

Surveying Farmers: A Case Study

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A large percentage of farmers do not respond to mail surveys. To gain insight into why farmers do not respond and how to improve response rates, a three-step research design was developed. First, an initial survey, based on in-person interviews with 15 farmers, was sent to 100 farmers. Second, farmers who did not respond to this mail survey were contacted by phone to investigate the reasons for not responding. Third, based on the information from these nonrespondents, the survey instrument was revised and sent to 3,990 U.S. farmers. Our studies show that the period in which the survey is sent is a crucial factor in the willingness to participate, along with the form and amount of compensation, the sender of the questionnaire, and the perceived length of the questionnaire.

“Too long, too detailed, bad time; got too much to do; not a day goes by without getting something; just worn me out.”

“Why should I spend even 1 minute? What’s the benefit to me?”

“Make as simple as possible. Go after 3 or 4 points at most. Do not ask questions that would require farmers to go to their records.”

—Responses of farmers about mail surveys (August 1999)

Agricultural economists have long used mail surveys as a data collection instrument. Recent examples include Hayenga; Hobbs; and Thilmany. The widespread use of mail surveys can be attributed partly to the advantages of economy and convenience inherent in such mail surveys. Surveying farmers through the mail on a nation-wide basis can be cost efficient when the surveys effectively generate a representative response. The economies, however, may be

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negated by the failure of researchers to consider factors that stimulate response rates and completeness. Although mail surveys are widely used in agricultural economics research, the problem of low response rates has seldom been addressed.¹ A low response rate affects the ability of a mail survey to produce high quality data. A common problem is the lack of a representative sample due to a low response. Related to the latter is the effect of "selection by the respondent," where respondents who are interested in the subject of the questionnaire may respond relatively more often than respondents who are not as interested. In this case, nonrespondents differ from respondents, potentially resulting in biased survey results.

This study describes an exploration of factors influencing response rates of mail surveys sent to U.S. farmers. The mail survey as a technique to obtain primary data is briefly discussed, followed by a short literature review of factors that are associated with mail survey response rate. Three steps are used to study the response rates of farmers and the factors that influence them. First, a questionnaire on farmers' use of market advisory services, based on group discussions with farmers on this topic, was mailed to 100 U.S. farmers. Second, farmers who did not respond to the questionnaire were contacted by phone about why they did not respond. Third, based on the information provided by the nonresponders, a second mail survey was sent to U.S. farmers in which the findings from the telephone interviews with nonrespondents were implemented. The results of the three steps are discussed along with some recommendations for improving the response rates of mail surveys sent to farmers.

Factors Influencing Response Rate

In agricultural economics research, theory is often tested using secondary data, that is, data gathered for some other purpose but applicable to the study. The primary advantage of secondary data is the low cost of collection. Moreover, much of the secondary data are "instant" since they already exist and merely need to be discovered. On the other hand, the collection of primary data (i.e., data that originate with the specific research undertaken) can take a long time and can be very expensive. However, the advantages of secondary data over primary data come at a cost. Secondary data might not fit the researcher's study because of differences in definitions. Furthermore, secondary data may not be available, particularly for research that involves farmers' opinions, perceptions, and attitudes.

Collecting primary data to validate theoretical models and concepts can be done in three ways: survey methods, observational procedures, and experimental procedures. With survey methods, data are collected by asking people questions they are assumed to be able to answer. Questioning can be done through personal interviews, telephone interviews, and/or mail questionnaires. With observational procedures, the researcher observes the objects and behavior of interest. These observations can be made either with mechanical devices or by individuals. With experimental procedures, the researcher introduces selected stimuli into a controlled environment and then manipulates these stimuli. Table 1 provides a short overview of the advantages and disadvantages of mail surveys.

Table 1. Advantages and disadvantages of mail surveys

Advantages	Disadvantages
Not subject to interviewer bias. Respondents work at their own pace. Can ensure anonymity of respondents. Wide distribution possible. Good for personal, sensitive questions. Least expensive.	Cannot control speed of response. Researchers cannot explain ambiguous questions. Does not allow probing with open-ended questions. Difficult to change sequence of questions. Sequence bias: Respondents can view entire questionnaire as they respond.

In the survey research literature, several factors have been identified that influence the response rate of mail surveys. The following discussion identifies various factors (not exhaustive) that have been associated with response rates. Childers and Ferrell found that response rates decrease with an increase in the *questionnaire's length*. Furthermore, they found that the length of a questionnaire, as perceived by the respondent, is multidimensional. The length of the questionnaire is a function of various factors, including the number of questions, number of pages, the size of the pages, layout, color, and instructions.

Harvey identified the importance of layout. A cramped layout with little space on the page is less attractive than a longer one that has ample space for responses. Jobber (1985) found that crowding questions and open-ended questions increased the respondent's perceived questionnaire length. Mixed results have been found regarding the color of the questionnaire. Fox, Crask, and Kim found some evidence that color affected the response rate, whereas Greer and Lothia found no significant impact on response rates from the use of different colors.

Biner and Kidd; Brennan; Fox, Crask, and Kim; Hornik; London and Dommeyer; and Pino, among others, found that *monetary incentives* increase response rates. James and Bolstein explain these findings by arguing that monetary incentives produce a greater degree of effort expended in completing the questionnaires.² Economic incentives increase response rates but may increase the costs to unacceptable levels. Balakrishnan et al. proposed a way to benefit from the increased response rate due to monetary incentives, while at the same time managing the costs. They investigated the effect of a lottery-oriented mail survey. Their results show that using a lottery prize giveaway incentive increased response rates significantly.

Jones and Lang found that hiding the *identification of the sponsor* increases the response rate. In their studies, the sponsors were commercial firms. One could argue that public sponsors and nonprofit sponsors might have a positive influence on the response rate. Fox, Crask, and Kim; and Heberlein and Baumgartner (1978), as well as Jones and Linda, indeed found that studies sponsored by a university yielded higher response rates. Greer and Lothia recently reconfirmed these findings in a study that investigated the role of four different types of sponsors: honor society, university, marketing research firm, and unidentified sponsor. They found that the response rates for surveys

sponsored by a university or honor society were significantly higher than those of surveys sponsored by a marketing research firm or an unidentified sponsor.

Follow-up reminder letters have been associated with increasing response rates as well (von Riesen). Buse (1973) and Wolfe and Treiman showed a large positive effect of persistence (repeated contacts) on response rate. von Riesen found that replacement questionnaires are preferable to postcard reminders. von Riesen's result does not confirm the findings of Heberlein and Baumgartner (1978), who found that reminders help increase response rates, but adding a questionnaire in a second mailing had little impact on the response. Paxson views the completion and return of a mail questionnaire as a social exchange between researcher and respondent. Paxson implements the Total Design Method (TDM), first introduced by Dillman, in which an important role is attributed to follow-up contacts. Paxson advises at least two follow-up contacts. Heberlein and Baumgartner (1981) were able to explain 51% of the variance in final response through the number of respondent contacts (preliminary and follow-ups) and the saliency of the survey topic.

Other factors that are related to response rate are *preliminary notification*, *provision of return envelope*, *personalization* (e.g., hand-addressed envelope and personal signature), *promise of anonymity*, and specification of a *deadline for returning the questionnaire* (Cox et al.; Yammarino, Skinner, and Childers).

Research on *cover letters* has shown a significant impact on response rates (Powers and Alderman). The cover letter can be used to leverage the factors described above. For example, Biner and Kidd and London and Dommeyer found higher response rates for cover letters that justified the monetary incentive, thereby inducing feelings of obligation on the part of the respondents to return the questionnaire, than for cover letters that omitted the monetary incentive. Childers, Pride, and Ferrell showed that a cover letter emphasizing how the respondent's input will help others raises the response rate. London and Dommeyer stress that the cover letter should indicate the benefits for the participants. Furthermore, the cover letter can increase response speed by making a direct appeal for quick returns in the cover letter (Tyagi).

The individual factors that influence response rates interact, such that they either reinforce the total effect of the factors or weaken it. For example, the positive effect of a follow-up reminder letter will be reinforced if a return envelope is included. On the other hand, one might expect the positive effect of a promise of anonymity to be weakened by an indication that the questionnaire benefits a commercial firm.

The above studies exclusively focus on consumers. An exception is Buse (1973), who reports that a personal letter and persistence in the form of several follow-ups resulted in a high response rate of farmers in Wisconsin.³ Recently, Yammarino, Skinner, and Childers found that the type of subjects sampled moderates the effect of above factors (e.g., consumers vs. managers in industry). In this study, the primary interest is farmers. The level of influence of the factors mentioned above might be different for farmers, while other, hitherto unmentioned factors, such as the time of year in which the questionnaire is sent, might play a role. One would expect the response rate of farmers, in particular crop farmers, to be lower when there is fieldwork to be done.

In the studies reviewed above, the response rate was the dependent variable and the independent variables were the manipulated factors designed to affect

response rates. Rather than using different mail survey designs to investigate the response rate, farmers in this study were directly asked what features of mail questionnaires are related to their willingness to complete the survey. These questions were asked in a telephone interview with farmers that had not responded to a mail questionnaire received a few weeks earlier. The findings of the telephone interview and the results of the literature discussed above were applied to a second mail survey.

Research Design and Initial Survey Results

A mail survey was developed that dealt with the way farmers choose among market advisory services and how they use these services. The mail survey was part of a project that was motivated by the expansion in the use of market advisory services by farmers in the United States.⁴ The questionnaire was designed to take into account the insights of the survey literature. That is, an in-person pretest was done with a group of 15 farmers, in which they were asked to complete a questionnaire and to indicate any ambiguity or other difficulty they experienced in responding to the questions, adding any suggestions they deemed appropriate. Based on the feedback received from these farmers, some questions were eliminated, others were modified, and additional questions were developed.

After the pretest, a survey was designed based on the literature reviewed above. Farmers who returned the survey were eligible to win a \$200 cash prize. The envelope revealed that it was a questionnaire from a university and a return, postage-paid envelope was included. The cover letter was personalized, printed with university letterhead, and indicated that it was a university study about agricultural market advisory services that should require about 20 minutes for completion. The questionnaires were printed in booklet form with 18 letter-sized pages containing 47 questions. The cover letter indicated that the information provided would remain strictly confidential and that respondents could call one of the researchers if they had any questions about the survey. The researchers' names and telephone numbers were given in the cover letter as well.

The questionnaires were sent in the second week of June 1999 to 100 randomly selected crop farmers across the Midwest, Great Plains, and Southeast regions of the United States. The sample was drawn from directories kept by a U.S. firm that delivers agricultural market information and advisory services via satellite. This data also provided background information about the farmer, such as age, size of farm, and crops grown. In general, the customers of this firm represent relatively large-scale commercial farmers. After two weeks, a reminder was sent to the nonrespondents, including a copy of the questionnaire. Acceptance of surveys was concluded in the second week of July 1999 (one month after the first questionnaire was sent out). By that time, only 12 questionnaires were returned, 8 from the Midwest, 4 from the Great Plains and none from the Southeast, resulting in a response rate of 12%. The overall response rate was lower than the typical response rates of 20% to 30% reported in the survey literature (Yammarino, Skinner, and Childers). Looking at the geographic distribution, heterogeneity was observed in response rates: the Midwest had a response rate of 22%, the Great Plains of 13% and the Southeast of 0%.

To gain insight into why farmers did not respond, a telephone interview was attempted with all 88 nonresponding farmers in the first week of August 1999. Of these 88 farmers, 55 completed the telephone interview. Of the 33 farmers who did not complete the telephone interview, 15 refused to participate and 18 were not available.

A large percentage of the farmers did not scan or read the mail questionnaire. It appeared that farmers are very selective when reading their mail. They indicated that they only read mail when it has some benefit for them or when it is obligated (e.g., tax forms). The fact that only 25% of the respondents scanned or read the mail survey can partially be attributed to sending the surveys in June. An overwhelming percentage of farmers indicated that January and February were the best months to receive a survey.

This time preference was consistent for all three regions (table 2). Farmers across the three regions disagree about the most inconvenient month to receive a mail survey. This can partly be attributed to the different harvest and planting

Table 2. Farmers' mail survey time preferences

	Great Plains	Midwest	Southeast
What months are a good time to receive a survey? (open-ended question) Respondents were allowed to mention two months; the percentage refers to the number of times a particular month was mentioned.			
	Percentage		
January	39	46	37
February	32	42	30
March	0	4	4
July	0	3	4
August	0	0	4
November	12	0	0
December	12	4	9
Never a good time	5	0	6
What months are a bad time to receive a survey? (open-ended question) Respondents were allowed to mention two months; the percentage refers to the number of times a particular month was mentioned.			
	Percentage		
March	0	0	13
April	3	10	4
May	7	15	11
June	21	10	12
July	18	15	13
August	21	15	22
September	10	15	0
October	7	15	13
November	3	5	0
December	3	0	0
Never a good time	10	0	12

Table 3. Farmers' preferences regarding survey length and form of compensation

Questions	Answers		
What is the maximum number of minutes you are willing to spend on a questionnaire?	13.45 (mean)	13 (median)	11.52 (st.dev.)
Do you expect compensation?	Yes 52%		No 48%
What type of compensation do you expect (open-ended question)?	Money 77%	Gifts/ Coupons 14%	Other 9%
What dollar amount of compensation do you expect (open-ended question)?	\$15.13 (mean)	\$10 (median)	13 (st.dev.)
What are the conditions for compensation? (open-ended question)	Length, 61%	Whether it's for nonprofit or profit organization, 16%	Depends on for whom, 22%

times in the three regions. However, table 2 shows that May through October is a time period that is not preferred by all farmers.

Table 3 shows that respondents indicated that they are willing to spend, on average, a maximum of 13 minutes to complete a mail survey. Forty-five percent of the respondents were unwilling to spend more than 10 minutes, while 35% would not spend more than 5 minutes to complete a mail survey (table 4). The

Table 4. The frequency distribution of maximum amount of minutes willing to spend on a mail survey and the compensation desired

Maximum Minutes	Percentage	Cumulative Percentage	Desired Compensation (dollars)	Percentage	Cumulative Percentage
0	8.2	8.2	1	6.7	6.7
2	6.1	14.3	3	6.7	13.3
3	2.0	16.3	4	6.7	20.0
5	18.4	34.7	5	6.7	26.7
8	4.1	38.8	8	13.3	40.0
10	6.1	44.9	10	20.0	60.0
13	8.2	53.1	15	6.7	66.7
15	20.4	73.5	18	6.7	73.4
18	4.1	77.6	25	13.3	86.7
20	8.2	85.8	35	6.7	93.3
23	4.1	89.9	50	6.7	100.0
30	6.1	96.0			
45	2.0	98.0			
60	2.0	100.0			

mail survey in this step of the study took about 20 minutes to complete, which contributed to the low response rate.

About half of the farmers interviewed expected to be compensated for completing a survey. Money was the preferred compensation, followed by gifts and coupons (table 3). The appropriate compensation varied between \$1 and \$50, with an average of \$15 and a median of \$10 (table 4). One-third of the farmers identified a compensation of \$15 or more.

The interview results indicate that the appropriate compensation depends on the length of the survey and the organization that conducts the survey. Farmers did not expect to receive a (high) compensation from a university or government organization, but would expect compensation from private companies.

During the telephone interview, the farmers had an opportunity to provide suggestions that would make mail surveys more attractive to them. A suggestion often mentioned was that mail surveys should not include questions that require farmers to consult their records. Surveys that consist of questions that require rating and checking boxes are preferred over open-ended questions.

Revised Mail Survey

Based on the telephone interview and the literature discussed above, the mail questionnaire was changed. The length of the survey was reduced by 16 questions (34%) to 31 questions, resulting in a decrease of the number of pages by 6 (33%) to 12 pages. The questionnaire could easily be completed within 10 minutes, which is below the 13 minutes that the call-back study indicated as the maximum that farmers wish to spend on mail surveys. Compared to the first mail survey, the questions that required consulting farm records were deleted. Also, the questions were formulated such that farmers could easily check the answers. The cover letter mentioned the importance of this survey for farmers by communicating the benefits for farmers (i.e., gaining insight in the performance of market advisory services). It was indicated that completing the survey would take 10 minutes and that it was part of a university research program. Finally, it was indicated that they would be eligible to win one of ten \$200 cash prizes, if they returned the questionnaire. In the cover letter, the names and phone numbers of the researchers were given, so that farmers with questions about the mail survey might contact them. Based on the call-back interview, the questionnaire was sent at the end of January, and following Dillman's Total Design Method, farmers who had not responded were contacted twice by means of a postcard reminder and an extra copy of the questionnaire.

The revised questionnaire was sent to 3,990 farmers in the Midwest, Great Plains, and Southeast on January 21, 2000. Table 5 shows the number of questionnaires returned between January 21, 2000, when the mail survey was sent, and the cutoff date, March 10, 2000. Table 5 shows a dramatic increase in the total response rate in comparison to the initial survey (35% versus 12%). Furthermore, the response rate was high compared to previous surveys among small- and medium-sized enterprises (Jobber, 1986; Karimabady and Brunn). This result shows that the revisions made to the initial survey were effective in generating a higher response rate.

Table 5. Response rate over time for the revised mail survey

Time Frame	Cumulative Number of Questionnaires Received	Total Response Rate	Change in Response Rate
January 21, 2000	(Sent out 3,990 questionnaires)		
First week	267	7%	
Second week	781	20%	13%
End of second week	(Postcard reminders are sent)		
Third week	1,005	25%	5%
Fourth week	1,118	28%	3%
End of fourth week	(Second mailing of questionnaires)		
Fifth week	1,276	32%	4%
Sixth week	1,316	33%	1%
Seventh week	1,356	34%	1%
Eighth week (Cutoff)	1,399	35%	1%

Looking at the survey response rate over time, it appears that most questionnaires were sent back during the first two weeks, amounting to a response rate of 20%. Postcard reminders helped gain another 5% in the week that followed them, confirming previous findings by von Riesen. In the week following, the incremental increase in response rate dropped to 3%. A second reminder including a new set of questionnaires temporarily increased the incremental response rate to 4%. Thereafter, the incremental response rates dropped to 1% in the last three weeks of the survey. From these results, it is concluded that response is enhanced by sending a reminder postcard and an extra copy of the questionnaire (Heberlein and Baumgartner, 1981; Sudman). However, the initial response of the first two weeks made up the greater part of the total response rate, indicating that the period in which the survey is sent, the content and layout of the mail survey, as well as the cover letter, are important factors to stimulate farmers to respond to mail surveys. A total of 60 calls (i.e., 4% of the farmers who did respond) were received from farmers who wished to verify that the research was done by the university, showing the importance of revealing who is behind the research, and confirming the results of Greer and Lothia. When investigating the geographic distribution, we observe that the response rates for the three regions did not differ significantly. This result is in line with our mail time-preference study that indicated that farmers of all three regions considered January or February as the preferred period to receive mail surveys.

As mentioned earlier, data are available on the background characteristics of all 3,990 farmers surveyed, such as size of farm, age of operator, crops grown, and so on. This allows us to investigate whether differences exist in responders versus nonresponders. Specifically, to investigate whether a difference between respondents and nonrespondents regarding their farm operation could be found, both groups were compared regarding main crop, farm size (expressed in acreage rented and owned), and farmer's age. No significant difference appeared between respondents and nonrespondents regarding the crops grown. This may be explained by the fact the questionnaire was sent in a period when

there was no field work for crop farmers at all. However, there was a significant difference between respondents and nonrespondents regarding farm size and farmer's age ($p < 0.01$). Farmers who mailed the questionnaire were younger (35 vs. 45 years) and their farms were larger (2,000 vs. 1,500 acres). As a result, our findings indicate that relatively young farmers operating a relatively large farm are more willing to participate in mail surveys than older farmers with smaller farms. This might be explained by the fact that young farmers with larger operations are more involved in the topic of the questionnaire (e.g., use of market advisory services).

We are also able to illustrate response biases related to the low response rate in farmers' surveys by comparing the key variables of the study between the initial survey and the revised survey. It appears that these biases indeed occur. For example, one of the key variables in both surveys was to investigate the impact of market advisory services on farmers' pricing decisions. Farmers were asked to indicate this impact on a 9-point scale with 1 being "no impact at all" and 9 "great impact." In the initial survey with the low response rate, the average score was 5.78, whereas in the revised survey with the relatively large response rate, the average score was 7.00, a statistically significant difference.

Summary and Implications

Agricultural economists' widespread use of mail surveys to collect data can be attributed partly to the advantages of economy and convenience. However, a common problem that has seldom been addressed is the lack of a representative sample due to a low response.

This study describes an exploration of factors influencing response rates of mail surveys sent to U.S. farmers. To gain insight into the problem, a three-step research design was developed as part of a project on farmers' use of agricultural market advisory services. First, an initial survey, based on in-person interviews with 15 farmers, was sent to 100 farmers. Second, farmers who did not respond to this mail survey were contacted by phone to investigate the reasons why they did not respond. Third, based on the information from these nonrespondents, the survey instrument was revised and sent to 3,990 U.S. farmers.

The empirical study of step two (telephone interview with nonrespondents of initial survey) revealed several clues about how to improve response rates (Peterson). First, a relatively brief time window exists for effectively conducting mail surveys with crop farmers. About two-thirds of the farmers indicated that the best period is limited to January and February. Geographic heterogeneity was observed when investigating the least preferred months for receiving a questionnaire, caused by the different production and harvest schedules of farmers. Second, farmers are willing to spend relatively little time completing mail surveys. Without compensation, the majority of crop farmers will not spend more than about 10 minutes. Over one-third are unwilling to spend more than 5 minutes. Third, cash compensation may be required to assure desired response rates from crop farmers. The requirement for compensation is related to the length of the questionnaire and whether it is conducted by a private or public entity. The appropriate compensation varied between \$1 and \$50, with an

average of \$15. Fourth, crop farmers are more willing to answer questions that do not require them to consult their records for factual information.

Implementing these findings in the second mail survey resulted in a dramatic increase in the total response rate in comparison to the initial survey. Specifically, the total response rate of 35% for the second survey was substantially higher than that of the initial survey (12%) and relatively high when compared to other mail surveys directed towards small- and medium-sized firms. The careful construction of the second mail survey, which minimized the perceived length and optimized the time of reception, likely contributed to the relatively high response rate. The revision included rewriting questions, such that they became easier to answer (e.g., by just checking), and asking questions that farmers could answer from memory. It is interesting to note that 4% of the farmers who responded to the second survey called the researchers to verify that it was indeed a university mail survey, showing the important effect of sponsor identification (commercial vs. noncommercial). The improved response rate for the second survey verifies there are substantial benefits to carefully designing the survey instrument, taking farmers' mail preferences into account. Investigating the characteristics between respondents and nonrespondents to the second survey reveals that respondents tend to be younger and operators of larger farms.

As a final point, the results of this study are instructive with regard to the negative aspects of the "information revolution." While advances in computer and communication technology foster the production and analysis of data, there is still a basic constraint on the production of that data. Many of the comments by farmers in the telephone interviews appeared to be a plea for relief from the flood of surveys that inundate them on a daily basis. In the future, researchers need to carefully consider this issue when designing research projects requiring survey data.

Endnotes

¹ A notable exception is the work of Buse (1973).

² Hansen indicated that although a monetary inducement improves the response rate, it does not necessarily improve the accuracy of the results.

³ See Brooks et al. and Buse (1975) for a further discussion on personalization and persistence.

⁴ More information about this project can be found at the homepage of the Agricultural Market Advisory Project (AgMAS) at <http://www.farmdoc.uiuc.edu/agmas/>.

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