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Determinants of Irrigation Farmers' Crop Choice and Acreage Allocation Decisions: Opportunities for Extension Service Delivery

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Determinants of Irrigation Farmers' Crop Choice and Acreage Allocation Decisions: Opportunities for Extension Service Delivery

Abstract

A survey of Georgia irrigators focused on the determinants of farmers' crop choice and crop acreage allocation decisions was conducted. The survey also addressed farmer interest in open-access information and decision support programs delivered by the University of Georgia via the Internet. Results indicate crop choice and acreage decisions are heavily influenced by rotational considerations, but such considerations are not viewed as strict constraints. Crop futures prices and expected input costs are also important factors. Farmers expressed considerable interest in accessing information relevant to their crop choice and acreage allocation decision on the Internet at a university-run Web site.

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Introduction

In the information and outreach market that was once dominated by Extension programs from land-grant universities, rapid technological advancements have created opportunities for other private data providers to compete with university Extension services in offering fast, convenient, open access information (Ilvento, 1997). At the same time, urbanization and industrialization trends have restructured most of the country's rural communities. As we look across the modern rural landscape, we see more mechanized farm operations, the consolidation of smaller farm businesses, and the adoption of technologies designed to produce highly specialized products (USDA, 1999). In this new landscape, the clientele of agricultural Extension services have redefined their information needs, with more specialized producers leaning more toward alternative sources of public information (Ilvento, 1997; King & Boehlje, 2000).

Surveys conducted over the years show a gradual decline in farmers' demand for university outreach services (Ford & Baab, 1989; Ortmann, Patrick, Musser, & Doster, 1991). To spur university Extension programs to recapture their market share and reputation as a reliable source of relevant information, King and Boehlje (2000) issued a challenge for these institutions to identify "newly defined niches of technology-mediated outreach (intended) for broader audience segments."

More recent studies have confirmed that ample opportunities still exist for university Extension programs. More than 50% of the farmer respondents to a survey in Michigan in 1999 emphasized the need for outreach programs in marketing, business management, and farm economics, in addition to traditional Extension topics such as pesticide use and plant genetics (Suvedi, Lapinski, & Campo, 2000). Three years earlier, programs related to farm economics did not receive high significance ratings.

Lavis and Blackburn (1990) analyzed Extension clientele satisfaction and found that, while older farmers were generally more satisfied with the delivery of Extension services, much of the demand for such services actually came from younger, full-time farmers operating larger farm businesses that require more specialized information. These younger farmers also tended to be more educated. These results are not outdated, as the same trends are still evident in a more recent study of diffusion-adoption stages and the use of information technology by farmers (Hall, Dunkelberger, Ferreira, Prevatt, & Martin, 2003). Most of the respondents in the Hall survey who were classified as technology innovators were younger, more educated operators of larger beef and peanut farms in the Southeast region. Age and education are also correlated with early adoption of information technology.

This article presents the results of a survey of Georgia irrigators that focused on the determinants of farmers' crop choice and crop acreage allocation decisions. The purpose of the survey was to identify opportunities for the delivery of university Extension services. The survey also addressed farmer interest in open-access information and decision support programs delivered by the University of Georgia via the Internet. The results of the survey should be beneficial to Extension programs in determining priority areas of involvement.

Data

Irrigation permits were required in Georgia beginning in 1988, although voluntary permits were encouraged prior to that date. By 2001, more than 21,000 irrigation permits had been issued by the Department of Natural Resources. Many farms have obtained multiple permits. By screening the permit database for multiple entries based on phone numbers, farm corporations, address, and name, one can identify 8,677 unique permit holders. Of the unique permits, 8,279 had listed phone numbers. From those 8,279 permits, a random sample of 195 farmers in Georgia was drawn for the survey. The sample was stratified to ensure proportional representation among groundwater and surface water users.

The database from which the sample was drawn represents the best information available concerning irrigation permits in Georgia. It includes all permits issued. Some of the permits within the database, however, are not exercised by the permit holder.

Attempts were made to contact the farmers in the sample by telephone in June of 2004. Of the 195 farmers in the sample, 37% (72 farmers) completed the survey. Another 8% (16 farmers) had retired from farming. The remaining 55% were either unavailable (69 farmers) or refused to complete the survey (38 farmers).

The questionnaire focused on the factors farmers consider when making two key decisions about use of their irrigated acres: which crops to plant and the number of irrigated acres to allocate to each crop. The questions were structured to limit the possibility of misinterpreting the results.

While the overall response rate was lower than had been hoped, of those who were contacted that were not retired, the survey response rate was 65%. No systematic pattern was identifiable among either the farmers we were unable to contact or the farmers who refused to answer the questionnaire. In his review of a number of comprehensive studies examining non-response in telephone surveys, Gary Langer finds that non-response has an insignificant impact on the quality of information received from the survey (Langer, 2003). For these reasons we feel the response rate is unlikely to have affected the results presented in this paper.

Crop Choice Decision

Farmers were asked to identify from a list all factors they consider in choosing the crops to plant in their farms' irrigated acreage. Respondents were also asked to identify any other factors they consider that were not listed. A follow-up question then requested them to identify the two most important factors that influence their planting decisions. Table 1 summarizes the most popular answers provided by the respondents.

Table 1.
Factors Influencing Farmers' Crop Choices

Most Commonly Cited Factors	Indicated Factor Is Considered		Ranked Most Important Factor		Ranked 2nd Most Important Factor	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Rotation	59	80.8	27	39.1	21	41.2
Input Costs	48	65.8	5	7.3	8	15.7

Futures Prices	45	61.6	26	37.7	13	25.5
Crop Water Needs	26	35.6	3	4.4	3	5.9
Weather Forecasts	14	19.2	0		1	2

More than 80% of the respondents identified rotational considerations as a factor in their decision of which crops to plant on their irrigated acres in any forthcoming season. This factor is also ranked ahead of all other factors in both the "most important" and "second most important" categories of the responses.

Economic considerations such as knowledge of futures prices and expected costs of production inputs were also important considerations, cited by over 60% of the respondents. Although input costs were identified by one more respondent than futures prices, futures prices were much more important to the planting decision than input costs.

Interestingly, while 20% to 35% cited weather forecasts and crop water requirements as among those factors influencing planting decisions, very few ranked these factors (especially weather) among the top two considerations.

These results suggest that farmers are making a multi-dimensional decision. The importance of rotational considerations indicates a long-run perspective that revolves around the agronomic consequences of crop choice. In addition, the importance of single-season economic factors like futures prices and input costs reflects a short-run perspective consistent with maximizing the season's net returns.

Crop Acreage Allocation Decision

The farmers were also asked to identify from a list all factors they consider when deciding how to allocate their irrigated acreage to the crops they intend to plant. They were also requested to list other factors they consider. Here, as well, the respondents were asked to identify the two most important factors considered. The most popular responses are summarized in Table 2.

Table 2.
Factors Influencing Farmers' Crop Acreage Allocation Decisions

Most Commonly Cited Factors	Factor Considered		Ranked Most Important Factor		Ranked 2nd Most Important Factor	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Rotation	56	77.8	18	26.9	17	39.5
Input Costs	44	61.1	7	10.5	10	23.3
Futures Prices	45	62.5	23	34.3	9	20.9
Crop Water Needs	24	33.3	4	6	2	4.7
Weather Forecasts	12	16.7				
Demand	5	23.8	5	7.5	1	2.3

Consistent with the crop choice results, concerns about the agronomic benefits of rotation, futures prices, and input costs are the three most commonly cited factors influencing the crop acreage allocation decision. Marketing concerns are rated highly, as knowledge of futures price levels is considered more important than anything else by 34% of the respondents. Rotation issues rank 2nd in the highest importance category and 1st^t in the 2nd most important category.

These results suggest that rotational considerations serve as a general guide to crop choice, but not as a strict constraint to planted acreage. In other words, farmers appear to be willing to forego some of the long-run benefits of rotational practices to capitalize on expected short-run economic conditions. Extension programs that assist farmers in quantifying the short-run benefits and costs versus the long-run benefits and costs of their acreage allocation decision should be of particular interest to this clientele.

Prospects for a University Decision Support Program

The survey was also designed to explore the feasibility of offering a decision support program that will be available through the University of Georgia Web site. The decision tool is envisioned to

incorporate such factors as futures prices, input cost estimates, weather forecasts, crop water needs, and pest pressure predictions. This information will be routinely updated and available at a single location for easy access by farmers at the time planting and crop acreage allocation decisions are made.

Farmers were asked, "If a decision support program were available on the Internet through a University of Georgia website, would you consider using it?" Among the 72 respondents, 50 farmers comprising 69% of the survey participants said "yes", they would consider using the university's proposed online decision tool. Among the 22 who declined, the most popular reasons cited were lack of Internet access (8 farmers), lack of experience in Internet surfing (5 farmers), and inability to use Internet services (4 farmers).

Summary and Conclusions

This article presents survey results concerning the determinants of farmers' crop choice and acreage allocation decisions. What is evident from the results is that agronomy should remain an Extension priority area, as previous assessments of the demand for Extension services have established.

The more compelling result, however, is that while crop choice and acreage decisions are heavily influenced by rotational considerations, such considerations are not viewed as strict constraints. Farmers appear willing to adjust their acreage allocations away from agronomic recommendations under certain economic conditions. This suggests that Extension programs that provide economic as well as agronomic information will better serve the Extension clientele.

Finally, farmers appear to be very interested in accessing information relevant to their crop choice and acreage allocation decision on the Internet when that information is presented at a single Web site managed by the university. The survey did not address farmers' desire to substitute Internet-based programs for traditional information delivery methods. However, the survey did ask of those who were not interested in Internet-based information, why they felt that way. Two key factors were cited repeatedly: lack of computer literacy and lack of access to Internet resources. The lack of computer literacy also impedes the adoption of computer-based tools for formulating production and business plans. There are still some farmers who need to be guided through the computer adoption process in their farm business operations.

Meeting this important challenge will enable Extension programs to deliver relevant, reliable, timely information with greater efficiency. This, in turn, will assist farmers in making production decisions that are consistent with their own goals, and thereby enhance the welfare of the greater farming community.

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