

8-1-2001

Differences in District Extension Leaders' Perceptions of the Problems and Needs of Tennessee Small Farmers

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Recommended Citation

Ekanem, E., Singh, S. P., Muhammah, S., & Tegegne, F. (2001). Differences in District Extension Leaders' Perceptions of the Problems and Needs of Tennessee Small Farmers. *The Journal of Extension*, 39(4), Article 13. <https://tigerprints.clemson.edu/joe/vol39/iss4/13>

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August 2001 // Volume 39 // Number 4 // Research in Brief // 4RIB4



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Differences in District Extension Leaders' Perceptions of the Problems and Needs of Tennessee Small Farmers

Abstract

A survey questionnaire was used in collecting data used in examining differences in Extension leaders' perceptions of problems faced by small farmers in Tennessee. Analysis of Variance (ANOVA) was used in analyzing questionnaire responses. Capital, credit, and appropriate technology were some of the problems facing small farmers. Fear of acquiring additional debt; inability to run large operations; lack of machinery and equipment; and scarce cash constrained expansion of small farms, according to surveyed Extension leaders. Although there were differences across districts, most frequently cited research and educational needs of small farmers were those related to production, marketing, and management.

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Introduction

Structural changes in U.S. agriculture continue to result in fewer but larger farms. These changes continue to have an impact on existing small farmers, particularly those with limited resources (Church, Siegel, & Jacobs, 1988; Dagher, Christy, & McLean-Meynesse, 1991; Gebremedhin, 1991; Kinsey & Senauer, 1997; Nelson, Brown, & Toomer, 1991; O'Sullivan, 2000; Surendra, Muhammad, Tegegne, Ekanem, & Comer, 1999). The official definition of small farms has changed over the years (Breimyer, 1997; Carlin & Crecink, 1982; Church et al., 1988; & Jones, 1991). A new definition by the National Commission on Small Farms defines them as "farms with less than \$250,000 gross receipts annually on which day-to-day labor and management are provided by the farmer and/or the farm family that owns the production or owns, or leases, the productive assets" (USDA, 1998).

Despite the trend towards increasing size and scale of farm operations, some 94% of today's farms fall under the USDA's definition of "small farms," and about 98% of all farms in Tennessee would be considered small using this definition (USDA, 1997; 1998). About 62% of the market value of production is attributable to these small farms. Small farms also continue to serve as an important component of rural community life and cultural continuity (Singh et al., 1999).

There were 11 million acres in farms in Tennessee in 1997, with an average farm size of 145 acres. About 62% of all Tennessee farms had up to 99 acres of land in 1997, while 33% had 100 - 499 acres. Only 5% were in the 500 - 2,000+ acre range. Farms with less than \$99,999 in gross annual sales (94.4% of all farms) contributed approximately 29.3% of the total market value of agricultural products sold in Tennessee in 1997 (USDA, 1997).

Small farms are vital to both agriculture and rural communities, and both have a stake in their viability and sustainability (Steele, 1997). To ensure their viability, key issues and problems facing small farms have to be identified and addressed. Because all problems facing these groups of farmers are not equally important, efforts must be made to understand and prioritize them.

In October, 1997, the University of Tennessee Extension Service redrew Tennessee's Extension district lines, reducing the number of districts in the state from five to four. The redistricting was intended to allow the Extension to "evaluate its educational programs and look for more effective ways of administering programs" (The University of Tennessee Agricultural Extension Service).

This article discusses the perceptions of Extension leaders from all the four Extension districts of the state. Challenges, problems, and the future direction of small farmers in Tennessee are also documented. The opinions reported here are those of the leaders in the counties and should be an accurate representation and assessment of the issues and problems that are important to small farmers in Tennessee.

Extension provides an important linkage between farmers and researchers, and farmers have come to value the services they receive from Extension. Agricultural producers are, generally, satisfied with Extension workers and have ranked them as good information sources (Schnitkey, Batte, Jones, & Botomogno, 1992). In addition to being a good source of information for producers, a good Extension program should also be aware of the needs of its constituents (Bowe, Smith, Massey, & Hansen, 1999). Extension leaders surveyed for the study reported here should know enough about the needs of their clientele to be able to provide a good assessment of the issues facing small farmers in the state.

Objectives of the Study

The objectives of the study reported here were to:

1. Assess the research, Extension, and educational needs of small farmers as perceived by district Extension leaders, and
2. Analyze differences in needs assessment for small farms from four Extension districts for the purpose of drawing policy implications for Extension programs to assist small farmers.

Data and Methodology

A mail survey addressing various issues was developed and mailed to all 95 county Extension district leaders during the fall of 1999 with the help of the Cooperative Extension Program at Tennessee State University. The data were collected from questionnaires using a Likert-type (1-5 scale) format. Means, standard deviations, and variances were used in categorizing and analyzing responses recorded from survey participants.

Two open-ended questions were used in asking Extension leaders to (1) identify key areas of research and educational needs for small farmers and (2) outline changes that should be made in order to better serve small farmers. Although open-ended questions tend to be more difficult and time consuming to analyze, they presumably provide "unbiased, unconstrained and thoughtful responses" (Santos, Mitchell, & Pope, 1999). Answering these questions allowed respondents the opportunity to elaborate on responses that would otherwise be constrained if closed-ended questions were used. Sixty-seven completed surveys (71% response rate) were analyzed for the study.

One-way analysis of variance (ANOVA), a method that uses the F-test to simultaneously compare multiple means, was used to analyze data collected. The Levene test (SPSS, 1997; 1998) was used to check the equality of variances of the populations, an important assumption for the F-test. Although the ANOVA procedure allows one to detect significant differences among the means of the variable tested, it does not guide one to identify where the means differs from one another. The Bonferroni method was consequently used in investigating where the differences occurred. Chi-square tests were used to investigate differences in leaders' assessment of changes anticipated in Extension during the coming decade.

Results

Of the Tennessee Extension leaders surveyed, 71% returned useable questionnaires: 21% were from Western district, 31% from the Central district, 24% from the Cumberland district, and 19% from the Smoky Mountain district. Three (5%) of the respondents did not indicate their district.

To understand the composition of farms in each of the four districts, leaders were asked to estimate the percentage of farms in each of the selected gross sales categories: (1) up to \$9,999, (2) \$10,000 - \$19,999, (3) \$20,000 - \$39,999, (4) \$40,000 - \$49,999, (5) \$50,000 - \$99,000, and (6) \$100,000 - \$250,000. Based on these categories, the distribution of farms indicated that most of the farms had gross annual sales within the range of \$0 - \$9,999, with the Smoky Mountain district leading (55%), followed by the Central district(47%). The Cumberland and Western districts had a total of 33% and 18% farms, respectively, in this category. In the category of \$100,000 to \$250,000 annual sales, the Western district had the highest percentage of farms (17%), while the

Smoky Mountain district had the lowest (4%). Table 1 shows the complete breakdown of farms in all categories as estimated by the district leaders.

Table 1

Distribution of Small Farms by Annual Gross Sales in Four Extension Districts as Estimated by Their Leaders

Annual Gross Sales Categories (\$)	Percentage of Small Farms in District (Estimated)			
	Western	Central	Cumberland	Smoky Mountain
Up to 9,999	18	47	33	55
10,000 - 19,999	16	16	17	15
20,000 - 39,999	14	11	15	15
40,000 - 49,999	17	10	15	7
50,000 - 99,999	18	9	11	5
100,000 - 250,000	17	8	9	4

To determine perceptions regarding small farm issues and expected changes by the leaders, the questionnaire included questions in the following nine broad categories:

1. Changes expected during the next decade,
2. The importance of selected problems facing small farmers,
3. Quality of small farmer's resources,
4. Sources of information on farm production, marketing, purchase of inputs and off-farm job opportunities,
5. Adequacy of the information available to small farmers,
6. Criteria used by leaders to visit small farms,
7. Factors limiting the expansion of small farms,
8. Key areas of research and educational needs for small farmers and,
9. Changes that should be made to better serve small farmers.

Changes Expected in the Next Decade

As shown in Table 2, leaders were asked to assess selected areas of anticipated changes for small farms during the next decade. A 5-category Likert-type responses ranging from "decrease" (1 = significant decrease, 2 = non-significant decrease), 3 = "stay the same" and "increase" (4 = significant increase, 5 = non-significant increase) were used to collect this information. For simplicity, responses in categories 1 and 2 were combined into "decrease," and responses in categories 4 and 5 were combined into "increase." All responses in category 3 were retained in the "stay the same" category.

Using this reclassification, there were significant differences in two areas of assessments-number of small farmers participating in Extension and other programs (Table 2, item c) and the number of farm enterprises expected in the next decade (Table 2, item g). Extension leaders differed significantly in their expectation of small farmer participation in Extension and other programs ($\chi^2 = 11.46, p \leq 0.08$), a weak significance, and in their assessment of the number of farms enterprises expected in the next decade ($\chi^2 = 14.23, p \leq 0.05$).

On the issue of young people in agriculture, most leaders (64%) believed that the number of young people getting into farming would decrease drastically in the coming decade. About 21% of leaders believed that the number of young people getting into agriculture would stay the same, while 15% predicted an increase. Only a few (3%) of respondents surveyed believed that direct marketing by small farmers will decrease, while about 5% believe that small farmer participation in Extension programs and production levels will decrease in the next decade. This is an interesting finding in that most of these leaders also acknowledged that capital investment in farming will increase (74%), with an increase also in the average age of operators (55%).

Table 2

Distribution of Responses About Perception of Selected Issues and Changes by Extension Leaders in the Next Decade

Changes Expected in District in the Next Decade	% Responding (all respondents)			Number of respondents, N
	Decrease	Stay Same	Increase	
(a) Younger persons in small farming	64	21	15	67
(b) Direct marketing by small farmers	3	36	61	67
(c) Small farmers participation in Extension and other agencies	5	27	69	67*
(d) Capital Investment	8	18	74	66
(e) Gross income level	10	34	55	67
(f) Average age of operators	13	31	55	67
(g) Number of farm enterprises	36	24	40	67**
² $\chi^2 = 11.46, p \leq 0.08$; ² $\chi^2 = 14.23, p \leq 0.05$ 1 = significant decrease; 2 = insignificant decrease responses combined into "decrease"; 3 = stay the same responses combined into "stay same"; 4 = significant increase; 5 = insignificant increase responses combined into "increase"				

The Importance of Some Selected Problems

Extension leaders were asked to assess the importance of problems facing small farmers. The following range of responses, "1 = least important" to "5 = most important," were used to indicate the severity of problems facing small farmers in Tennessee. Responses are reported only for four factors that showed significant differences between regions. The mean values for responses are given in Table 3.

Analysis of variance (ANOVA) results indicate that capital (CAPITAL), credit (CREDIT), appropriate technology (APPTTECH), and marketing information (MKTINFO) were identified as significant problems in the districts. Testing a null hypothesis of no difference in the mean response to the question relating to capital, versus the alternative hypothesis of some difference, the Bonferroni test revealed significant differences between the Western and the Smoky Mountain districts, leading to a rejection of the null hypothesis at $\alpha = 0.05$.

For credit, there were significant differences between the Western and the Smoky Mountains districts ($p \leq 0.001$). The Western and Smoky Mountain districts also differed significantly in appropriate technology (APPTTEC). The Central and Smoky Mountain districts differed in terms of market information, MKTINFO ($p \leq 0.040$). Extension leaders from the Western and Smoky Mountain districts differed significantly in their perception of the importance of capital, appropriate technology, and credit. Similarly, there were significant differences in perceptions of the sources of marketing information between leaders in the Central and Smoky Mountain districts.

Table 3

Mean Responses of Perceived Importance of Selected Problems by District (1 = least important, 5 = most important)

Problems in District	District			
	Western	Central	Cumberland	Smoky Mountain
(a) Capital	4.21 ^a	3.90 ^{ab}	3.60 ^{ab}	3.08 ^b
(b) Credit	4.29 ^a	3.65 ^{ab}	3.40 ^{ab}	2.75 ^b
(c) Appropriate	4.07 ^a	3.75 ^{ab}	3.40 ^{ab}	3.17 ^b

technology				
(d) Marketing information	4.00 ^{ab}	4.35 ^a	3.87 ^{ab}	3.42 ^b
From the Bonferroni test, means within rows not sharing same letter differ significantly at $p \leq 0.05$.				

Sources of Information on Production, Marketing, Purchase of Inputs, and Off-Farm Job Opportunities for Small Farmers

There were significant differences in the mean responses of Extension leaders on the source of farming operations and marketing information for small farmers. Leaders differed in their perception of the Internet as a source of information for small farmers. ANOVA tests showed the perceptions were significantly different for leaders across the districts ($F = 4.82$, $p \leq 0.004$). The Bonferroni test showed that there were significant differences particularly between the Western and Cumberland districts ($p \leq 0.007$), and between the Central and Cumberland districts ($p \leq 0.015$).

Criteria Used by Leaders to Visit Small Farms

Ten criteria were listed as being of importance to Extension leaders in determining which small farmers they would visit in their districts. Leaders who completed the survey generally disagreed that farm size, farmer's education, farmer's age, the number of years in farming, farmer's technical training in agriculture, part-time or full-time engagement in agriculture, type of farming operation, specialization, or previous participation in Extension were important criteria for the decision to visit farmers.

Most of the leaders, however, agreed that the farmer's request was very important in their decision to visit the farmer. On a scale where 1 = strongly disagree and 5 = strongly agree, the mean response values of 4.43, 4.67, 4.56, and 4.47 for Western, Central, Cumberland, and Smoky Mountain districts showed that leaders tended to strongly agree that the farmer's request for a farm visit was an important criterion used in initiating farm visits.

Factors Limiting the Expansion of Small Farms

Many factors may act as constraints in expansion (adding more land or intensifying production) of small farmers in Tennessee. All respondents tended to consider additional debt, labor, and money as most important limiting factors across the Extension districts. A detailed analysis of variance (ANOVA) conducted on data collected showed that fear of getting into more debt, ADDDEBT, ($F = 2.883$, $p \leq 0.043$); ability to run a large operation, BIGOPER, ($F = 3.81$, $p \leq 0.015$); lack of machinery and/or equipment, MACEQUIP, ($F = 4.50$, $p \leq 0.007$); and lack of money to use in expansion, MONEYEXP, ($F = 4.16$, $p \leq 0.010$) were factors significantly limiting the expansion for small farmers in Tennessee.

For ADDDBET, the Bonferroni test revealed significant difference between Western and Smoky Mountain districts, $p \leq 0.04$ (mean responses of 4.36 and 3.38 for the Western and Smoky Mountain districts, respectively). There were significant differences between the Western and Central districts for BIGOPER, $p \leq 0.014$, while for MACEQUIP significant differences were found between the Western and Smoky Mountain regions, $p \leq 0.029$, and Smoky Mountain and Central, $p \leq 0.029$. For MONEYEXP, significant differences were observed between Smoky Mountain and Central districts, $p \leq 0.017$ (Table 4). Surprisingly, in the perception of the Extension leaders surveyed, lack of land to buy or rent, labor, and age of the farmer posed no significant threats to expansion of small farms.

Table 4
Leaders' Mean Responses to Factors Limiting Small Farm Expansion by District
(1 = least important, 5 = most important)

Factors Limiting Small Farm Expansion in District	District (Mean values)			
	Western	Central	Cumberland	Smoky Mountain
(a) Do not want to go into debt, ADDDEBT	4.36 ^a	4.15 ^{ab}	4.00 ^{ab}	3.38 ^b
(b) Ability to run a bigger operation BIGOPER	2.79 ^a	3.81 ^b	3.44 ^{ab}	3.08 ^{ab}
(c) Machinery and/or equipment,	3.93 ^a	4.00 ^a	3.81 ^{ab}	3.08 ^b

MACEQUIP				
(d) Operator does not have money to use in expansion, MONEYEXP	4.29 ^{ab}	4.38 ^a	3.81 ^{ab}	3.54 ^b
From the Bonferroni test, means within rows not sharing same letter differ significantly at $p \leq 0.05$.				

Key Areas of Research and Educational Needs for Small Farmers

Extension leaders who participated in the survey were asked to identify key areas of research and educational needs for small farms in Tennessee. Respondents were given an opportunity to identify five such areas. Based on the frequencies of listed responses, three broad areas of research and educational needs were identified: marketing, production, and management. These areas of needs are comparable to those identified by farmers in a Michigan study with one objective of identifying major educational needs of agricultural producers (Suvedi, Knight Lapinski, & Campo, 2000).

An evaluation of results indicated that responses varied from the very narrow (such as providing higher yielding grain crops) to the very broad areas (value-added agriculture). Leaders indicated a need for equipment upgrading and expressed a need for greenhouse production and management training. The following issues were, however, mentioned most frequently by leaders in the survey.

Marketing-Related Needs

- New products and niche marketing
- Marketing access and alternative markets
- Market information

Production-Related Needs

- Alternative enterprises/diversification
- Weed/disease/insect control
- Chemical use
- Efficient use of labor, land, and water resources
- New crop varieties, for example, high-yielding grain crops
- Equipment for production/harvesting; storage issues

Management-Related needs

- Cash flow/money management and assistance
- Farm management
- Record-keeping
- Property tax management

Changes That Should be Made to Better Serve Small Farmers

Leaders identified numerous areas where changes would better serve the needs of small farmers. An analysis of the various responses suggested that changes made in the following areas would better serve this group of farmers.

- More agents for more one-on-one assistance to farmers
- Organized focus groups to discuss farmers' needs
- Information availability
- Improved communication between Extension agents and farmers
- Commodity price structure examination
- More effective USDA policies to assist small farmers
- Availability of more educational material
- Training in different areas such as marketing, cash flow management, credit applications, and chemical management.

Conclusions and Implications

This study used an opinion survey of Extension leaders in four Tennessee Extension districts to seek an understanding of the issues facing small farmers and assessing their research, Extension, and educational needs. Differences in leaders' assessment were examined using ANOVA techniques. Results showed that there were significant differences in responses from leaders in the state. Capital, credit, appropriate technology, and marketing information were significant problems facing small farmers in Tennessee as indicated by Extension leaders. Fear of taking on additional debt, running a large operation, lack of machinery/equipment, and cash on hand were significant factors that limited expansion for small farmers in Tennessee.

There are, perhaps, many explanations for observed differences in district leaders' perceptions of

the problems faced by small farmers in Tennessee. One possible explanation could be found in the diversity of the state's agricultural sector and its regions. Tennessee's agricultural diversity means that it produces livestock products and crops such as soybeans, wheat, corn, cotton, and sorghum. Additionally farmers in the state grow tobacco, vegetables, nursery and greenhouse crops, and timber. Beef cattle, and dairy and other products, in the eastern portion of the state generated more than \$1.04 billion in cash receipts in 1998 alone (Tennessee Department of Agriculture, 1999).

Such diversity may have consequently generated different issues and concerns for farmers and Extension leaders in their districts. Diversity is not unique to Tennessee agriculture. O'Sullivan (2000) documented the agricultural enterprise and farm management diversity as a trend that is quite noticeable in Southern agriculture. Obviously, the needs of farmers vary and so will the perceptions of the leaders in the regions where the farms are located.

Another reason for observed differences can be attributed to differences arising from the relative sizes of "small" farms from the Extension districts. These size differences have implications for how resources are viewed by the leaders. The average farm size of 328 acres in the Western district stands in stark contrast to the 86 acres in the Smoky Mountain district, 164 in the Central district, and 136 in the Cumberland district.

The relative location of a district in a rural-urban context may provide yet another explanation for the differences in leaders' perceptions of the problems faced by small farmers in the districts. An examination of the rural-urban classification of the Extension districts in Tennessee revealed that 11 of the 24 counties in the Smoky Mountain district were metro counties, 8 were adjacent to metro counties, and 5 were not adjacent to a metro county. The Cumberland district had 2 metro counties, 13 counties adjacent to metro counties, and 12 not adjacent to metro counties. The picture was different between Western and Central districts. While 4 of the Western district's 21 counties were metro counties, 9 were adjacent to metro counties, and 8 were not. Nine of the Central district's 23 counties were metro, 11 were adjacent to metro counties, and 3 were not. These differences in the districts' rural-urban continuum could also possibly be used to explain observed differences in leaders' perceptions of problems and issues facing small farmers in their counties.

The differences in perception of Extension leaders on many issues investigated in this study imply that Extension policies, programming, and recommendations should be tailor-made to suit the needs of the particular Tennessee region or district. For effective and efficient programming, input should be sought not only from leaders, specialists, and agents, but also from small farmers, themselves. A survey designed to collect information directly from small farmers in Tennessee would determine to what extent the opinions of leaders are in line with those of the small farmers who make up the majority of farmers in Tennessee.

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