on participant farms was much greater than on the non-participant.

Data obtained from participants and non-participants was analyzed to permit evaluation on a county basis as well as for the five counties combined.

The counties involved in the program are scattered throughout the state so there are differences in types of farming. Oregon, Polk, Shannon and Wayne counties are in the Ozarks, while Putnam County is in north central Missouri.

Putnam county has somewhat larger farms with more row crop production. South Missouri agricultural production consists primarily of livestock with emphasis on feeder calves and feeder pigs. Because of these differences, many of the results are presented on south Missouri counties as well as for the five counties combined.

Although the program in the south central part of the state included both Oregon and Shannon counties most of those interviewed were in Oregon County and all will be included under Oregon County in presentation of results.

The analysis compared changes by participants and non-participants during the

period from 1971 to 1974.

Data was obtained for both 1973 and 1974 because of the large differences in output prices in the two years. This permitted examination of changes from 1971 to 1973, 1971 to 1974, and 1973 to 1974.

Farm Sales

Farm sales refers to total or gross sales from the farm.

This is one of the better overall measures of output or farm size. Admittedly the measure is affected by agricultural price levels and figures for 1973 and 1974 emphasize this. Total sales of both participants and non-participants increased between 1971 and 1973 (Table 2). For Putnam County, the increases were comparable, but in the other counties the change in sales on participant farms was much greater than on non-participants' farms.

In general, farm sales in 1974 were lower than in 1973. This was expected with the sharp decline in livestock prices in 1974, particularly for feeder calves. The average for Polk county participants was the lone

Table 2: Average Farm Sales from Small Farms in Selected Missouri Counties 1971, 1973, and 1974

	1971	Participants		1971	Non-Participants	
		1973	1974		1973	1974
Putnam	\$5,125	\$11,913	\$10,138	\$6,250	\$11,875	\$6,375
Oregon	2,500	5,783	4,283	2,212	3,472	2,319
Polk	2,361	6,917	7,222	1,318	2,045	1,659
Wayne	2,382	4,618	3,324	3,100	3,406	1,156
South Missouri Counties	2,421	5,549	4,530	2,184	3,034	1,872
Summation of Counties	2,714	6,240	5,140	2,705	3,896	2,311

Source: Data from personal interviews.

Farms were grouped according to size of farm sales.

exception as it showed a slight increase from 1973. However, the decline in sales from participant farms was much smaller than for non-participants.

For all participants the decline was approximately \$1,100, while for non-participants the decline averaged over \$1,500. This left participants with a higher gross income than they had in 1971. However, non-participants in all of the counties except Wayne were about even with 1971 and Wayne had actually dropped below the 1971 level.

This in turn pulled the average for the total group of non-participants below that of 1971.

A statistical "t" test was applied to the data to determine if the difference between the gross farm sales means was significant. There was a significant difference in both 1973 and 1974 between the participants and non-participants farm sales. This was true for both the summation of counties and south Missouri counties.

As previously stated, there was a small difference in 1971

in the south Missouri counties which would naturally account for some of the difference in later years. The "t" values in both 1973 and 1974 were much larger; therefore, there was a greater difference between the two populations than in 1971.

A few farmers were unduly influencing the average farm sales figures and distorting the true picture. In an attempt to obtain some verification, two additional analyses were completed.

First, the farms were grouped according to size of farm sales and the relative distributions in each year were examined.

Secondly, the number of farms increasing, decreasing or maintaining sales levels were calculated.

The farms were grouped into three sales categories. They were less than \$5,000; \$5,000 to \$10,000; and over \$10,000. In 1971, the participant and non-participant farms were distributed almost identically with just a slightly larger proportion of the non-participant farms in the \$5,000 to \$10,000 sales category (Table 3). By 1973 and again in 1974 a much larger proportion

Table 3: Comparison of Farm Sales from Small Farms in Selected Missouri Counties 1971, 1973, and 1974

	South Missouri Counties						Summation of Counties					
	1971		1973		1974		1971		1973		1974	
	P* (%)	NP* (%)	P* (%)	NP* (%)	P* (%)	NP* (%)	P* (%)	NP* (%)	P* (%)	NP* (%)	P* (%)	NP* (%)
Less than \$5,000	90.2	85.3	63.4	83.3	80.6	91.9	85.0	76.9	57.6	75.6	74.4	87.9
\$5,000 - \$10,000	9.8	14.7	14.6	8.1	2.4	5.4	15.0	23.1	16.8	9.7	5.4	9.8
Over \$10,000	0	0	22.0	8.1	17.1	2.7	0	0	25.6	14.7	20.2	2.3

Source: Data from personal interviews.

*P = participants; NP = non-participants.

There is considerable evidence to suggest the Small Farm Program led to increased farm sales.

of the participant farms were in the higher sales categories.

A larger percentage of participant farms increased farm sales from 1971 to 1973 (Table 4). Over two-thirds of the participant farms increased sales from 1971 to 1973 while only about one-half of the non-participants increased farm sales. The difference is even greater when 1974 is compared with 1971. Approximately one-half of the participants had higher farm sales in 1974 while only one-fifth of the non-participants had increased sales in 1974 compared with 1971.

In general, there is

estimated. Although detailed cost information was not obtained in this study, data from previous studies and data gathered on small farms by the Missouri Extension Division indicate that approximately 70 per cent of gross sales is typically operating expenses.

However, 1973 was exceptional with the favorable price relationships, so that expenses amounted to more nearly 60 per cent of gross sales. These figures were used in combination with the data on gross farm sales presented earlier to estimate net farm income. These are rough estimates, but they do give

Table 4: Incidence of Changes in Farm Sales on Small Farms in Selected Missouri Counties, 1971-1974

	1971-1973		1971-1974	
	Participants	Non-Participants	Participants	Non-Participants
	(%)	(%)	(%)	(%)
South Missouri Counties:				
Increase	67	30	44	18
Same	24	57	41	70
Decrease	19	13	15	12
Putnam County:				
Increase	85	80	60	40
Same	15	20	30	--
Decrease	--	--	10	60

Source: Data from personal interview

considerable evidence to suggest the Small Farm Program led to increased farm sales. Although much of the increase may be attributed to higher prices, it was also in part related to expansion of output as will be evidenced in a later section on size of enterprise.

Net Farm Income

Net farm income for participants and non-participants were also

some indication of the magnitude of changes in net farm income and the absolute level of net farm income on the participating and non-participating farms.

Net farm income for both participants and non-participants increased sharply from 1971 to 1973 (Table 5). The difference is in 1974 when both declined from 1973 but the decline on participant farms was much less

The majority of the small farms are diversified and have from two to five enterprises.

Table 5: Average Net Farm Income for Small Farmers in Selected Missouri Counties, 1971, 1973, and 1974

	Participants			Non-Participants		
	1971	1973	1974	1971	1973	1974
Putnam	\$1,536	\$4,336	\$1,865	\$1,875	\$4,323	\$1,173
South Missouri Counties	726	2,469	1,513	655	1,350	625

Source: Data from personal interviews.

Table 6: Average Number of Units Per Enterprise on Small Farms in Selected South Missouri Counties 1971, 1973, and 1974

Enterprise	Participants			Non-Participants		
	1971	1973	1974	1971	1973	1974
Beef cows (no.)	16.6	19.1	18.2	11.9	15.2	16.0
Sows (no.)	9.0	15.1	7.6	10.1	11.9	7.0
Dairy cows (no.)	9.2	13.7	16.8	2.8	1.0	7.4
Hay (acres)	21.9	28.1	29.8	22.9	26.9	25.3
Impr. pasture (acres)	42.0	71.8	70.7	34.4	56.9	53.4
Corn, soybeans, wheat (acres)	26.1	32.6	41.7	24.5	10.0	25.0
Total crops (acres)	50.0	84.2	86.2	41.5	68.4	66.0
Percent of total land operated	37.0	57.3	58.6	39.4	57.6	55.7

Source: Data from personal interviews.

Table 7: Average Number of Units Per Enterprise on Putnam County Small Farms, 1971, 1973, and 1974

Enterprise	Participants			Non-Participants		
	1971	1973	1974	1971	1973	1974
Beef cows (no.)	27.4	38.3	44.5	36.8	41.2	43.4
Sows (no.)	10.4	10.6	7.3	0	8.0	1.0
Dairy cows (no.)	14.5	16.0	13.0	8.8	7.5	5.7
Hay (acres)	42.6	67.1	66.8	106.8	87.5	78.6
Impr. pasture (acres)	38.0	129.1	120.3	65.0	81.8	84.6
Corn, soybeans, wheat (acres)	40.9	42.4	47.1	31.2	39.0	36.4
Total crops (acres)	106.5	186.1	195.3	140.6	192.8	203.2
Percent of total land operated	35.0	54.5	56.0	42.0	52.6	55.5

Source: Data from personal interviews.

than on non-participant farms. Non-participant net farm income in 1974 was lower than in 1971 when the program began.

Although net farm income on participant farms declined in 1974, it was still considerably above 1971 and for the south Missouri counties averaged almost twice the 1971 level. Again it should be emphasized that net farm income in these counties is low, but with low off-farm income any increment to net farm income can make a contribution to family living.

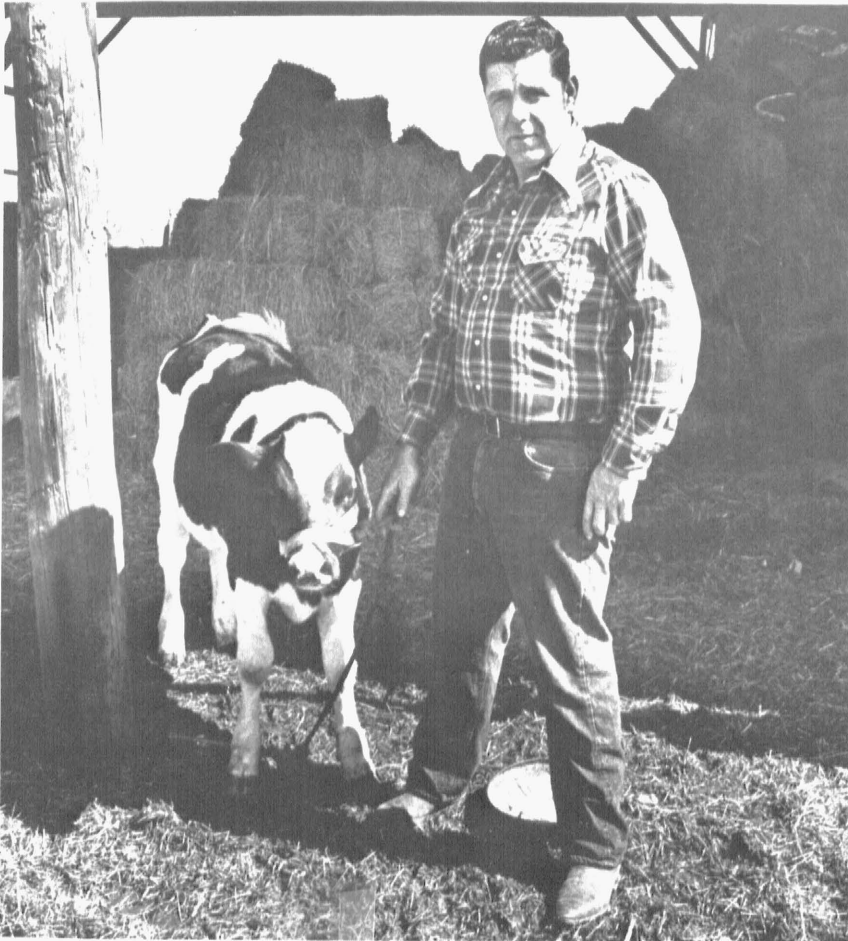
Size of Enterprise

The enterprises found on small farms in Missouri are similar to those on the larger more commercial size operations. The majority of the small farms are diversified and have from two to five enterprises. These include beef cows, hogs and row crops such as corn, soybeans, and wheat. Dairying was an enterprise on some of the small farms. Comparisons of size of enterprise on participant and non-participant farms were made to gain further insight into effects of the Small Farm Program.

Putnam County has larger farms and more cropland. This makes their farming quite different from that of south Missouri. For that reason and in this part of the presentation, the south Missouri counties will be combined to make comparisons, while Putnam county will be kept separate.

With the exception of the dairy enterprise on non-participant farms, size of enterprise increased for both participant and non-participants

A number of farms continued to increase the size of the beef enterprise.



Mr. and Mrs. Ralph Buckner, Dunnigan, are "graduating" from the Small Farm Program. He has a herd of 90 Holstein cows.

between 1971 and 1973 (Tables 6 and 7). Increase in size of enterprise was typically much greater on participant farms than on non-participant farms, with beef cows in the south Missouri counties the only exception. In the case of beef cows, the rate of increase was just slightly greater on non-participant farms.

In south Missouri, the period 1971-1973 was one in which participants in the program increased the size of their livestock enterprises and also increased the production of hay, pasture and crops which served as inputs for the livestock

enterprises.

The increases in size of enterprise as well as production of inputs was not nearly as great on non-participant farms. In Putnam County the changes for participants and non-participants were quite similar between 1971 and 1973 except for the fact that participants increased their acreage of improved pasture much more than non-participants.

A major difference is between participants and non-participants with regard to size of enterprise in 1974. High prices for feed relative to livestock products led to a sharp reduction in hog production. A number of farms continued to increase the size of the beef enterprise but declines were much more frequent than during the period 1971 to 1973. Most of the other enterprises remained at about the same level in 1974 as in 1973. This left participant farms with somewhat larger increases in size of enterprise in 1974 as compared with non-participant farms.

The number of farms on which size of enterprise increased, decreased or remained at the same level was also examined. This information complements that on average size of enterprise in that it provides some indication of the prevalence of change among participants and non-participants.

A much larger proportion of the participants in the south Missouri counties increased the size of their beef cow, dairy cow, hay, and improved pasture enterprises (Table 8). In each of these cases the number of

Livestock assets increased considerably for participants.

Table 8: Number of Small Farmers in Selected Missouri Counties with Changes in Size of Enterprise^a

		Beef Cows		Sows		Dairy Cows		Acres Hay		Ac. Impr. Past.		Row Crops	
		p ^b	NP ^b	p ^b	NP ^b	p ^b	NP ^b	p ^b	NP ^b	p ^b	NP ^b	p ^b	NP ^b
1971 - 1973													
South Missouri Counties	Incr.	17	12	10	7	9	3	14	7	22	23	1	3
	Same	3	2	3	2	0	0	1	1	1	0	1	0
	Decr.	8	10	17	16	2	3	6	8	10	7	7	2
Putnam	Incr.	12	5	2	1	4	0	10	1	11	5	9	3
	Same	3	0	1	4	4	1	1	1	2	0	2	1
	Decr.	1	0	5	0	5	4	8	3	3	0	7	1
1971 - 1974													
South Missouri Counties	Incr.	18	14	9	3	9	5	14	5	24	23	2	3
	Same	2	3	2	1	0	0	1	2	1	1	1	0
	Decr.	9	8	19	19	3	3	7	9	9	7	7	2
Putnam	Incr.	11	5	0	1	5	0	11	2	12	5	10	2
	Same	4	0	0	0	0	1	0	1	2	0	2	1
	Decr.	1	0	7	0	7	4	8	2	2	0	6	2

Source: Data from personal interviews.

^aNumbers account for only those who had each particular enterprise.

^bp = participants; NP = non-participants.

farms showing increases considerably outnumbered those with decreases in size of enterprise.

In the case of the hog enterprise and row crops, the number decreasing size of enterprise outnumbered those increasing. The same situation was essentially true for non-participants except in the case of row crops where a slightly larger proportion increased row crop acreage.

Data for Putnam County indicated a very similar situation with the majority of the participants increasing the size of their beef cow, hay, pasture, and row crop enterprises. There was very little difference between participants and non-participants in Putnam County with the exception of the hay enterprise where very few of the non-participants

increased the size of the hay enterprise. Both groups showed a majority of producers decreasing the size of the hog and dairy enterprises.

Incidence of changes between 1971 and 1974 in size of enterprise were essentially the same as those for the 1971-1973 period. About the only difference was that as a result of the high feed prices in 1974 a slightly larger proportion of participants and non-participants decreased the size of their hog and dairy enterprises.

Changes in size of enterprise were also evaluated by calculating changes in real value of livestock assets (Table 9). A dollar value was given to each type of livestock on the farm with January 1975 prices used as a basis for the values. This provides a picture for the

Small farmers have typically made poor use of their resources.

total livestock operation on the farms and permits a comparison of changes on participant and non-participant farms.

There were some differences in livestock assets between participants and non-participants in 1971. In Putnam County the non-participants had a greater value of livestock assets while in south Missouri the difference was small and in favor of participants.

value of livestock assets is naturally due to an increase in the number of head since the same prices were used all three years. This provides further evidence of the increase in size of enterprise on participant farms relative to non-participants.

Resource Use

Small farmers have typically made poor use of their

Table 9: Comparison of Average Real Values of Livestock Assets for Small Farms in Selected Missouri Counties, 1971, 1973, and 1974

	Participants			Non-Participants		
	1971	1973	1974	1971	1973	1974
South Missouri Counties	\$3,573	\$ 5,692	\$ 5,482	\$ 2,766	\$4,302	\$ 3,632
Putnam	7,294	10,920	12,552	10,112	9,952	11,984

Source: Data from personal interviews.

Livestock assets increased considerably for participants in Putnam County as well as in the south Missouri counties. However, Putnam County non-participants showed an actual decline in livestock assets between 1971-1973 while non-participants in south Missouri counties increased their livestock assets slightly. In south Missouri counties livestock assets declined from 1973 to 1974 but the decline was much greater on non-participant farms. Whereas, livestock assets on non-participant farms in Putnam County had exceeded those of participants in 1971, such was not the case in 1974. By the time of the survey participants had livestock assets of approximately \$600 greater than non-participants.

The increase in the dollar

resources. They generally have not managed their land, labor and capital to their best advantage. The data collected in this study was not adequate for a complete evaluation of resource use on small farms. However, the data obtained on land use does provide some indication.

The total number of acres of cropland as a per cent of total land operated was calculated for each farm. This was done to provide indication of land use intensity. Since the acres of cropland included improved pasture, farm management specialists estimated that 65 to 70 per cent of the total land should be cropland. The expected figure would be somewhat higher normally but these counties are characterized by hilly, rough terrain.

Both the participants and

Participants made more changes in their production practices in their production of hogs and crops.



The program has been effective in accomplishing changes in hog and crop production.

non-participants indicated approximately 35 per cent of their land was in cropland in 1971. The percentage had increased to better than 55 per cent for both groups by 1974. The figures indicate very little difference between participants and non-participants. It would appear that the land resource was not being used as efficiently as possible by either group. However, the non-participants started out with approximately 2.5 per cent and 7 per cent more land classified as cropland in south Missouri and Putnam county respectively. By 1974 non-participants were trailing by 3 per cent in south Missouri and 1 per cent in Putnam County.

Thus a change in relative percentages of approximately 5

per cent occurred during the three-year period. This would suggest that participants have made slightly more progress in improving the utilization of their land resource during this period.

Production Practices

Changes in production practices involve management decisions relating to the technology used in farm production. This is a very complex process and the data available for analysis from this study was quite limited. An attempt was made to obtain information from farmers on changes made during 1974 in a limited number of practices. The farmers interviewed were somewhat reluctant to describe

Non-participants report more changes in beef and dairy cattle.

Table 10: Production Practice Changes Made on Small Farms in Selected Missouri Counties During 1974

	South Missouri Counties		Summation of Counties	
	P*	NP*	P*	NP*
	(% yes)	(% yes)	(% yes)	(% yes)
Hogs				
Increased wt. of pigs	26.7	20.0	21.0	18.0
Increased no. of pigs weaned/litter	33.3	10.0	26.0	18.0
Purchased better boar	33.3	0	42.0	9.0
Improved ration	13.3	10.0	20.0	9.0
Improved health program	26.0	10.0	20.0	9.0
VALID OBSERVATIONS	15	10	20	11
Beef Cattle				
Increased weaning wt. of calves	13.0	22.2	21.0	26.0
Higher percent calving rate	21.7	29.4	34.0	27.3
Purchased better bull	30.4	41.2	37.0	40.9
Provided better pasture	17.4	33.3	34.2	34.8
VALID OBSERVATIONS	23	18	38	23
Dairy Cattle				
Used A. I.	28.6	100.0	28.6	66.7
Improved pasture	28.6	0	28.6	33.3
Provided better ration	28.6	0	35.7	100.0
Kept mastitis under control	100.0	100.0	85.7	100.0
Improved milking facilities	28.6	100.0	35.7	33.3
VALID OBSERVATIONS	7	1	14	3
Crops				
Increased no. of soil samples	7.3	0	8.2	0
Increased acres of improved pasture	14.6	5.7	14.8	5.0
VALID OBSERVATIONS	41	35	61	40

Sources: Data from personal interviews.

*P = participants; NP = non-participants.

Note: Valid observations are the number of small farmers with the particular enterprise.

or make judgements concerning their production practices. Perhaps this was due to a feeling that lack of improvement would reflect on their management ability.

Participants made more changes in their production practices in production of hogs and crops while non-participants report more changes in beef cattle and dairy cattle (Table 10). Since many of the participants had already been in the program two years

prior to the period involved in this question, it may well be that they had made the desired changes earlier. It is also possible that differences in response by enterprise is related to program emphasis and the size of farms emphasizing the beef and dairy enterprises.

These data do not permit definite conclusions with respect to production practices. It would appear that the program has been effective in

Two major information sources—magazines and extension were more often used by participants.

accomplishing changes in hog production and crop production but the results for dairy and beef cattle do raise questions. This area is being explored further in current research with emphasis being given to changes in practices that have been stressed and the extent to which farmers credit the program with bringing about these changes.

objective of this study was to find out whether the Small Farm Development Program had brought more professional assistance and information to the small farmer.

Information sources used by participants and non-participants were slightly different in 1971 (Table 11). Two major information sources — magazines and extension —

Table 11: Information Sources for Small Farmers in Selected Missouri Counties, 1971 and 1974

Source	1971				1974			
	South Missouri Counties		Summation of Counties		South Missouri Counties		Summation of Counties	
	P* n=41 (%)	NP* n=40 (%)	P* n=61 (%)	NP* n=45 (%)	P* n=41 (%)	NP* n=40 (%)	P* n=61 (%)	NP* n=45 (%)
Extension	23.0	36.3	29.2	31.9	29.0	17.6	31.0	15.0
Magazines	30.0	14.3	35.6	24.9	19.0	23.0	20.9	24.8
Experience	19.2	9.6	9.3	7.8	17.0	8.1	13.7	6.8
Neighbors	7.6	24.4	14.3	21.0	11.0	14.9	8.6	15.0
Radio	3.8	4.4	3.8	5.3	8.0	6.8	7.2	6.8
Television	0	2.2	0	1.8	5.0	8.1	5.0	8.2
Dealers	11.6	2.2	5.2	1.8	5.0	2.7	5.0	2.8
G. I. School	0	0	1.3	0	3.0	2.7	2.9	2.8
A. S. C. S.	3.8	2.2	1.3	1.8	3.0	6.7	2.2	6.8
Relatives	0	0	0	0	0	0	1.4	1.4
Banks	0	2.2	0	1.8	0	8.1	.7	8.2
College	0	0	0	0	0	1.3	.7	1.4
N. F. O.	0	2.2	0	1.8	0	0	.7	0
Number of valid observations**	52	49	77	55	103	76	142	79

Source: Data from personal interviews.

*P = participants; NP = non-participants.

** More than one source was accepted so there are more observations than farmers.

Information Sources

Small low-income farmers tend not to use the services of professional agriculturalists. Previous studies indicate that this group of farmers get much of their information from magazines, neighbors, and personal experience. One

were most often used by participants, whereas the importance of these sources was reversed for non-participants. Experience and neighbors also ranked high for both groups, which emphasizes the fact that people do learn from their friends and by doing for themselves.

In most cases, the most limiting resource is capital.

As indicated earlier, not all of the non-participants indicated a desire for assistance. This seeming independence may be related to the fact they were already using extension to the extent they felt needed.

Information sources changed considerably from 1971 to 1974. Extension and magazines became the major sources for participants while the order was reversed for non-participants. While extension was becoming more important as a source for participants, it was being replaced by magazines as the most important source for those not participating in the program. This was true even though many of the participants indicated in the interviews that they did not necessarily associate the small farm program with extension. If this is an accurate reflection of the situation, extension is actually serving as a source of information for more participants than indicated by their response.

The attitude toward extension as a source of information is further emphasized by the actual number of farmers indicating extension as an important source in 1971 and again in 1974. Whereas only 22 indicated extension as an important source in 1971, 44 of the participants in 1974 actually indicated extension as an important source. On the other hand, the number of non-participants mentioning extension as a source of information actually declined from 15 in 1971 to 12 in 1974. The change was particularly noticeable in south Missouri counties where the number of participants mentioning

extension increased from 12 to 30 during the three-year period. The change was somewhat less dramatic in Putnam County, perhaps due to the existence of an earlier program directed towards small farmers.

Credit Use and Availability

Limited resources are an obvious problem on most small farms. In most instances, the most limiting of these resources is capital. In the original survey of small farms, the factor mentioned most often as the one preventing expansion of the farm operation was lack of capital. Nearly one-third of the small farmers interviewed mentioned this problem.

A linear programming study carried out by Williamson at Missouri showed that if operating capital could be increased from \$3,000 to \$10,000, gross farm incomes could be increased by an amount ranging from \$4,800 to \$27,000. This emphasizes the need for additional capital.

Not only is additional capital difficult to obtain for many small farms, but many farm operators have a fear of debt. Expected benefits from the small farm program were greater availability of credit for the participants as well as a changed attitude on the part of the farmer. It was assumed (1) if he could be shown how additional capital would be useful and productive, and (2) lenders could also be shown how small farms could repay their loans, then greater use would be made of credit on participant farms.

Use of credit on participant farms was significantly greater

Participants borrowed money more often and in greater quantities.

than on non-participant farms during the period 1971 to 1974 (Table 12). Results from the survey indicated that 60 per cent of the participants had used credit during the past three years compared to 35 per cent of the non-participants. This may be one reason why participants' farm sales and assets increased more rapidly during the period than non-participants.

rates were rising and general monetary conditions were tight. This change in the capital market may have more than offset effects of the program.

Banks were the most popular source of credit for both participants and non-participants, receiving over 50 per cent of the business. However, participants did use FHA and PCA much more frequently than did non-participants.

Non-participants were getting much of their credit from personal sources and dealers. There was considerable variation among counties in sources of credit. For example, in one county, FHA was a major source of credit while in another neither FHA nor PCA were reported as a source of credit by those interviewed. It would appear that participants were making somewhat greater use of the best sources of credit and thereby reducing their cost of borrowing.

Not only were more participants than non-participants borrowing money, they were also borrowing in greater quantities. Approximately 40 per cent of the participants had borrowed over \$10,000 during 1974. The average amount borrowed by participants was nearly twice that borrowed by non-participants. Most of the evidence suggests that the program has helped farmers obtain more capital and in turn provided the base for expansion of the farm operation.

Changes in the Farming Operation

In the original survey farmers

Table 12: Use, Sources and Availability of Credit for Small Farms in Selected Missouri Counties,

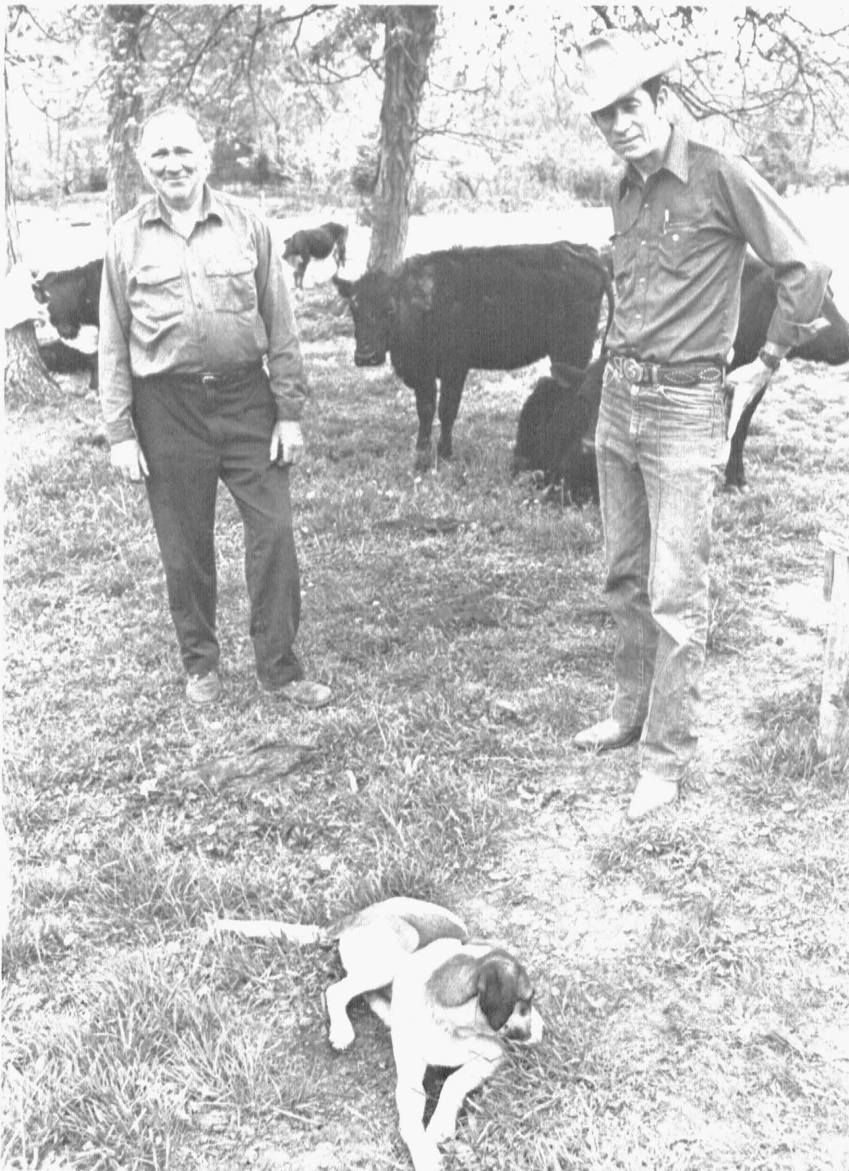
1971-1974	Participants	Non-Participants
	(%)	(%)
Used credit during past 3 years	60.0	35.6
Of those who used credit:		
Credit was easier to obtain	35.1	31.3
About the same	51.4	50.0
More difficult to obtain	13.5	18.7
Sources of credit:		
F. H. A. - P. C. A.	31.9	15.0
Bank	57.5	55.0
Personal	2.1	15.0
Dealers	6.4	10.0
Credit Union	2.1	5.0
Amount borrowed in 1974:		
Less than \$2,500	32.5	68.7
\$2,500 to \$4,999	18.9	6.3
\$5,000 to \$10,000	8.1	18.7
Over \$10,000	40.5	6.3
Average amount (dollars)	\$5,771	\$3,136

Source: Data from personal interviews.

Farmers participating in the program did not see credit as being more readily available. about one-third of both participants and non-participants thought credit was easier to obtain while approximately one-half of those interviewed in both groups thought the difficulty was about the same. Of course this was a period in which interest

Inadequate land resources and age were also limiting factors.

Henry Hockstatter (left), Irondale, has 17 cows and 35 acres in production. Bill Foxx, education assistant in the program, frequently gives him information.



were asked what kind of changes they planned in their farming operations. By 1974, 26 of the 61 participants interviewed had made at least one of the changes planned. Only 11 out of the 45 non-participants interviewed had done so. The proportion would have been higher had not a number of those interviewed

failed to indicate planned changes in 1971. However, more of the participants had accomplished some of the goals by making changes planned in their farm operations.

In both 1971 and again in 1974 farmers were asked what they thought prevented them from making changes in their farming operations. The response was very similar in both years.

Lack of operating capital was most frequently mentioned as the greatest problem. Inadequate land resources and age were also limiting factors. The per cent of farmers having various problems differed very little between participants and non-participants. This would suggest that the Small Farm Development Program has not eliminated the problems nor has it greatly changed the farmers' perceptions of their problems.

Stability of Agricultural Production

While change was an objective of the program, there is one type of change which is not so desirable. This is the tendency of farmers, particularly small farmers, to get into a particular enterprise when prices are high and drop out when prices fall. They are not producing when they should be from the standpoint of favorable price conditions and are producing when prices are low. It was anticipated that the educational program might encourage participants to depart from this pattern. This was based on the idea that with consultation and the use of

From 1971 to the latter part of 1973 prices of most agricultural products were rising.

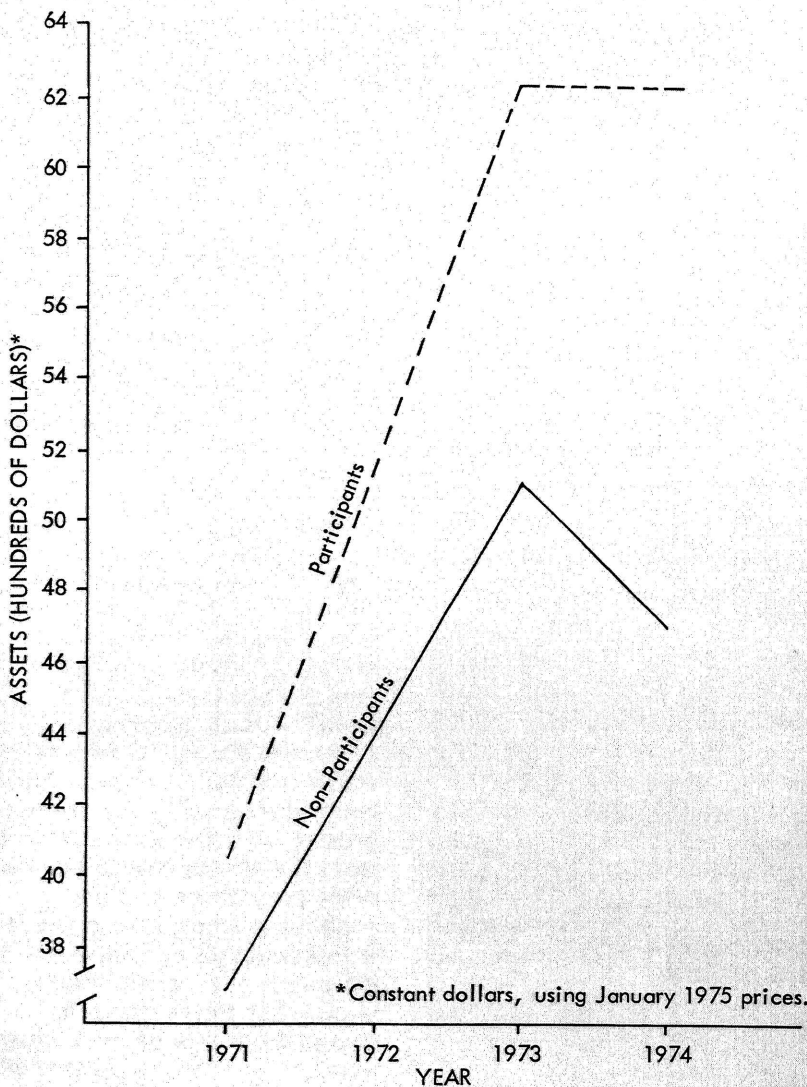
simple budgets they could see the desirability of stabilizing production.

The period from 1971 to 1974 provided an opportunity to examine this particular issue. From 1971 through the latter part of 1973 prices of most

agricultural products were rising. Small farmers, including both participants and non-participants, increased output during this period. However, during the last quarter of 1973 and throughout 1974, livestock prices declined, falling back to the 1971 level or below. Both participants and non-participants reduced the size of their livestock enterprises but there were differences in the extent of response.

The enterprise data shows that non-participants reduced their livestock numbers much more sharply than participants. The number of beef and dairy cows on participant farms remained almost constant in 1974 while there was considerable reduction on non-participant farms. Sow numbers were reduced on both but there was a tendency for participants to hold back gilts that was not apparent on non-participant farms. This placed participant farms in much better position to benefit from increasing prices for feeder pigs in 1975 than non-participant farms. The data on value of livestock assets, expressed in terms of constant dollars, reflects similar information in that it indicates participants were holding almost constant between 1973 and 1974 while non-participants had a sharp decline (Figure 2). In general it would appear that the program has reduced the tendency for participants to move in and out of production to the extent present on most small farms.

Figure 2: Livestock Assets on Small Farms in Selected Missouri Counties, 1971, 1973, and 1974



Improvements in Housing

The basic objective of the

The basic objective of the program was an improvement in the quality of life on small farms.

Small Farm Program was an improvement in the quality of life on small farms. In addition to income, it was hoped that improvements would occur in other aspects of family living. Although admittedly difficult to measure, housing was thought to be one important indicator of quality of life. Those interviewed were asked about conveniences in the home, changes in their housing and the type of changes made.

Over 90 per cent of both participants and non-participants had most of the conveniences considered (Table 13). Such items as electricity, telephone, kitchen sink, complete bath, home freezer, electric or gas range and television were found in

practically all of the homes. Only about half of the homes had central heat but there was no apparent difference between participants and non-participants.

A larger number of participants had made changes in their housing during the period 1971 to 1974. A much larger proportion of the participants had built a new home, purchased a trailer or made an addition to their home. Remodeling had been accomplished by an almost equal proportion of participants and non-participants. In four of the five counties a larger proportion of participants than non-participants had made improvements in their housing.

This would indicate that participants were making somewhat greater strides forward in housing than non-participants while at the same time maintaining or increasing their investment in the farm operation.

Table 13: Number and Type of Housing Changes Made by Small Farmers in Selected Missouri Counties, 1971-1974

	South Missouri Counties		Summation of Counties	
	p* n=41	NP* n=40	p* n=61	NP* n=45
I. Number making changes in home	21	19	32	20
Type of housing changes made:				
New home or trailer	5	2	7	2
Addition to home	13	6	17	6
Remodeling	11	13	19	15
II. Conveniences in the home:				
Electricity	40	39	60	44
Telephone	35	39	55	44
Kitchen sink	39	38	59	44
Complete bath	36	38	56	43
Home freezer	38	35	57	40
Electric or gas range	40	39	60	44
Television	35	36	55	41
Central heat	14	17	30	19

Source: Data from personal interviews.

*P = participants; NP = non-participants.

Reality Versus Optimum

Although considerably below optimum level, participant farms were much closer to optimum than non-participant farms.

Farmers participating in the program have made progress during the period 1971 to 1975. However, questions might be raised as to whether the changes made are in the right direction.

Using data on resources available to small farmers, Williamson completed a linear programming study in 1974 in which he attempted to determine the optimum resource combination and level of use on small farms. This provided the basis for a comparison of the optimum with changes actually made on participant and non-participant farms.

Williamson's study produced optimum combinations for both full-time and part-time farmers. Two operating capital restraints were used, one of \$3,000 and the other of \$10,000. Operating capital was the limiting factor for both full-time and part-time farms in each of the counties when \$3,000 was used as the operating capital constraint. When the capital constraint was increased to \$10,000, land or labor was usually the limiting

resource.

Optimum farm sales varied considerably among counties and depending upon the assumption with respect to operating capital and amount of work off-farm. With a \$3,000 operating capital limitation, optimum gross sales averaged nearly \$19,000 for full-time farms compared with nearly \$10,000 for part-time farms. The range was from \$7,855 for Polk County part-time farms to \$24,810 for full-time Wayne County farms. With the capital constraint relaxed to \$10,000, the range was from \$7,855 for part-time Polk County farms to \$59,540 for full-time Putnam County farms. At the \$10,000 operating capital level optimum farm sales for full-time farms were nearly four times as large as for part-time farms.

Actual farm sales on both participant and non-participant farms were considerably below the optimum level (Table 14). If the \$3,000 operating capital level is an accurate reflection of the capital situation, actual sales were about one-third to one-half of optimum in most counties. Although considerably below optimum level, participant farms were much closer to optimum than non-participant farms. This suggests that changes in farm sales on participant farms were in the right direction but that much remained to be done if farms were to be near their optimum level of operation.

Linear programming solutions such as those used for optimum levels in this study do not account for risk and many non-economic factors that enter into management decisions. However, there is room for further progress.

Table 14: Farm Sales on Small Farms in Selected Missouri Counties as a Percentage of Optimum Farm Sales, 1973

County	Participants		Non-Participants	
	\$3,000 ^a	\$10,000 ^b	\$3,000 ^a	\$10,000 ^b
	(%)	(%)	(%)	(%)
Putnam	53.5	20.0	53.3	19.9
Oregon	43.9	19.0	26.3	11.4
Polk	59.0	32.0	17.0	10.0
Wayne	18.6	14.1	13.7	10.0
South Missouri Counties	33.4	22.3	18.3	12.2
Summary of Counties	34.6	18.6	21.6	11.6

^aOperating capital limited to \$3,000

^bOperating capital limited to \$10,000

Nearly two-thirds of the farms had a beef enterprise.

Actual size and combination of enterprises were also examined and compared with optimum solutions for small farms (Table 15). Optimal enterprise combinations for small farms included beef cow and hog enterprises as well as small acreages of corn and soybeans. When the capital constraint is relaxed, the number of beef cows typically declines, while the number of sows increases. Because of larger acreages available to small farmers in Putnam county, the solutions are somewhat different with average size being almost twice as large for most enterprises in Putnam County.

The actual combination of enterprises on small farms was found to be similar to the optimal solutions but the size of enterprise was much smaller than indicated by the programming solutions. Of the 106 interviewed, there were beef or dairy enterprises on 89 of the farms. Nearly two-thirds of the farms had a beef enterprise. The hog enterprise was the next most prevalent with approximately 40 per cent of the

farms reporting sows in 1973. As might be expected with the type of land involved, crop enterprises were much less prevalent, particularly in south Missouri.

The beef and hog enterprises were by far the most important in terms of prevalence, resources used, and gross sales. The size of the beef enterprise approached the optimum level on many of the farms, and on non-participant farms in Putnam County actually exceeded the optimum level of production. The hog enterprise was much below optimum size even with capital restricted to \$3,000.

However, the number of hogs on participant farms was considerably greater than on non-participant farms and hence came closer to the optimum. Average size of the corn enterprise actually exceeded the optimum level. This is somewhat deceiving though in that corn production is concentrated on a relatively few farms.

Both the combination and size of enterprise depart

Table 15: Actual and Optimal Enterprise Combinations for Small Farms in Selected Missouri Counties, 1973

Enterprise	South Missouri Counties				Putnam Counties			
	p*	Actual NP*	Optimum		Actual		Optimum	
			\$3,000 ^a	\$10,000 ^b	N*	NP*	\$3,000 ^a	\$10,000 ^b
Beef cows	12	7	18	14	28	41	39	33
Sows	7	4	20	40	3	1	9	64
Corn (acres)	5	1.3	1.4	--	16.2	18	0	--
Soybeans (acres)	1.5	--	12	--	8.4	19.2	26	--
Dairy Cows	3	--	--	--	8	3	--	--

*P -- Participants and NP -- Non-Participants

^aOperating capital limited to \$3,000

^bOperating capital limited to \$10,000

A larger proportion of small farmers are forced to work some off-farm.

Danny Cornelison, Unionville, continues to work off the farm. He and his wife are expanding their 74-beef cow herd. Cornelison credits the program with helping them improve the pastures.

considerably from the optimum level on small farms. Participant farms come closer to optimum, but the hog enterprise in particular is not as prevalent as it should be nor is it as large as indicated in the programming solutions. If small farms wish to expand, an increase in hog production would appear to be the direction in which expansion should taken place. However, changes in relative

prices and availability of capital must be considered.

Adjustments to Changing Prices

Williamson's work designed to suggest optimum resource use and enterprise combinations was updated using projected prices for 1975-77. These prices were more in line with actual 1974 prices and indicate the extent to which small farmers actually made the kinds of adjustments which would maximize profit. Since livestock prices were lower and feed grain prices much higher, the \$3,000 operating capital constraint became a much more limiting factor. Optimum gross farm sales figures were much lower even with operating capital restricted to \$10,000. They ranged from \$4,734 for south Missouri part-time farms with zero acres cropland to \$17,026 for Putnam County full-time farmers. These figures suggest that net farm income would be below \$5,000 in most instances. These figures provide further evidence as to why a larger and larger proportion of small farmers are forced to work some off-farm.

With the changes in relative prices, the changes in optimum enterprise combinations were toward more corn production and fewer hogs. In fact, with operating capital restricted to \$3,000, hogs were eliminated from the suggested enterprises and the beef cow enterprise was expanded. It is interesting to note that this is the direction in which most of the small farms moved during 1974, particularly those with limited capital.



Summary and Recommendations

Results from this analysis show the educational program has been successful

The Missouri Extension Service launched a small farm educational program in 1971. Farmers participating in the program have made numerous changes since 1971 including marked increases in production and sales. This report contains the results of an attempt to assess progress made by participant farms relative to those who were not participating in the program. A group of farms from which information had been obtained in 1971 were identified for use as a control group in the evaluation of the educational program.

Although both participants and non-participants have made changes in their farming operations, participants have made more progress. Participants had higher farm sales, higher net farm income, larger enterprises, more livestock assets, slightly more efficient resource utilization,

more professional assistance and information, more changes in housing and more stability in level of production. Evidence was not conclusive with respect to relative changes in production practices nor was it obvious that participants had accomplished more of their goals in terms of planned changes than non-participants.

Although participants in the Small Farm Program made considerable progress relative to non-participants, they were still far short of optimum in terms of farm sales or size of enterprise. This would seem to suggest room for further progress with emphasis on more intensive enterprises such as feeder pig production.

Results from this analysis show the educational program has been successful and would warrant expansion to other areas of the state as funds become available. It would appear desirable to develop procedures for showing small farms their opportunities with more intensive enterprises which are adapted to the area. Somewhat greater attention might also be given to improvement of production practices and utilization of resources to help participants achieve some of the planned changes in their farming operations. Participants in the program had a generally favorable reaction towards the program but did not necessarily associate it with the extension service.

Recognition of extension's role is deserved and will be necessary if funds are to be made available for continuation and expansion of the program to additional areas of the state.

Mr. and Mrs. Bill Haddock, Alton, raise cattle and feeder pigs on their 60-acre farm. Haddock often asks the education assistant for help.



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