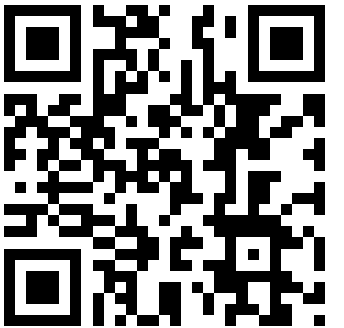

A Guid[illegible] Survey[illegible]earch for Local Cooperative Management

United States Department of Agriculture

Economics, Statistics, and Cooperatives Service

Cooperative Information Report No. 24

Foreword

For more than half a century Congress and the U.S. Department of Agriculture have recognized the need for a research and service program specifically tailored to the needs of farmers who have joined to form cooperatives. That program, now conducted by the Economics, Statistics, and Cooperatives Service (ESCS), seeks to improve farm income through more effective cooperative marketing and purchasing activity.

While many farmer cooperatives turn directly to the ESCS program for specialized technical assistance on a myriad of problems, others are interested in information and advice that would enable them to arrive at their own solutions. A local cooperative taking this approach often needs information on how to survey members to gain an accurate picture of their opinions, preferences, and future needs. Such information may help the cooperative change, modify, or expand its marketing or purchasing operations to better suit member requirements.

This pamphlet can assist cooperative managers and boards of directors who want to survey their membership. In simple terms, it contains suggestions on interviewing and questionnaire design which should improve the quality and quantity of responses, and in turn, enhance decisionmaking of the cooperative.

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A Guide to Survey Research for Local Cooperative Management

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Introduction

Cooperatives cannot be successfully operated unless managers recognize the concerns which are uppermost in the minds of patrons. Knowledge of their preferences, perceptions, and expected behavior can reduce uncertainty for both the manager and the board of directors. This information can help identify operations of the cooperative which are successful and merit expansion, as well as those which need to be corrected or curtailed. A cooperative may need to relocate, add new facilities such as a feed mill, or do bulk spreading of lime. In each of these situations, questionnaires and interviews, the tools of survey research, can provide information to ease decisionmaking.

This pamphlet is intended to aid cooperative managers who want to survey patrons or other groups on these and other issues facing a cooperative.

Guidelines for Questionnaire Construction

Interpretation of responses on a questionnaire is dependent on the respondents themselves, particularly when an interviewer is not present. Respondents find it easier to answer the questions if the purpose of the questionnaire is clear. Consequently, the objectives of the questionnaire should be established before the questions themselves are formulated.

One means of defining questionnaire objectives is to think about the results which are anticipated. After a set of preliminary questions is developed, a listing of expected responses can be used to clarify and strengthen the relationships between the questions.

Background information such as age or education may be unnecessary if the purpose of the questionnaire is to examine the feasibility of modifying a cooperative's operations. Questionnaires are also more likely to be answered if they are short. Information that would be merely "nice to know" probably should not be pursued except in interview situations.

Interviews are very useful in pretesting questionnaires before final distribution. In a pretest, the questionnaire is given to at least five persons who are similar in background to the intended recipients. One would ask the pretest respondents how they would phrase each question, and determine the frame of reference used to answer the questions. This procedure can uncover topics which are insufficiently covered on the questionnaire.

A single question should raise only one issue. A question such as, "How have recent increases in feed and fertilizer prices affected your operation?" will elicit complicated, poor responses. A better approach would be to ask two separate questions. Making alternatives and ideas explicit increases the probability that each will be given equal weight and consideration.

Answering a questionnaire can be a learning experience. If respondents are made aware that only sacrifices of time or money will support changes in operation, they may be less willing to demand improvements. One should try to determine how much a respondent will modify present practices in order to guarantee

a particular result. Asking respondents if they favor an operation even if it means a particular outcome may help pinpoint the degree of their preferences. Questions directed to the consequences of opinions held by the respondents permit greater confidence in the survey results. One model question tests the respondents' willingness to support changes in operation at the risk of some personally adverse consequences:

> **"Your support is necessary to make expansion of elevator capacity a financial success for the cooperative. If capacity is expanded, would you sell at least 10 percent of your grain volume to the elevator despite a net return of 1 cent per bushel less than could be obtained from another buyer?"**

Cross-checks on the survey results will help offset replies distorted by emotional influence. Overly pessimistic estimates of crop damages by farmers, for example, can be counterbalanced by different approaches to the same material in the questionnaire. Outside sources can provide additional verification.

Types of Questions

Questions can be divided into two types: Fixed alternative or "check answer" questions where the respondent selects one of a list of predetermined response options, and open-ended questions where the replies depend entirely on the respondent. The latter type allows greater flexibility.

If respondents are unlikely to hold clear-cut opinions because the issue is foggy, then open-ended questions are appropriate. However, fixed alternative questions demand less work and thought from the respondent, so they are more likely to be answered.

An open-ended question immediately following a fixed alternative question gives background material, such as the assumptions made by the respondent and past events that influence choice. The format for combining the two types of questions could be:

> Does the management of your cooperative show an interest in your farming problems?
>
> Interested _____
> Doesn't care _____
> Other answer _____
>
> In what ways does management show interest?

Checklists require care in construction. Terms such as *usually, sometimes, excellent, fair,* and *poor* will vary in meaning among respondents. Ambiguity can be reduced by using concrete and objective categories, and by quantifying whenever possible.

Consider the question, "How often is the machinery department unable to supply repair parts within 3 days?" A checklist offering the alternatives, "rarely," "sometimes," and "frequently," would be more difficult to interpret than one with categories such as, "less than twice a year," "2-3 times a year," or "more than 3 times a year."

Faulty checklists may contain alternatives which are equally compelling or true. One should try to differentiate among alternatives as much as possible, choosing those which do not overlap. A list offering lower prices as one option and larger discounts as another would contain items which are not mutually exclusive.

Items in a checklist should also be kept consistent with each other. An alternative related to fertilizer usage should not creep into a question on grain marketing. Present only one idea per alternative to sharpen the analysis.

The first and last items on a checklist tend to receive a disproportionate number of responses. This situation can be avoided by reordering the items from one questionnaire to another.

Information on identifying data about the respondent should be asked at the end of the questionnaire, for several reasons. Respondents may be deterred by the length of the questionnaire. If they do not proceed beyond the questions seeking identifying data, the primary purpose of the questionnaire is frustrated. By initially answering questions which establish the intentions and sincerity of the sponsors, respondents may be more willing to reveal their income group, age, education, and so on.

Likert Scales

The most refined version of a check-answer question is an attitude scale. A commonly used version is the Likert scale, basically a set of favorable and unfavorable statements about an issue or object. Respondents choose the extent to which they agree or disagree with each statement, checking such categories as "strongly agree," "undecided," and "disagree."

The respondent generally chooses from among three to seven expressions of agreement or disagreement. Five expressions are used in the example below on attitudes toward the quality of service offered by a cooperative. Terms such as "almost always agree," "frequently agree," "rarely agree," and "almost never agree" could replace or supplement those used.

1. Turnaround time for grain deliveries is too slow.

☐ Agree completely ☐ Agree very strongly ☐ Agree to some extent ☐ Agree to a little extent ☐ Completely disagree

2. The moisture content determined by the elevator is generally accurate.

☐ ☐ ☐ ☐ ☐

3. Service at the elevator is prompt and efficient.

☐ ☐ ☐ ☐ ☐

4. I have mentioned to my friends and neighbors that the grading done by the elevator is very fair.

☐ Agree completely ☐ Agree very strongly ☐ Agree to some extent ☐ Agree to a little extent ☐ Completely disagree

Note that both positive and negative expressions of attitude are used and that the same concept is expressed by more than one item. Each of these features of Likert scaling serves as a check on the consistency of respondents.

Statements indicating a positive attitude toward the grain services were scored as: agree completely, 5; agree very strongly, 4; agree to some extent, 3; agree to a little extent, 2; completely disagree, 1. The scoring was reversed for statements reflecting discontent.

Suppose a respondent checked "agree very strongly" to item 1 (score 2); "agree to some extent" to item 2 (score 3); "completely disagree" to item 3 (score 1); and "agree to a little extent" to item 4 (score 2). That person's total score is 2 + 3 + 1 + 2 = 8. This total score represents how favorable the respondent finds the grain services overall, particularly when compared to the maximum or minimum score attainable. For this series of questions, the highest possible score would be 20; the lowest would be 4.

Scores on individual items in a Likert scale are less important than the pattern of responses. The individual's attitude is determined by his or her responses to many items. Thus, those who favored the issue would be expected to agree with most of the favorable statements, and disagree with the majority of unfavorable items. Ambivalent persons would be less consistent. The repetition found in Likert scales, the restating of a position several different ways, means that the conclusions drawn from the survey will be more reliable than if an individual's attitude was inferred from only one or two questions.

Construction of Likert Scales

Likert scales are easy to construct. The formal procedure uses several persons to compose a large number of favorable and unfavorable statements about the attitude under study. In practice, items could be formulated by the one or two persons responsible for drawing up the

questionnaire. These statements are pretested with a group of respondents who are similar to those who will receive the final version of the questionnaire. Selected patrons who would be expected to represent both sides of the issue could be used for the pretest. At least 16 individuals should be chosen.

The pretest respondents indicate their degree of agreement or disagreement with each statement. A total score is then calculated for each respondent. The highest scorers could be considered the top 25 percent and the lowest, the bottom 25 percent. One can easily divide the 16 pretest respondents into subgroups. Answers to certain questions will raise the scores of the top group and lower the scores of the bottom group. In other words, some of the pretest items will draw out more opinionated responses than others. These items are retained for the final version of the questionnaire. Items which received many neutral responses—in the previous example, responses such as "agree to some extent"—should be dropped.

Interpretation of Results

The results achieved using a Likert scale do not indicate how favorable one respondent is compared to another. One can conclude that one respondent is favorable to the issue involved, and another very favorable, but in each case the definitions of "favorable" and "very favorable" are subjective. It is impossible to state that a very favorable opinion is twice as favorable as a favorable opinion. Likert scaling provides only a rough ordering of people on the attitude being measured.

Another consideration is involved in the interpretation of total scores. A respondent may agree very strongly or completely disagree with the questions, yet obtain the same total score as a respondent who consistently chose milder expressions. In such situations, the total scores should be seen as representing the same net opinion, even though the opinion is expressed differently.

Sampling

Generally speaking, it is too expensive to distribute a questionnaire to every potential respondent, or what is known in statistical terms as the population. Consequently, a group or sample of respondents is used to generalize about the population. There are three ways of selecting a sample that may be particularly useful to cooperative managers: random selection, systematic sampling, and stratified sampling.

Random Selection

Random selection does not imply that patrons to be included in the sample are selected arbitrarily. Distributing a questionnaire by leaving it out for interested persons to complete does not constitute a random sample, for example, since not all patrons are equally likely to visit the cooperative while the questionnaire is available. When a sample is selected randomly, every potential respondent has the same chance of falling into the sample.

The only reliable means of obtaining a random sample is to use a random number table, found in most textbooks on statistics. Such tables contain sets of numbers generated by a computer. Each number listed in the table has no connection to any of the other numbers.

Suppose there are 500 patrons in a cooperative and a sample of 50 is desired. The first step in making a random selection would be to list the patrons and assign each one a number. In an example, the patrons would be numbered from 1 to 500. As the second step, one would select patrons for the sample with numbers corresponding to an entry in the table.

Suppose one chooses three columns of numbers similar to those found in a random number table (see tabulation below). Using the first three digits of each random number in the first column puts patrons numbered 240, 96, 347, and 129 into the sample. Random numbers which repeat or are larger than the sample size are ignored. Any part of a column or row may be used to determine the sample, as long as the selection procedure is consistent. The process is continued until the desired sample size is reached.

tent. The process is continued until the procedure is consis-

Hypothetical Random Numbers

24067	28792	87062
09642	62358	66693
34728	00932	78087
12954	78261	93362

This method of sampling may be tedious when selecting large samples, but random selection is a fairly simple way of representing the population at large with some degree of accuracy. Random selection is also the foundation for systematic and stratified sampling.

Systematic Sampling

Suppose a cooperative has 1,000 patrons and wants to sample 50 of them. Obtaining a sample of this size through random selection would be very time consuming. An alternative procedure to consider is systematic sampling.

As in random selection, patrons are assigned a number from 1 to 1,000. Patrons are selected at regular intervals for the sample. To obtain the interval, the population (in this case, the total number of patrons) is divided by the desired sample size, or 50. As shown below, every twentieth patron will be chosen.

$$\frac{\text{Population}}{\text{Desired sample size}} = \text{Interval used to select potential respondents}$$

$$\text{that is,} \quad \frac{1{,}000}{50} = 20$$

To determine the first patron selected, a number is chosen at random between one and the number representing the interval between sampled patrons. This number is called the "random start." If the number 12 is chosen, the sample would consist of patrons numbered 12, 32, 52, 72, 92, and so on.

Systematic sampling is easier to implement than random sampling. However, the data to be sampled should not be arranged according to a seasonal or systematic pattern. Suppose a set of data collected monthly was arranged from low to high values. If only one observation was taken from each month, the sample could contain only low or high values, depend-

ing on the random start. To prevent this, the data should be shuffled, and/or a large sample size should be taken, such as several observations per month. Either random selection or systematic sampling can be used to develop a stratified sample.

Stratified Sampling

Stratified sampling is used when a population can be separated into several distinct groups. A random or systematic sample is drawn from each group or stratum, and these subsamples are joined to form the total sample.

For example, suppose information is required on the attitudes of patrons toward various changes in their farm supply cooperative. The patrons represent diverse operations, but most sales of the cooperative come from a few farmer members. A random or systematic sample of all the patrons might omit farmers who are the backbone of the cooperative. Stratified sampling should be used in this case because it facilitates comparisons between classes in addition to minimizing the possibility of overlooking important groups. Descriptive lables other than occupation may be used to stratify, such as geographic area or type of products purchased. Quantifiable labels are also chosen: acres farmed, amount of purchases, and quantity of product delivered for processing.

Suppose a survey was taken using 50 dairy farmers out of a possible 300, and 60 hog producers out of the 500 available. Possible positions taken on the issue might be:

Item	Total number patrons	Number sampled		
		For	Against	Undecided
Dairy farmers	300	25	20	5
Hog producers	500	30	27	3

Note that the sample sizes of dairy farmers and hog producers shown are not equal. The sample size from each stratum does not have to be proportional to the size of the stratum in the population. If little is known about opinions of dairy farmers compared to hog producers, the former can be sampled more intensively than the latter.

Determination of population projections requires some simple arithmetic (see tabulation below). Calculations based on one group or stratum such as dairy farmers are done independently of those for the other stratum, in this case, hog producers. First, the percentage of the sample representing each viewpoint is calculated. Each percentage is then multiplied by the total size of the group from which the sample was taken.

Item	Estimated number in the population		
	For	Against	Undecided
Dairy farmers	150	120	30
Hog producers	250	225	25

The estimate of all the dairy farmers in the co-op who approve of the issue based on only those who were sampled is calculated using the values previously listed.

$$\frac{\text{No. of respondents in stratum who approve of issue}}{\text{Total no. of sampled respondents in stratum}} \times \text{No. of respondents available for sampling from the stratum} = \text{Estimated population value}$$

that is, $\frac{25}{50} \times 300 = 150$

Information on population averages may also be required in the context of a survey investigation. Suppose in the sample that hog producers and dairy farmers used an average of 17 and 20 tons of fertilizer per year, respectively. A combined average for both groups would be calculated as:

$$\frac{\text{No. of respondents in strata 1}}{\text{Total no. in population}} \times \text{Average for strata 1 based on sample} + \frac{\text{No. of respondents in strata 2}}{\text{Total no. in population}} \times \text{Average for strata 2 based on sample} = \text{Estimated population average}$$

that is,

$$\left(\frac{300}{800} \times 20\right) + \left(\frac{500}{800} \times 17\right) = 18.1$$

Reliance on the estimate of the population average should depend on the amount of variation in the values used to compute the sample averages. The previous examples showed how to calculate a combined average for two groups, dairy farmers and hog producers. However, if some of the hog producers use very little fertilizer and the rest use only large amounts, then the computed average use among hog producers will not be realistic. An inaccurate sample average will result in an incorrect estimate of the population average.

One final note. Sometimes appropriate variables for stratification are not known in advance, but emerge during analysis of the survey data. If random selection has been used to determine the sample, stratification before or after data collection will have equivalent results. Either procedure produces subsamples with randomly selected elements.

Some Points on Interviewing

No matter which sampling procedure is chosen, the response rates for mailed questionnaires usually vary from about 10 to 50 percent. Relatively few respondents in any group have the time and ability needed to clearly express opinions in written form.

Personal interviews, on the other hand, usually have much better response rates provided confidentiality is assured. People are generally flattered when they are singled out for an interview. Participation in a survey is easier when talking is all that is required. Misunderstandings about question content can be clarified immediately during an interview, further bolstering responses. Consequently, topics which are complex or controversial are more suited for interviews than questionnaires.

The initial requirement for a successful interview is a friendly atmosphere to put the respondent at ease. Awkward pauses can be avoided if the interviewer is familiar with the content and sequence of questions. Attempts by the respondent to obtain the viewpoint of the interviewer or to engage in a debate can be passed over with a comment that the interviewer needs to get opinions, not have them.

Respondents often avoid thinking about the issue raised by a question by replying, "I don't know." If this does not appear due to fear of making a statement or to a genuine lack of an opinion, persistence may bring about a better answer. In this case and in situations where the respondent appears to misunderstand the question, the interviewer can begin by admitting the question might have been unclear, then slowly repeating the question exactly as previously stated. Attempts to explain the question would mean that some of the persons interviewed will have a slightly different interpretation of the question than others, so questions should be explained only as a last resort.

An alternative method of drawing out a response would be to remark, "Not everyone has thought about this issue, but I'd like to get your ideas on it, whatever comes to mind." Vague or incomplete responses may improve if the interviewer suggests, "That's an interesting answer. Could you explain a little more?" or "When you said ... how did you mean that?"

If the interviewer already knows the questions to be asked, he or she can state the next question while recording the last response. This procedure also gives the respondent a little time to think about a reply. Few respondents will object to waiting a moment while the interviewer finishes jotting down a last sentence. However, delays will be minimized if the interviewer begins writing as soon as the respondent starts talking, without waiting for the entire response. Reporting the complete, verbatim answer will avoid future confusion about what was actually said or implied during the interview. Paraphrasing or correcting bad grammar and cursing may mean losing the force and nuances of the original reply. The interview could also be recorded on tape if the respondent does not object.

Followup

Regardless of the questionnaire, interview, or sampling methods chosen, participants in a survey investigation should be told they will have access to the results. The cover letter of the questionnaire can be used for this purpose. Providing some feedback demonstrates that the time and opinions of the respondents were taken seriously. If respondents know they will obtain a copy of the results, they may be more inclined to cooperate in the study.

If responses to mail questionnaires are inadequate, postcards may be sent to participants in the survey as reminders. Another technique to prompt replies is to phone the participants to suggest that the study is incomplete until their questionnaires are returned. Followup can substantially increase response rates; certainly, it demonstrates that the survey investigation was as thorough as possible.

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COOPERATIVE PROGRAM

U.S. Department of Agriculture
Economics, Statistics, and Cooperatives Service

The Cooperative Program of ESCS provides research, management, and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. It works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

The Program (1) helps farmers and other rural residents obtain supplies and services at lower costs and to get better prices for products they sell; (2) advises rural residents on developing existing resources through cooperative action to enhance rural living; (3) helps cooperatives improve services and operating efficiency; (4) informs members, directors, employees, and the public on how cooperatives work and benefit their members and their communities; and (5) encourages international cooperative programs.

The Program publishes research and education materials and issues *Farmer Cooperatives*. All programs and activities are conducted on a nondiscriminatory basis, without regard to race, creed, color, sex, or national origin.

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