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USAID Program Design and Evaluation Methodology Report

Conducting Mini Surveys in Developing Countries

Krishna Kumar
Senior Social Scientist
Center for Development Information and Evaluation
U.S. Agency for International Development

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PREFACE

This monograph was originally published in 1990 in the Development Information and Evaluation Series on program design and evaluation methodology. Because of continuing high demand, it has been re-issued. This edition contains a new section, researched by Development Associates, on software that can be used for mini surveys.

I hope that the monograph will continue to be used by development aid practitioners, particularly those engaged in conducting evaluations and field assessments.

I wish to acknowledge again the invaluable advice, comments, and suggestions in writing the monograph that I received from Kurt Finsterburch of the University of Maryland, Michael Hendricks of Hendricks & Associates, Charles R. Perry of the U.S. Bureau of the Census, and former colleagues John Eriksson and the late Annette Binnendijk.

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Krishna Kumar
Senior Social Scientist
USAID

DESCRIPTION OF MINI SURVEYS

[T]he extensive questionnaire survey with the 30 pages of questionnaire (multidisciplinary, each discipline with its own questions), which if asked are never coded, or if coded never punched, or if punched, never processed, and if processed and printed out, never examined, or if examined, never analyzed or written up, or if analyzed and written up, never read, or if read, never understood or remembered, or if understood or remembered, never used to change action. Rural surveys must be one of the most inefficient industries in the world.

Robert Chambers, 1981

A survey of 20 respondents is better than no survey. For example, in the absence of a survey one only has hunches about who is for or against various policy alternatives facing a decision maker. The sample of 20 at least gives a rough idea of what people are thinking and is better than one's hunches.

Kurt Finsterbusch, 1976

Surveys are the most widely used method of data collection. In popular belief, they are synonymous with social research. This is not without justification, since analysts usually rely on surveys in one form or another when doing basic and applied research in social, economic, political, and cultural subjects.

A survey requires direct collection of information from individuals. The basic element is a structured questionnaire. In the developing world, most surveys are administered in person, by telephone, or through the mail. Web-based surveys are less frequently used. Respondents are carefully selected, generally—although not always—on the basis of probability sampling. Responses gathered from questionnaires are coded and statistically analyzed to yield findings and conclusions.

In popular perception, surveys are large investigations that involve hundreds (even thousands) of respondents, and they generate data on a multitude of variables. Such surveys, undoubtedly costly and time-consuming, require the support of an efficient organization. However, mini surveys can be done on a smaller scale; they concentrate on a few variables and use a small sample.

Mini surveys focus on a narrowly defined issue, question, or problem. The kinds of questions they address include the following:

- What proportion of targeted farmers are using the recommended technical package?
- How do project participants evaluate the services provided by a microenterprise development project?
- Are most farmers willing to pay user fees to access necessary health facilities?

The number of questions is deliberately kept small—usually only between 15 and 30. In this respect, mini surveys differ significantly from traditional household or agricultural surveys, whose questionnaires may run into several pages. Mini survey questionnaires are designed to be completed within half an hour, at most. To save time and resources, sample size is also kept small, usually 25–70 cases. This is the most important characteristic of mini surveys, one that distinguishes them from large socioeconomic surveys.

In addition, mini surveys largely (though not exclusively) use closed questions. Such questions list major response categories, and respondents identify one category or more that they consider appropriate. The essential idea is to quantify responses so statistical analysis can be done rapidly. In this respect, mini surveys differ from key informant interviews or informal surveys that use open-ended questions.

For mini surveys, the use of probability sampling is preferred. Each unit in the population has an equal chance of being selected, and the

sample is representative. Though this kind of representative sampling is efficient and ensures unbiased findings, it may not be feasible because of time and resource constraints. When this is the case, informal sampling procedures are acceptable. However, because informal sampling is based on convenience and individual judgment, results can be biased.

ADVANTAGES AND LIMITATIONS OF MINI SURVEYS

Mini surveys have several advantages:

- Unlike other rapid, low-cost data collection methods, mini surveys generate qualitative data from sources such as key informant interviews, rapid rural appraisal, or focus group discussions. Such data permit analysts to say, for example, that 50 percent of women farmers surveyed indicated that the technical assistance provided by the project was valuable, or that 40 percent reported that their incomes had increased because of their participation in the project. However, qualitative data-collection methods do not generate quantitative data.
- Because mini surveys can be completed within three to seven weeks, they are the only practical alternative when quantitative data are needed but there is insufficient time to mount a comprehensive survey. If an evaluation team has only about four weeks in the field to assess the impact of a microenterprise project, it cannot launch a comprehensive survey of local entrepreneurs targeted by the project. However, the team can easily design and implement a mini survey that can produce reasonably credible data for the evaluation.
- The number of nonsampling errors tends to be low in mini surveys. Each requires only a few interviewers, who tend to be better trained and supervised than interviewers used for large surveys. Mini survey interviewers also tend to have a better grasp of the small volume of data being gathered. Interview and coding errors are reduced because samples are small and questions are few. The overall quality of data thus tends to be satisfactory.
- Mini surveys are generally managed at relatively low cost. Manpower requirements are minimized because of small sample sizes and relatively brief questionnaires. A mini survey interviewer does not require much outside help; he or she can manage with two or three full- or part-time assistants.

Notwithstanding, mini surveys have limitations that should be carefully weighed.

- Compared to large surveys, it is harder to generalize from mini survey findings. This is especially true of mini surveys that did not use probability sampling. When this is so, analysts cannot be sure that the sample is representative and cannot compute the sampling error. Even experienced researchers can make mistakes when they rely on informal sampling.[1]
- In many instances, small sample sizes do not permit elaborate statistical analysis. For example, if only 8 out of 50 farmers in the sample are women, the analyst cannot make a comparative analysis of the behavior of male and female farmers.
- Credibility is always a problem. Many policymakers and decisionmakers consider findings from mini surveys unreliable—not without justification—because of their small sample size. The remark is often heard, "So, you are generalizing about the whole project on the basis of 35 respondents!"

[1] This occurred when interviewers questioned available heads of households for a survey of rural households in Lesotho. Many men in these villages worked in the South African mines, and their households enjoyed higher incomes than other villagers. But because only available heads of households were interviewed, those working in South Africa were underrepresented in the sample. Thus, the findings of the otherwise carefully planned survey were undoubtedly inaccurate.

WHEN ARE MINI SURVEYS APPROPRIATE?

Mini surveys are not substitutes for large, carefully designed, and efficiently implemented surveys that study complex social and economic subjects. When rigorous and reliable data from heterogeneous populations are needed for major policy or program initiatives, large sample surveys may be indispensable.

Mini surveys are appropriate when limited time and resources do not permit or justify the launching of a large sample survey. Their data are often satisfactory in project and program settings. Mini surveys may be extremely useful when conducting feasibility studies, preparing project papers, assessing beneficiary responses, and preparing final and impact evaluations. Within such contexts, analysts are more interested in broad patterns, trends, and tendencies than in precise measurements. For example, in evaluating an agricultural project for small farmers, it is often immaterial if the beneficiary approval rating is 60 or 63 percent; the difference of 3 percent will hardly affect the conclusions and recommendations of the evaluation team.

Mini surveys can be used to develop questions, hypotheses, and propositions for further testing. They can be a prelude to more comprehensive, large-scale surveys, and their information may help to sharpen study questions, design relevant questionnaires, and develop sampling strategies.

Mini surveys are also useful when quantitative data are needed to supplement qualitative information. For example, a mini survey could be used to measure perceptions of beneficiary farmers when a USAID manager wants further confirmation of conclusions emerging from key informant interviews about agricultural inputs supplied by private traders. Box 1 contains other examples of appropriate situations for conducting mini surveys.

Box 1. Three Examples of Appropriate Mini Surveys

- A mini survey was conducted to test the effectiveness of agricultural extension in a South Asian country. A sample of 60 farmers was randomly selected in three villages; 30 were contact farmers (who were receiving extension advice) and 30 were noncontact farmers. The findings did not show any significant differences in adoption behavior: more or less the same percentage in each group adopted the recommended variety of wheat. The explanation was that the government had been promoting the new variety for the past six years. Most farmers had become fully aware of its advantages and limitations and did not require much extension advice.
- A private voluntary organization undertook a mini survey in an African country to learn whether hospital clients would be willing to pay to use the facility. A sample of 60 respondents representing six villages were asked to identify factors they would consider in choosing between a paying and a nonpaying hospital. The survey revealed that fees were not a significant determinant. Instead, income, the quality of the facility, and its proximity were the factors that influenced their choice.
- In a Southeast Asian country, an evaluation team reviewed the impact of a large education project on the quality of primary schooling. Though the team had access to the project over seven years, they sought the views of experts and decisionmakers. They therefore designed and conducted a survey of 35 educationists, experts, and administrators familiar with the local educational system. Each was given a structured questionnaire that took about 15 minutes to complete. The survey was completed within 10 days. The findings confirmed the documentary evidence that the project contributed to improving the quality of primary schooling.

PLANNING A MINI SURVEY: SEVEN STEPS

1. Formulate study objectives: The first step in planning a mini survey is to formulate precisely the mini survey's objectives. This is done by listing study questions, which, in most cases, are stated in the scope of work prepared by the concerned USAID office. The person designing the survey should discuss with the office's staff any questions that are unclear or unspecific. This sharpens the focus of the survey and helps avoid any possible misunderstanding. A few precisely formulated study questions determine what is and is not to be covered by the survey. During

the planning stage, there is always a temptation to seek more information than can be realistically used by managers and policymakers. The focus on study questions curbs this temptation.

2. Review the literature: The next step is to conduct a review of existing information, including project or program records and documents, published and unpublished studies, and statistical data available through public and private agencies. An effort should also be made to review earlier surveys on similar and related topics. Such a review will provide valuable information on substantive issues and generate a list of questions that can be used in planning the mini survey. Moreover, the literature review can alert survey designers to potential conceptual, methodological, and logistical problems, and may even reveal data or information that make a new survey unnecessary. Many agencies and organizations gather data with scant attention to each other's efforts: it is not uncommon to find several surveys being conducted by different agencies on the same topic. As a result, there is often too much information, rather than a shortage of it, in many developing countries.

3. Prepare survey questions: Interview questions should now be prepared, keeping in mind the study objectives. This task is not simple. It requires careful reflection because the wording, length, and open or closed nature of a question can all significantly affect the responses given. The recall period is also important. It cannot be assumed that respondents will easily remember and report relevant details, however important those details may seem to survey designers. In addition, care must be taken in wording questions that may be sensitive in a given social and cultural milieu.

4. Design the questionnaire: The next logical step is design a carefully crafted short questionnaire that can be easily administered to respondents. All questions should be arranged in a logical sequence to facilitate the interview. Practical guidelines for conducting interviews need be developed at the outset that cover such topics as initial contact, questioning methods, and recording and editing interviews. The questionnaire should also be pretested and revised in light of findings.

5. Choose the type of sampling: Survey designers then need to choose between probability sampling and informal sampling. They must also decide on the specific sampling technique. Though probability sampling is preferred, it may not be feasible because of time and resource constraints. If so, the limitations of informal sampling should be recognized and precisely stated in the report.

6. Choose the mode of contact: Survey designers need to determine how the questionnaire will be administered, though the only viable method in developing countries may be the individual interview. Mail, the simplest and least expensive means of contacting respondents, is not practical. One reason is that literacy rates are usually very low, especially among populations that are the subject of development interventions. A second reason is that response rates for mailed questionnaires tend to be poor—even among literate people—especially if there is little or no incentive to complete and mail them. In the developing world, telephone interviews and web-based surveys are also out of the question, primarily because most people do not have access to telephones and computers.

7. Analyze the data: The final stage is coding and analyzing the questionnaire data. The analysis in mini surveys is invariably limited to simple frequencies, percentages, rates, or—at most—simple correlations.

PREPARING MINI SURVEY QUESTIONS

Two priests were debating whether it was right to smoke during prayers. Both marshaled all kinds of

arguments without coming to an agreement. They decided to consult their superiors and meet the next day.

When they met, the prosmoking priest said: "My superior told me that it was all right to smoke."

"How could it be?" replied the antismoking priest, "My superior was emphatic that it was wrong. What did you ask him?"

"I asked him if it was alright to smoke while praying" came the reply.

"That explains it," said the antismoking priest. "I asked whether it was all right to pray while smoking."

A survey tale

As this tale suggests, preparing good questions requires more than good language skills. It requires a robust common sense and the ability to empathize, both with the subject and the social and economic milieu in which the survey is conducted. Familiarity with the literature on designing survey questions is essential. General guidelines for drafting appropriate questions for mini surveys follow.

WORDING AND LENGTH OF QUESTIONS

Words used in phrasing survey questions should be simple, widely understood, and have precise meanings. Slang and colloquialisms should be scrupulously avoided. Many respondents may not understand them, and this will cause both embarrassment and errors. For the same reason, technical terms should not be used unless most respondents are technical experts.

If the word that best describes a relevant behavior or concept is not understood by respondents, the ideal course is to begin with an explanation of the word before using the word itself. For example, the question "Should the technical assistance provided by the project be sustained over time?" may confuse those not familiar with the word "sustained" in the development context. This question would be better rephrased as "Should technical assistance provided by the project be continued after external funding ends—that is, should technical assistance be sustained?"

Often words have multiple meanings. For example, *any, anyone, anybody,* or *anything* may mean 'every', 'some', or only 'one'; *fair* may mean 'average', 'pretty good', 'not so good', 'not bad', 'favorable', 'just', 'open', 'according to the rules', or 'plain'; and *you* can be singular or plural. Those who design surveys must be extremely careful with and limit the use of such words with multiple meanings.

Interviewers should use standard language, but norms of spoken (rather than written) language are appropriate, since questions are read to respondents. Better results may be achieved by violating the rules of written language; commas, colons, and other punctuation marks should be avoided if they break the flow of ideas.

Questions should be kept short and succinct. A lengthy question can confuse respondents and cause them to miss its essential point. Indeed, the reliability of responses declines as the length of a question increases. This is particularly true when questions address opinions, judgments, or attitudes. However, when respondents are asked to recall events that happened long ago, lengthier questions may be helpful. Such questions not only provide memory cues and aid recall, but the time they take to read permits reflection and improves the accuracy of responses.

OPEN-ENDED AND CLOSED QUESTIONS

The choice of open-ended or closed questions requires careful attention. Open-ended questions enable respondents to tell their stories in their own words. The interviewer reads a question and tries to record the answer verbatim. Closed questions list major response categories,

Box 2. Examples of Open-Ended and Closed Questions

During the last year, did you borrow money for your business? ❑ Yes ❑ No

If the answer is yes, then

Open-Ended Question

Please tell me the source or sources from whom you borrowed money

_____
_____
_____
_____

Closed Question

If the answer is yes, then

Who among the following loaned money to you?

1. Relatives and friends ❑
2. Money lender/trader ❑
3. Cooperatives ❑
4. Commercial banks ❑
5. Others ❑

and respondents simply identify one or more they consider the most appropriate (box 2).

Open-ended questions encourage spontaneity and freedom; respondents can use their own language, concepts, and analytical categories. Free expression makes an interview interesting, and it often generates insightful quotes and rich vignettes for survey reports.

Open-ended questions enable respondents to provide additional details or to qualify their statements, and unanticipated findings may emerge. For example, when responding to an open-ended question about credit, a respondent may say that he prefers commercial banks, but borrows from a rich uncle when interest rates are high. Such a statement will not be produced by a closed question.

But open-ended questions have several limitations. The data they generate are difficult to code, making this task more costly and time consuming. Their data are also more prone to errors, since coders have to interpret answers and then classify them in appropriate categories. Two coders may code answers to one question differently, increasing the likelihood of bias. Open-ended questions also require more time: respondents take more time to think and verbalize their responses.

One persistent problem with open-ended questions is that interviewers are inclined to edit answers, omitting portions that do not make sense, condensing them to fit the space provided in the questionnaire, or even elaborating points considered to be unclear. Such editing results in inaccuracies and distortions. Interviewers need considerable discipline and skill to take verbatim notes and systematically question respondents whose answers are inadequate.

In sharp contrast, closed questions are easy to ask, still easier to record, and do not require highly skilled interviewers. Many respondents also find them less taxing than open-ended questions because closed questions do not require as much recall of detail or contemplation. Moreover, the response categories of closed questions aid recall. For example, the listing of consumption items in expenditure surveys helps respondents to recall items the household might have purchased within a specified time. The coding of closed questions is also simpler, less time consuming, and less likely to contain coding errors. And because the same response categories are used, the data are comparable.

But closed questions lack all the advantages of open-ended questions. They inhibit spontaneity and force respondents to choose from response categories with which they may not even agree. Because closed questions do not provide ample time for reflection and recall, responses may be superficial; standardization may be achieved at the cost of oversimplification.

Most questions in a mini survey should be closed, and there should be only limited use of open-ended questions. If most questions cannot be answered using a closed format, other rapid data-collection methods should be substituted, such as key informant interviews, group meetings, or focus group discussions.

In mini surveys, open-ended questions should be restricted to three situations:

1. *When the issue is why and how:* If a survey on credit wants to know the reasons for respondents' preferences for various credit sources, a closed-question format may be unduly restrictive.
2. *When response categories are large or unknown:* If recommendations for improving the operation of a health project are sought, an open-ended format will be more informative. It is difficult to determine in advance the specific recommendations that respondents may offer. Indeed, a closed-question format may cause some respondents to agree with recommendations they had not previously considered.
3. *When respondents may have no information or opinion on an item:* In these situations, the closed-question format may produce inauthentic answers and inaccurate data.

Responding to Closed Questions

Response categories for closed questions need to be exhaustive. If the full range of possible answers are not included, the resulting data may be inaccurate. If, for example, a question is asked about the sources of prenatal care, all important local sources available—private prenatal clinic, public prenatal clinic, doctor, traditional midwife, and so on—should be listed. This is necessary because respondents tend to choose from given categories; they do not suggest new ones unless they know the subject and feel strongly about it.

When there are more than five possible responses, it is usually preferable to list them on cards. However, this is not practical when illiteracy is widespread. If it is, the interviewer should slowly read each category and seek the appropriate response—for example, yes, no, not applicable, or don't know. The question "How do you get to market?" might have more than 10 response categories (walk, bicycle, truck, cart, train, bus, car, taxi, horse, mule, other). Interviewers should slowly read each category and ask for a yes or no response. However, the best option may be to avoid more than four or five response categories and provide an "anything else" category. This procedure cannot be used when questions require rating an event, behavior, or opinion. For example, in an evaluation of a health program, respondents may be asked to rate, on a scale of 1 to 7, the quality of care provided.

MAKING QUESTIONS SPECIFIC

Questions should be as specific as possible. Respondents understand and respond better to specific questions, and they tend to interpret general questions differently, depending on their backgrounds and experience. Take the question: "What has been the impact of structural adjustment programs?" Economists are likely to answer by referring to inflation, balance of payments, economic growth, and gross national income. Social scientists are inclined to focus on living conditions, economic inequalities, and the availability of social services. And political scientists may refer to institution building,

social unrest, and political instability. Though responding to the same question, respondents are addressing different things. But when the question is restricted to a specific sector (for example, "How have structural adjustment programs affected the balance of payments situation, inflation, and economic growth?"), respondents focus on the same issues and the resulting data will be comparable.

Specific questions will also assist recall. If separate questions are asked about the social, economic, and political effects of structural adjustment, respondents are likely to mention items that they might have otherwise forgotten. Listing specific items will help refresh their memories.

Avoiding Double-Barreled Questions

Sometimes interviewers combine two or more issues in one question. Consider the question: "Do you think that the government should provide credit to farmers at affordable rates and assist them in getting the improved variety of maize seed at subsidized prices?" Respondents may be confused when more than one question is being explicitly stated or implied. In addition, they may agree with one part of the question but not with the other. In the example, the respondent who does not favor the government providing credit but wants seeds at subsidized rates will not know how to answer. Often respondents answer only the first part of the question and ignore the rest. Interviewers should be careful to provide separate questions for each issue being examined.

WORDING QUESTIONS TO AID RECALL

Interviewers must pay particular attention to questions that require recall. Lapses of memory are more common than many realize. People tend to forget behaviors or events, especially those that seem trivial to them or that happened long ago. Recall of multiple events poses additional problems because respondents often confuse them.

Despite these problems, many surveys contain questions that require vivid recall of events and behaviors. A draft household survey questionnaire prepared by the World Bank to study the social dimensions of structural adjustment in Africa provides an interesting example. One section listed dozens of consumption items—ranging from newspapers to razors, soap to taxi fares, and cooking oil to coconuts—and asked a common set of questions about each of the items (box 3).

Unless respondents kept elaborate records of their expenditures or were gifted with exceptional memory, most were unlikely to respond

Box 3. Questions about Consumption Items

The following questions were asked for each item listed in the World Bank's draft questionnaire.

1. Was anything spent on ____ during the last 12 months?
2. Do you buy ____ once a week or more?
3. How many times was ____ bought in the last 12 months?
4. How much was spent on ____ the last 12 months altogether?
5. How much was spent on ____ in the last 3 months?
6. Were there months when you did not purchase this item?
7. In how many months did you not buy this item?
8. How much was spent on ____ since my last visit?

accurately. How many of us can remember the amount we spent on razors or cooking oil during the past 12 months?

Three general strategies can be followed for questions that require recall:

1 *Narrow the reference period.* As much as possible, questions should focus on the recent past. For example, an interviewer is more likely to obtain an accurate answer to the question, "How many times did you see an extension agent last month?" than to the question, "How many times did you see an extension agent last year?" Longer reference periods can be used when the question is about a topic of great importance to the respondent, such as the purchase of a major piece of agricultural equipment or construction of a house. But the guiding principle is that it is better to refer to days and weeks than to months and years.

2 *Ask for average—not specific—time spans:* the prevalent norm, not a particular incident or behavior. For example, in expenditure surveys, interviewers should ask, "How much meat do you buy every week?" rather than "How much meat did you buy last year?" Respondents seem to give relatively accurate information about the average or norm. In many instances, questions concerning a short reference period can address both the norm and actual behavior.

3 *Use landmark or important events as a reference to refresh the respondent's memory.* Instead of asking, "Have you seen an extension worker during the past six months?" interviewers might ask, "Have you seen the extension worker since the new year?" Making the reference period more concrete will refresh the respondent's memory.

However, questions asked about events several years in the past tend to be confusing. Respondents may then include events that happened earlier or focus on more recent events, omitting others that should have been included.

AVOIDING LOADED QUESTIONS

Loaded questions are those likely to push respondents to answer in a certain way. Such questions undermine the validity of survey data. Expressions such as "Don't you agree?" or "Wouldn't you say?" push respondents to give affirmative answers. Because of the outright suggestion, respondents may feel obliged to agree, even if they have reservations about the statement. In societies where it is considered impolite to disagree, especially with outsiders, loaded questions can be particularly damaging. For example, the question, "Wouldn't you say that the agricultural extension program has benefited farmers?" is likely to evoke a more positive response than the question, "What was the impact of the agricultural extension program on farmers?"

Using emotionally charged words, clichés, and appeals to self-respect can also influence the respondent. Consider the wording of two loaded questions for a survey of smallholder farmers in a developing country:

- "The insurgents who are fighting the government believe that farmers should own the land they cultivate. Do you agree with them?"
- "The government of this country believes that farmers should own the land they cultivate. Do you agree with its position?"

The second question will evoke more positive response than the first, and the mere mention of "insurgents" will hamper an objective frame of reference.

More subtly loaded questions evoke the name of an authority. These questions attribute a statement to an expert, respected leader, or established institution, then ask the respondent to agree or disagree.

Box 4 presents some examples of loaded questions directed at entrepreneurs being served by a microenterprise project. Such questions encourage responses that show the project in favorable light. With a few possible exceptions when data are being gathered for sensitive topics, loaded questions should be avoided. Intelligent respondents easily see through such questions, which will further undermine the credibility of the survey.

WORDING SENSITIVE QUESTIONS

In project and program settings, interviewers may have to ask sensitive questions—about people, organizations, or the respondents themselves. However, some respondents who do not like to answer such questions directly will either evade them or give inaccurate answers. For example, some farmers may not like to disclose that they are not using the new variety of maize seed being vigorously promoted by the government, and some educated mothers may be reluctant to admit that they visit traditional healers when their children are sick. In addition, people do not like to divulge information that they believe will damage the image of an organization or an individual. Interviewers have to be extremely careful in wording sensitive questions to obtain accurate answers.

Box 4. Examples of Loaded Questions for an Impact Evaluation

1. Was it not an excellent idea to locate the microenterprise project in this district?
2. Experience shows that such projects contribute to the growth of small business enterprises. Wouldn't you say that this project had similar effects in this district?
3. Do you disagree with the prevalent view that the project has helped many small entrepreneurs by providing subsidized credit?
4. Several experts believe that small businesses in the area would have faced many technical and financial problems in the absence of such projects. Wouldn't you agree with this assessment?
5. Are you in favor of continuing the project so that both credit and technical assistance are provided to local businesses, thereby improving the economy?

Five strategies can be employed when sensitive questions must be asked:

- Questions can convey the impression that the behavior or incident in question is not unusual. A question about visits to traditional healers could begin with the following: "Experience has shown that even scientists, doctors, and highly educated people consult traditional healers in the wake of family illness. Was there any time during the past six months when you went to see one?" By stating that educated and respected people also visit traditional healers, the interviewer minimizes the implicit threat of the question.
- A question can make the assumption that the particular behavior or event happened or happens. For example, an interviewer can ask, "How many times did you visit the traditional healer during the past six months?" This approach is often used in surveys. Because the assumption may be resented by respondents, a provision should be made for a "none" category. A more important problem is that the question may lead to overreporting of the behavior or event; for example, even mothers who had not visited traditional healers may say that they did.
- The name of an authority whom respondents are likely to trust can be cited in a sensitive question, as in the following example: "Now the Ministry of Industry concedes that there have been serious problems with the current technical assistance program, particularly

with its extension activity. Did you face any problem in obtaining technical assistance from the project?" By mentioning the Ministry of Industry, the interviewer seeks to reassure the respondent that the problems are recognized at the highest levels and talking about them is acceptable.

- Interviewers can minimize the sensitivity of what is being asked with a phrase such as "Did you happen to...?" The tone as well as the wording of such questions is important.
- A question can advance reasons for a respondent's behavior. One example: "Many things that are beyond one's control can come in the way of making regular payments to a lending institution. Was there any time during the past 12 months when you were not able to make your payments to the agricultural credit bank?"

DESIGNING THE QUESTIONNAIRE

The same care and thought that are given to the wording of individual questions must be given to the construction of the total questionnaire. The tasks of both interviewers and respondents should be made as easy and enjoyable as possible. The respondent, after all, is doing you a favor; and a well-designed questionnaire makes the interviewer's job easier and improves the quality of data obtained.

Seymour Sudman and
Norman M. Bradburn, 1988

After a set of appropriate questions is crafted, the next task is to present them in a short questionnaire. This task is not as simple as it first appears. It involves arranging the questions in a logical sequence, developing a suitable physical format for the questionnaire, and pretesting the questionnaire to identify and resolve problems. Each task requires careful reflection and analytical skills.

PUTTING QUESTIONS IN A SEQUENCE

The First Question

The first question should be simple and nonthreatening, but also important. It should stimulate the respondent's interest in the survey, since boring or complex questions asked at the outset will adversely affect the respondent's willingness to cooperate.

An interviewer might consider starting with an open-ended question on an important issue. These tend to more interesting to respondents and allow them free expression. However, such questions are helpful only if respondents are well-informed and articulate; they may make a respondent who is neither feel threatened.

Demographic Questions

At the beginning of the questionnaire, many interviewers routinely include demographic questions about a respondent's age, employment, marital status, and even religion. For mini surveys, such questions are generally superfluous: demographic variables are rarely used in analyzing their data. Demographic questions thus not only take time from the interview but they intimidate respondents who do not like to divulge such information. As a general rule, demographic questions should be avoided, except when required for analytical purposes. If required, they should come at the end of the questionnaire.

Funnel and Inverted Funnel Sequences

A funnel sequence in a questionnaire moves from general to increasingly specific questions. Funnel sequences are especially useful when interviewers want to learn quickly about a respondent's perspective or frame of reference.

In a funnel sequence concerning the privatization of agricultural input supply, the first and most general question might seek opinions about privatization in the agricultural sector

(box 5). The next question would be slightly restrictive; it would concern privatization of the type of parastatal that supplies agricultural inputs to farmers. The third question would have an even narrower focus: perhaps progress toward privatization that had been made by a specific parastatal. The final question would be the most specific of all, seeking to discover how satisfied respondents were with the pace of privatization for a parastatal.

The inverted sequence reverses the funnel sequence: the interviewer asks a specific question first, followed by increasingly general questions. This is useful if an interviewer believes that respondents have not considered the subject and cannot give thoughtful answers to general questions. The advantage is that respondents can think through a topic before verbalizing their responses. Both funnel and inverted funnel sequences can be used in mini survey questionnaires.

Box 5. Example of a Funnel Sequence on Privatization of Agricultural Input Supply

1. How is the privatization program going in the agricultural sector?

_____
_____
_____
_____

2. Do you think that the government has made progress in transferring ownership of agricultural input supply parastatals to the private sector?

❑ Yes ❑ No ❑ Don't know

3. What progress has been made in privatizing the fertilizer corporation that markets fertilizers to farmers?

_____
_____
_____
_____

4. Are you satisfied with the progress of privatization in the fertilizer corporation?

_____
_____
_____
_____

Chronological Order

Interviewers should ask questions that address historical events in chronological or reverse chronological order. For example, questions about respondents' experience with technical assistance provided by a microenterprise project may begin with the most recent experience and work backward to earlier periods, or vice versa. Chronological order is helpful in aiding recall; it forces respondents to describe the sequence in the time period under consideration.

Changing Topics

Often, a mini survey covers more than one topic. For example, a survey designed to examine the impact of an international training program is likely to include questions on the selection of trainees, overseas training experience, reentry, placement of trainees, and the contribution of graduate trainees to institution building. The simple rule is that all relevant questions on a topic should be grouped together. For example, the questionnaire will group all questions on the selection process or the reentry of trainees in one place in logical order. A short, transitional sentence can help interviewers switch topics. One example is, "So far, we talked about the working of the child survival program. We will now ask questions about its impact." This helps to lead respondents to the next topic.

LENGTH AND FORMAT OF QUESTIONNAIRES

Mini survey questionnaires must be short and succinct. They should contain between 15 and 30 questions and take no more than 30 minutes to complete. Instructions on making introduc-

tions and asking questions should be included, along with instructions on recording answers and, when appropriate, recording the nonverbal behavior of respondents.

Guidelines for the physical format of the questionnaire are relatively simple:

- A booklet format is preferable, since loose sheets can be easily lost or misplaced.
- The questionnaire cover page should provide space for the name of the interviewer; the name and address of the respondent; and the time, date, and place of the interview.
- Each page should be numbered, and each question should be numbered on the left margin.
- Plenty of space to record answers must be provided. Economizing on paper is not productive. Leaving only two or three lines for recording responses to open-ended questions forces the interviewer to condense responses, which will undermine the validity of the data.

Questionnaires can be created on a personal computer. It is more economical to photocopy than to print mini survey questionnaires because of the relatively small size of the sample.

Translation

Often, questionnaires prepared in English must be translated into a local language. Because errors in translation can distort the meaning of questions and result in inaccurate data, translations should be done by persons fluent in English and the local language who have strong backgrounds in survey research.

The survey manager must brief the translator in considerable detail about the survey's overall objectives. This means explaining each question, its rationale, and the type of information it is supposed to generate. The time spent on such explanations is more than rewarded because the effort produces a better translation and fewer errors.

Time permitting, the draft translation can be given to another local expert to translate back into English. The comparison of the two versions will help identify possible errors, which can then be corrected by the translator.

PRETESTING

The manager of a mini survey should carefully pretest the draft questionnaire by conducting between 5 and 10 interviews. The number will depend on the complexity of the questionnaire and its target population. Those interviewed for pretesting must have backgrounds and experience similar to intended respondents. For example, if the questionnaire is designed for entrepreneurs receiving technical assistance from a project, only this type of entrepreneur should be included in pretesting. When a survey is likely to cover many categories of respondents, at least one respondent from each category should be included.

In pretesting and assessing individual questions, particular attention should be paid to the following issues:

- *Is the meaning of the question clear to respondents?* Because a question has been carefully prepared does not mean that it will be correctly interpreted. Despite an interviewer's best efforts, misinterpretations occur because of conceptual and linguistic barriers between interviewers and respondents. Intelligibility can be easily determined by reviewing answers and asking respondents how they interpreted a given question.
- *Do respondents have difficulty in answering the question?* Because the meaning of a question is clear does not ensure it can be easily answered. In their enthusiasm for obtaining information, many interviewers overlook the problem involved in accurately answering a question.

For example, an expenditure survey asked heads of households to state how many yards of cloth their families had purchased during the past 12 months. Obviously, only a few could answer this question, and their replies were suspect. If respondents do not answer a question or take considerable time to answer, the question should be reconsidered.

- *Are response categories appropriate?* Often, interviewers find that some are superfluous or that additional categories are needed.
- *Is there an acceptable variety of responses to the question?* Interviewers should suspect the usefulness of a question when all respondents give the same answer. For example, if all respondents say they have benefited from the intervention, the question should be reconsidered and possibly revised. One option is to use four response categories (very much, a fair amount, little, or not at all) to obtain more precise answers.

During pretesting, the questionnaire needs to be assessed in its entirety, paying particular attention to the following:

- *Does it read smoothly?* The flow is important because the questionnaire will be read by the interviewer, not the respondent, in most cases.
- *How much time does it take to administer?* Pretesting helps discover the answer to this question. If it takes more than 30 minutes, the questionnaire must be shortened.
- *Does it retain the attention of respondents?* If respondents look bored or indifferent, the questionnaire should be revised by adding or deleting questions and improving the language. Further training of interviewers may also be needed.

SELECTING RESPONDENTS

The selection of respondents is a critical issue for mini surveys. To make this selection, both probability sampling and informal sampling procedures are used. The description offered of these tools is both brief and elementary. Readers who do not have a background in sampling theory are strongly advised to consult experts before finalizing their sampling strategies.

The essential concept underlying sampling is that large groups of people, organizations, households, or other units can be accurately examined by carefully scrutinizing a small number of the group. A formula is used to draw inferences from the sample for the whole population. The small group is called a sample, and the large group is called a population or universe. Thus, for example, all small entrepreneurs who have received technical assistance from a microenterprise project are called the population or universe; those selected for interviews for the survey are called the sample.

PROBABILITY VERSUS INFORMAL SAMPLING

In probability sampling, each unit in the population has an equal chance of being selected for the sample. The selection of units for the sample is carried out by chance procedures, and with known probabilities for selection. Informal sampling, on the other hand, uses convenience or common sense rather than mathematical reasoning. For example, an interviewer selects 30 farmers who are available for interviews or visits 20 health centers regarded as "typical" by the survey designer or other experts.

One widely held misconception about probability sampling is that it requires large samples. In fact, statistically valid generalizations can be made with a relatively small sample. A simple example will illustrate. Suppose key informant interviews indicate that 60 percent of mothers have acquired the treated bednets that are being promoted by the government. The concerned USAID official wants to find out if this is true, but will be satisfied if the survey demonstrates

with 90 percent confidence that not less than 50 percent of mothers have these bednets. In this case, a sample of only 39 women users will provide the needed evidence.

A second faulty assumption about probability sampling is that the size of the sample depends on the size of the population, and that larger samples are required for larger populations. At best, this is only partially correct. Sampling error is determined by several factors, including sample fractions (the proportion of the sample to the population). But an increase in the sample size only marginally contributes to a reduction in the sampling error. This means that the sample sizes needed to study large or small populations are almost the same. For example, the sample size needed to estimate the birth rate in the small country of Lesotho is the same as that needed to estimate the birth rate in China.

As a general rule, probability sampling should be used for mini surveys, since it minimizes—though does not absolutely prevent—the risk of biased selection. If informal sampling is used, certain kinds of people are less likely to be selected. Those excluded for rural household surveys, for example, include households that are inaccessible or remote, those whose members are seasonal migrants or belong to ethnic minorities, and those with a single member. In addition, households with high social or political status may be underrepresented if enumerators are intimidated by them.

In addition, probability sampling permits estimations of the sampling error—or the probability of error in estimates for a given sample. For example, if probability sampling is used to estimate the percentage of women who own treated bednets, it can be said with confidence that there is only a 5 or 10 percent probability that the sampling error will exceed 10 percent of the estimate. This estimation is not possible in informal sampling.

Data generated by probability sampling are thus more credible than data derived from informal sampling. Survey findings are more trustworthy if respondents are selected randomly, rather than on the basis of personal convenience or judgment. However, those in the development field often find that time, logistics, and resource constraints make probability sampling impossible. In such cases, extreme care should be taken to make the sample as representative as possible, and the limitations of the sampling method used should be clearly stated in the report.

PROBABILITY SAMPLING METHODS

Four methods of probability sampling can be used. The choice should be dictated by the nature of the inquiry; the availability of a list of population units; time and resource constraints; and, above all, the expertise of the person managing the survey.

Simple Random Sampling

In simple random sampling, each unit of the population—whether households, people, organizations, or another grouping—has an equal chance of being selected. This type of sample is easy to design, and it is quite adequate when the population is relatively small.

A simple random sample can be drawn by lottery. Tags bearing names or identification numbers of all the units in the population are put into a bowl and thoroughly mixed. A predetermined number of tags is then randomly drawn. Although seemingly simple, the lottery method is cumbersome and time-consuming. Its precision rests on the assumption that the tags have been thoroughly mixed.

A better technique is to number all units, then use random numbers to select the sample. Most statistical calculators have random-number generators. If the list runs to a three-digit number, then every unit is given a three-digit number (for example, the number 5 is listed as 005),

and then three random digits are run off. If statistical calculators and computer software that can generate random numbers are not available, a table of random numbers can be used. The population unit with selected numbers is included in the sample. If a random number repeats or exceeds the highest number assigned, it is ignored. The process continues until the desired sample size is reached.

One common problem is that accurate and up-to-date lists of populations to be studied are not always available. Before constructing a sample, available lists should be carefully examined and every effort made to check and improve their accuracy. The time and resources spent on this task will be more than amply rewarded by the increased reliability of findings.

Survey managers should not discard units that "do not look right." For example, an entrepreneur who is randomly selected should not be excluded because he or she is considered to be atypical. If individual discretion is exercised, the simple random sample becomes a judgment sample, and this defeats its purpose. However, if there is clear evidence that the entire sample is unusual or peculiar—for example, it draws only from one geographical area or social class—the best course is to discard it and start afresh.

Systematic Sampling

Systematic sampling involves selecting units from a list, but on the basis of a fixed interval after a random start. If a sample of 50 is required from a population of 455 health workers, this means a sample fraction of 50/455, or one in nine units. In systematic sampling, a random number between one and nine is used to select the first health worker. The fixed interval is nine, so every ninth health worker is selected thereafter. Thus, if the initial random number is six, the selected health workers will be the sixth, the fifteenth, the twenty-fourth, and so on.

Systematic selection may made from a written list—such a list of farmers who received extension advice or a list of mothers who obtained treated bednets from a project. Systematic selection may also be made from a proxy list, such as rows of houses on a street or individual medical records in a file.

Systematic sampling is undoubtedly more convenient than simple random sampling. It is much easier to take the twelfth name from a document than to number each name and then draw a sample. If units are listed in an order that shows a steady trend, a reduction in sampling error can be achieved. For example, if a list arranges farmers by the sizes of their holdings or entrepreneurs by how much technical assistance they received, a somewhat smaller sample—say 45 instead of 50—could achieve the same degree of reliability as the larger sample.

There is a danger, however, of hitting a cycle. For example, corner houses are more expensive in some cities or towns. If the sample interval of houses selected from a map is every tenth house, this may coincide with or oversample corner houses, which are likely to be inhabited by relatively affluent people. If so, an assessment of the community's nutritional status that is based on data from these households may overestimate the quantity and quality of food consumed. Lists thus need to be carefully examined before a sampling method is chosen.

Stratified Sampling

In stratified sampling, the population is divided into groups called strata. This requires a complete population list, along with additional information on variables that form the basis for the stratification. After strata are determined, independent random samples are drawn from each stratum. Stratification is especially appropriate when the sample is designed to make estimates or comparisons between subgroups and

the entire population. It is appropriate when a simple random sampling of the whole population may not include a sufficient number of cases from strata that need to be investigated.

Strata must be relatively homogeneous: there must be less variance within a stratum than between strata. For example, project farmers could be classified on the basis of the size of their holdings into three strata—large, medium, and small holders—for a survey of adoption rates. This classification might be based on the premise that landholding size is related to adoption rates. Farmers with larger holdings and assets may be in a better position than those with smaller holdings to take advantage of new technical packages. It is also likely that farmers with large holdings have greater interaction with extension workers, more contacts, and more formal education. If landholding size turns out to be an invalid criterion, another—such as education, gender, or proximity to the demonstration center—could be used to classify the population. The essential point is that the stratum should be homogeneous.

Stratified sampling is of two types. The first is proportional, because strata sample sizes are proportional to the strata population sizes. For example, if the proportion of farmers with large holdings is only 10 percent in the study population, the size of their strata will be 10 percent of the sample. The problem, however, is that the numbers selected for a relatively small group do not permit satisfactory statistical analysis. For example, from a sample of 80 farmers, only 8 or 9 are likely to be selected. If comparisons need to be made, more units need to be sampled from the stratum that comprises a smaller proportion of the population.

This is referred to as disproportionate stratified sampling, since different sample fractions are employed in each stratum. Since there are variations in response rates among strata in this method, decisions need to made on how different results for each stratum will be aggregated to arrive at an overall estimate. The simplest procedure is to compute the response rate of each stratum, multiply it by the number of units in the stratum, sum the total for all strata, and divide the sum by the population total.

Cluster Sampling

Most of the time, the populations sought do not appear on lists. For example, there is rarely a list of farmers who received technical assistance from an agricultural extension project or a list of women who purchased bednets at village stores. Even if such lists were available, the population units in question are likely to be widely dispersed, making simple random sampling both time-consuming and costly.

Cluster sampling often provides a practical solution. It is based on the fact that most population units are clustered in one way or another. For example, farmers served by extension services live in villages, public health professionals work in organizations, and teachers teach in schools. While it may be difficult to prepare a list of all farmers, health workers, or teachers, lists for sampling purposes can be prepared of villages, public health organizations, or schools.

Cluster sampling is of two types: single-stage sampling, and two-stage or multiple-stage sampling.

- Single-stage sampling means the clusters are randomly selected and every population unit in the selected cluster is included in the sample. In the case of a survey of agricultural extension workers, a project has 50 clusters or extension units, and each cluster has five extension workers. If, to save the transportation costs and time, 10 clusters are selected through simple random sampling and all the extension workers in them are interviewed, single-stage cluster sampling is being used.

- Two-stage or multiple-stage cluster sampling means the sampling is done in two or more stages. For example, in the survey of agricultural extension workers, 10 clusters are selected, then three out of five extension workers in each are selected for interviews though simple random sampling.

Cluster sampling has several advantages for mini surveys, especially when the sample is drawn from a relatively large geographic area. This kind of sampling can drastically reduce costs, especially when a survey covers a whole province or country. For example, consider the cost of drawing a simple random sample of 60 out of 600 medical professionals who work in 100 medical centers spread across the country, compared with the cost of a cluster sample of 70 to 80 respondents drawn from 10 medical centers. Cluster sampling also simplifies the interviewing process and saves time.

The major drawback of cluster sampling is the likelihood of increased sampling error. Units selected in clusters, rather than independently, may not show the same variation. If cluster sampling is used for a mini survey, a slightly larger sample size will be needed than for simple probability samples. Usually, a 15–20 percent increase is sufficient.

Any of the four methods of probability sampling can be used. The choice should be dictated by the nature of the inquiry, availability of the list of the population units, time and resource constraints, and, above all, the expertise of the investigator. Box 6 provides some examples of probability sampling procedures.

Box 6. Examples of Probability Sampling Procedures

- A team evaluating the overall performance of a project that provided credit and technical assistance to 327 women entrepreneurs wanted to know whether participants thought the microenterprise development project was effective and how it had affected their economic conditions. Available records allowed the team to prepare a complete list of the women entrepreneurs receiving assistance. A table of random numbers was used to construct a sample of 30 from this list.
- A monitoring unit wanted to learn about differences in credit requirements for men and women farmers in a development project area. A current list of 407 male and 187 female contact farmers receiving extension advice from the project was available, and a preliminary check found no inaccuracies. The monitoring unit constructed a sample of 60 farmers, half of whom were women. To do this, they prepared separate lists for female and male farmers and selected every 13th male and every 6th female farmer. Responses from the two categories of farmers were then compared.
- The provincial office of a national maternal health agency wanted to gather feedback from its staff about its activities. Its 60 clinics, scattered throughout the province, employed 400 full-time and part-time workers. The office had neither up-to-date lists of local employees nor the resources to support visits to a large number of clinics. The investigator thus conducted the mini survey randomly: six clinics were randomly selected, then 10 workers were randomly selected from each for interviews.

INFORMAL SAMPLING

Convenience Sampling

In convenience sampling, the prime consideration is accessibility. Only those easily reached by interviewers are included in the sample, which is why many use this method. For example, medical researchers often depend on volunteer subjects; marketing firms tend to rely on people visiting malls or shops; and educators use their pupils for their surveys. For rural surveys, enumerators are often instructed to interview only respondents available when they visit. This saves time and transportation costs.

Convenience sampling is prone to sampling bias. Often, certain strata, socioeconomic subgroups, or categories of population units are inadvertently excluded, underrepresented, or overrepresented. For example, enumerators who

go to villages during the day will miss farmers working in the fields; when they interview farmers buying inputs at cooperative stores, they exclude those who get their inputs elsewhere—say, from a moneylender. Under such conditions, findings can be wrong, and flaws in the samples are not recognized.

As a general rule, mini surveys should not use convenience sampling. If it is unavoidable, extreme care should be exercised. The following steps can reduce sampling biases (box 7):

1. *Identify categories of population units likely to be eliminated or overrepresented in the sample.* This can be based on in-depth interviews with local experts, careful review of past studies, and a continual review of cases included in the sample.
2. *Design the convenience sampling to reduce the probability of omission, underrepresentation, or overrepresentation.* For example, arrange to visit villages when most farmers are likely to be there.
3. *When possible, generate a more representative sample by supplementing convenience sampling with other forms of informal sampling.*

Judgment Sampling

Judgment sampling uses the judgment or advice of experts or the survey designer to construct samples. For example, evaluators of extension programs often select farmers in a few "typical" villages for interviews. However, this judgment may be biased: what is viewed as typical may not be, whether this term is applied to a village, organization, or farmer. This is a serious problem when survey designers unfamiliar with the study population depend on outside experts who may, consciously or unconsciously, mislead them.

The relative accuracy of judgment sampling depends on three conditions:

1. *The study population is small enough to allow informed judgments to be made about the selection of sampling units.* For instance, if the number of health centers runs into the hundreds, no expert can establish that the samples are representative.
2. *The sample size is small enough for judgment sampling to yield results better than those yielded by probability sampling.* For example, if officials in three districts in a province with 20 heterogeneous districts are being interviewed, better results would be obtained if the sample is chosen by an expert, rather than using the vagaries of random chance.
3. *More than one expert is involved in constructing the sample.* For example, an evaluation team conducting a survey of health centers can ask several persons to suggest suitable sites, and

Box 7. How One Investigator Attempted to Reduce Sampling Bias

A survey was undertaken in remote villages in a South Asian country to discover prevalent attitudes toward immunization among women of childbearing age. Because of limited time and money, convenience sampling was used. Enumerators were expected to visit villages during the day to interview women. The investigator soon realized that the sample was likely to be highly biased because a substantial proportion of women were working outside their villages. They were thus likely to be excluded from the survey.

The investigator tried to persuade enumerators to conduct interviews in the late evenings. However, women enumerators refused because they would be required to stay overnight in unfamiliar areas. The investigator then suggested that at least half the interviews be held in workplaces—farms, shops, and small factories. However, this proved extremely difficult, and interviewers had limited success. In the end, the investigator selected additional respondents to make the sample more representative.

then include in the sample only those centers for which there is a general agreement. Such a course will minimize errors arising from individual biases.

Box 8. An Example of Successful Snowball Sampling

A five-nation study was undertaken in Asia to assess the impact of U.S.-funded participant-training programs on the professional advancement of Asian social scientists. The study required a comprehensive survey of trainees who had received their training in the United States during two or three decades.

As the study progressed, the investigator found that records for past trainees were missing in most of the countries. Even when some records were available, addresses were out of date because the social scientists were no longer with institutions they joined after completing their training.

Because it was impossible to construct a reliable sample under these conditions, the investigator used snowball sampling. Interviews were begun with the few social scientists whose addresses were available. During the interviews, each respondent was asked to give names and addresses of other U.S.-funded trainees. Those suggested were then interviewed and asked for names of other fellow trainees. By using this method, the investigator located most of the trainees in each country. The survey succeeded because fellow participants had kept in touch with one another and could provide names and current addresses of colleagues.

Box 9. An Example of Problematic Snowball Sampling

An interviewer who used snowball sampling to study the growth of a scientific community in a Southeast Asian country was dismayed to discover at the end of the fieldwork that the sample was biased and unrepresentative. The interviewer started with a few scientists who were members of a clique, and they referred the interviewer only to other clique members. As a result, members of two other prominent factions in the community were not interviewed. Clearly, the mistake was also caused by the interviewer's unfamiliarity with the local situation and the failure to cast a wider net when fieldwork was beginning.

Snowball Sampling

Drawing on the analogy of a snowball (which starts small but grows bigger and bigger as it rolls downhill), snowball sampling begins with a few population units but increases until it ends up with the required sample size.

Snowball sampling is performed in several stages. During the first, a few persons who meet the necessary requirements for inclusion in the sample are identified and interviewed. These respondents are asked to suggest the names of additional persons who meet the sampling requirements and should be interviewed. The second stage involves interviewing some or all of the persons identified by the first respondents. The process is repeated until a suitable sample size is constructed.

Snowball sampling is most appropriate when there is a need is to reach small, specialized populations that can only be located with great difficulty (box 8). One limitation is that respondents are likely to suggest persons who share similar backgrounds, lifestyles, and social and professional orientations. Thus, for example, if large landholders are initially contacted, they are likely to suggest the names of other large landholders (box 9).

Quota Sampling

In quota sampling, the population is divided into various strata, and a predetermined number of people, or quota, is selected for each. The difference between quota sampling and stratified probability sampling is that convenience or the judgment of interviewers—not probability—is the basis for the selection of respondents within each stratum. Once quotas are established, interviewers are free to include anyone who meets the requirements.

As with stratified sampling, quotas can be established on the basis of age, sex, income,

education, location, combinations of these, or any other criterion perceived to be relevant. For example, an informal survey of farming practices in a province may assign quotas for different ecological zones, based on the judgment that farming practices vary significantly from zone to zone. And establishing quotas for various economic strata makes sense if the impact of policy reform interventions on the standard of living is being assessed, since these interventions likely have differing effects on each stratum.

An evaluation of a microenterprise project that provides technical assistance relating to handicrafts, garments, and food-related enterprises and covers two districts could consider at least three different criteria—gender, geographical area, and the nature of the business—and assign quotas for each. It could develop a simple matrix (table 1), then try to establish quotas to make a representative sample.

Table 1. Sample Using Three Criteria for a Microenterprise Survey

Enterprise	District A		District B	
	M	F	M	F
Garments				
Handicrafts				
Food				
Total				

If half the entrepreneurs are involved in garments, efforts would be made to select half the respondents from this category. On the other hand, if only 25 percent of the businesses are located in district B, only a quarter of respondents would be selected from district B. Although the match may not be perfect, every effort would be made to select quotas in proportion to their size in the population.

How many variables should be used for establishing quotas? Obviously not many. The problem with using more than three criteria is that specifications become more complex, and interviewers find it more difficult to locate respondents with the requisite characteristics. It is not always easy to locate women entrepreneurs participating in a microenterprise project who are engaged in food-related businesses and reside in a certain district. But it becomes still more difficult when the interviewers are also asked to select three out of six of these women who are under age 35.

SAMPLE SIZE FOR MINI SURVEYS

For mini surveys, sample size is primarily determined by time and cost considerations. If time is limited and respondents are scattered over a wide and not easily accessible geographic area, a relatively small sample size—say, 20 or 30—is inevitable. The following factors need to be considered, in addition to time and cost:

- *The homogeneity of the population:* If the population of interest is highly heterogeneous, a larger sample is needed than if it is homogeneous. A mini survey designed to estimate the adoption rate of a particular input by farmers with widely dissimilar land holdings should have a larger sample than a survey of farmers who cultivate holdings of similar size.
- *The number of variables to be examined simultaneously:* If a survey also wants to find out the differences in the adoption rates between male and female farmers or literate and illiterate farmers, a larger sample is needed.
- *The degree of precision required:* While the relationship between the degree of precision required and the sample size is too complex to be detailed here, it is safe to say that the goal should be a upper limit of respondents—say, 70—rather than a lower limit—say, 25.

ADVICE FOR INTERVIEWERS

The farmer's wife was startled by the sudden arrival of an impeccably dressed, elegant woman to her remote hut when she was trying to start fire on a wooden stove. Her hut was filthy, full of smoke caused by wet wood. She could read horror on the face of the uninvited visitor, who was undoubtedly taken aback by what she saw. When the visitor, in an unfamiliar accent, said, "I have to ask a few questions of you," the farmer's wife was speechless for a moment and then asked her son to call his father. She thought that the visitor had come to investigate her husband's drinking habits.

Notes of a field supervisor

Box 10. Some Typical Questions and Remarks Early in an Interview

Question: Why did you pick me?

Response: The purpose of this survey is to find out the views of people on_____. Since it is not possible for us to talk with everyone, we have selected a few people like you to help us out. (The interviewer can add a sentence or two about the sampling process.)

Remark and question: I am too busy. Why don't you leave me out?

Response: It will not take more than 15 to 20 minutes of your time. However, if you are very busy now, please tell me when I can visit you again. It is extremely important that I have the benefit of your ideas and experience on this important subject.

Remark: I really don't know anything about this.

Response: We are interested in your opinions and experiences, not in what information you may or may not have. I am sure you will find questions interesting and will be able to answer them easily. We have asked the same questions to many people, and they did not have any problems answering them. In a study of this type, there are no right or wrong answers to questions.

Question: Who's behind this?

Response: This study is sponsored by the _____ project (or program). Its purpose is to get ideas and information that will be helpful in improving its activities.

As the excerpt from the field supervisor's notes suggests, preparing thoughtful questions and compiling them in a questionnaire is not sufficient to generate reliable, accurate data. Interviewers must also present themselves appropriately, establish rapport with respondents, ask questions in a manner that evokes accurate responses, and, above all, accurately report answers. This section provides general guidance on interviewing techniques.

INITIAL CONTACT

The first 30 seconds of contact are critical in any interview. During this brief period, the interviewer and respondent form their first impressions of each other, and this conditions the ensuing interview. Interviewers thus need be careful about their overall appearance: they should always dress simply and inconspicuously, and they must respect local norms of dress and behavior, even when inconvenient.

Interviews should be conducted at a time most convenient for respondents. For example, if farmers are in the fields during daylight hours, interviews should be held during the evenings, when they are most likely to be at home. Men and women employed in industrial and service sectors can be better contacted on weekends, when they are likely to be relatively free. Interviewers should make appointments with government officials and professionals to avoid scheduling conflicts.

Interviewers should begin the interview by briefly explaining their backgrounds, the objectives of the survey, and possible uses of information the respondent will provide (box 10). At this time, interviewers should also assure respondents of the confidentiality of this information. They should also indicate the time required for completing the interview—no more than 30 minutes for mini surveys. These remarks should be brief and to the point, and

interviewers should honestly answer any questions that respondents have at this stage.

USING THE QUESTIONNAIRE

An interview should be made as pleasant as possible. Interviewers should never give the impression that they are administering a quiz or conducting a cross-examination. Nor should they say anything that would imply approval or disapproval of the respondent's answers. Interviewers should invariably show respect to respondents and a genuine appreciation for their views and opinions.

The interviewer should read each question slowly. The ideal reading pace is two words per second. Studies have shown that a slow, deliberate pace enables respondents to understand the question and formulate a careful reply. When interviewers hurry through questions, respondents tend to follow their example. This contributes to superficial, even inaccurate, responses.

Some respondents may not be sure of their answers and need to be reassured. This is especially true of people of low socioeconomic status who have not been exposed to survey research. An interviewer who feels that a respondent is diffident and doubtful about a reply should make a neutral conversational remark to put them at ease, such as "We are just trying to get people's ideas on this," or "There are neither right nor wrong answers to this question."

Questions should be asked in the logical order in which they are presented in the questionnaire. Interviewers who change this sequence may inadvertently bias the results. If a question does not apply to the respondent, it should be crossed out and the reasons for its nonapplicability noted. This enables the coder to know that the question is not relevant and has not inadvertently been overlooked by the interviewer.

TECHNIQUES FOR GETTING RESPONSES TO QUESTIONS

One of the most challenging tasks for interviewers is to obtain complete responses that meet the needs of the survey. Respondents may give incomplete or irrelevant answers for a variety of reasons. Some have difficulty understanding the questions; others have problems expressing themselves; and still others may be reluctant to reveal their thoughts or what they know. Interviewers should deal with these situations tactfully, and in a way that will not bias responses.

Survey experts recommend five techniques to stimulate fuller, clearer responses.

1. *Repeat the question.* Repeating a question can help when the respondent does not understand it, misinterprets it, misses the emphasis, seems unable to make up his or her mind, or strays from the subject. Moreover, the repetition gives the respondent more time to reflect on the question.

2. *Pause for the answer* and convey, through a nod or an expectant look, that a fuller response is expected. A pause gives the respondent time to collect his or her thoughts. In many cases, however, the respondent may have nothing more to add, and a pause may cause unnecessary embarrassment. Interviewer need to be sensitive to these nuances and recognize when the respondent should not be questioned any further.

3. *Repeat the reply.* Hearing the ideas repeated may stimulate the respondent to expand on the response.

4. *Use neutral comments or questions*, such as "Anything else?" "Any other reason?" "Could you tell me more about your thinking on this subject?" "Why do you feel that way?" "How did this occur?" and "When did it happen?"These comments and questions

indicate that the interviewer is carefully listening to what the respondent is saying.

5. *Gently ask for clarification* of inconsistent, contradictory, or ambiguous answers. At the same time, the interviewer needs to take the blame for any ambiguity and must not imply that the respondent is unclear or inarticulate. To clarify a point, the following statements help: "I'm sorry, but I'm not sure if I got the point. Would you please repeat it?" "I'd like to be sure I understood you correctly. You said that you did not borrow money for your business? Is this correct?"

The success of the interview depends on the interviewer's ability to recognize immediately whether a specific answer has failed to meet the objective of the question and, if so, to find an appropriate alternative.

Box 11. Distorting Effects of Summarizing and Paraphrasing Answers

Consider the difference between the verbatim reply and the summary version reported:

Verbatim: Yes, indeed! I am positive about it.

Summarized version: Yes.

The summarized version lacks the intensity of the respondent's reply. A more serious example of distortion is the following:

Verbatim: I am very upset by the way the technical assistance program has worked in this district. The program has primarily benefited well-to-do entrepreneurs, rather than the poor, struggling self-employed men and women who were supposed to be targeted by the planners of this program. Thus it has totally failed to accomplish its stated objectives.

Summarized version: Program did not accomplish its objectives.

The summarized version does not capture the respondent's feelings on the subject; it even distorts the reply. The essential point that the respondent forcefully made was that the project failed to benefit "poor, struggling, self-employed men and women."

RECORDING AND EDITING THE INTERVIEW

Interviewers should record responses during the interview. If they wait until the interview has ended and try to remember what respondents said after the fact, they can lose relevant information.

Responses should be noted down in the language of respondents, keeping the same phrases, grammatical usages, and peculiarities of speech. When interviewers try to summarize or paraphrase respondents' answers, they often unknowingly create a communication gap. Summaries can also distort the true intent of respondents (box 11).

But interviewers should not get so involved in note-taking that they forget the respondent. One simple technique for holding the respondent's interest while taking notes is to repeat the response. Doing this shows that the interviewer is listening carefully, confirms what was said, and provides respondents more time to reflect on their answers. Many respondents modify their replies or provide more specifics when interviewers repeat their answers.

To speed note-taking, interviewers can construct and use abbreviations and codes for commonly used terms. For example, they can use "R" for respondent, "DK" for don't know, "P" for project, "E" for evaluation, and so on. To save time, articles and prepositions can be left out and only key words noted during the interview. During the editing process, the interviewer can insert these words and punctuation. For example, a standard question, "What is on your mind?" may be written as "What mind" at the note-taking stage.

Interviewers should also note the nonverbal behaviors of respondents, when appropriate. Often facial expressions reveal more than what an informant says. For example, if a woman

respondent seems skeptical or uncomfortable responding to questions about the effectiveness of credit delivery to women farmers, the interviewer should make a note of her reaction. Such notes enable a careful examination and review of replies during data coding and analysis.

The best time to edit is immediately after the interview. If that is not possible, editing should be done the same day. The purpose of editing is to ensure that all answers are correctly recorded. In particular, interviewers should ensure that entries are legible. They should also ensure that questions that were not relevant are marked, replies to open-ended questions are put in parentheses, and articles and prepositions are added.

ANALYZING AND PRESENTING THE SURVEY DATA

The manager of a large area development project in a southern African country came to meet with the permanent secretary of agriculture. He brought what he thought was the major achievement of his statistical division, a few neatly typed regression tables. These tables presented regression coefficients for variables predicting the adoption rates for high-yielding varieties of maize in the region. The permanent secretary asked a few general questions and dismissed the manager, promising to look at the tables carefully. As soon as his visitor left, he deposited the tables in his waste basket, breathing a sigh of relief.

An incident reported to the author

This story illustrates that the analysis of survey data in project and program settings should be kept simple. The purpose of the mini survey report should be to communicate, not to impress. Simple statistical tools that are more likely to be understood by people without statistical expertise are thus invariably preferred to complex and sophisticated tools. If complex statistical tools must be used, every effort should be made to present the findings in nontechnical language.

CODING DATA

Coding is indispensable for quantitative analysis. It involves transforming gathered data into categories and translating these categories into numbers. The purpose of coding is to simplify individual responses. For example, suppose respondents' occupations are as follows: farmer, barber, farmworker, blacksmith, general merchant, moneylender, baker, butcher, civil servant, primary teacher, mason, and midwife. Because the mini survey sample size is small, this number of occupational categories will serve little purpose. Instead, fewer categories should be developed that are geared to the purpose of the inquiry. If the primary interest is the farming population, only three categories may be used: farmers, farmworkers, and others. If the purpose is to understand microenterprise problems, a different scheme is required.

There are two methods for coding: inductive and deductive. In the inductive method, data are recorded in as much detail as possible—for example, all occupations in the community are listed. However, the deductive method involves the use of a predetermined classification scheme that is strictly followed by the coder. For example, if there are three categories—farmers, farmworkers, and others—the coder will classify all responses on this basis.

Both coding methods have advantages and limitations. One shortcoming of the deductive method is that it does not allow for new ideas and insights. Once the data are coded, there is no freedom to manipulate them beyond specified categories without recoding the questionnaires. An advantage of the deductive method is that it saves time and effort, and it imposes some order on data by eliminating superfluous or irrelevant details. Consider the difference in

Box 12. An Illustration of a Coding Scheme

a. Age
(Code actual age in years)

b. Gender
Male = 1
Female = 2
c. Number of children
(give actual number)

d. Use of immunization programs
Yes = 1
No = 2
I don't know = 8
No answer = 9

e. Agreement with the statement about the need for polio vaccine.
Agree strongly = 1
Agree = 2
Not sure = 3
Disagree = 4
Strongly disagree = 5

coding and analysis time if four instead of fifteen occupational categories are used.

The main strength of the inductive method is that it permits flexibility. New categories can be easily developed, even after the data have been coded. For example, if a new category—say, civil servants—is found to be useful, it can be added without any additional effort. Among the shortcomings of this method is that more time is needed for coding data and the investigation can become bogged down with unnecessary details.

Ideally, both methods should be used in a mini survey. When its designers know what they are looking for and have a reasonable idea of response categories, the deductive approach is preferable. But if appropriate categories are not apparent, the inductive method should be used. The inductive method is particularly appropriate for coding responses to open-ended questions.

There are four simple rules for developing a good coding scheme:

1. *Categories must be mutually exclusive;* each case should be classified only once.
2. *Categories should allow all responses to be categorized.* If the marital classification is only "married," "single," and "divorced," a widow or widower will create classification problems. The category "other" or "miscellaneous" would be required to make the system inclusive.
3. *Details needed by the survey must not be lost.* Fewer categories make data neat and manageable, but they also limit what is available.
4. *The coding scheme must be related to the purpose and scope of the mini survey.*

In some cases, actual numbers can be presented—such as a respondent's age, the size of a household, or the area cultivated. However, in most cases, an arbitrary number will be given to a category (box 12).

Coding open-ended questions requires considerable time and effort. The best course is to numerically code them as well as record them verbatim. For example, two steps can be used to code responses relating to recommendations for improving the quality of technical assistance provided by a microenterprise project. First, all responses are recorded in a separate sheet to provide a comprehensive picture. Second, after carefully reviewing the responses, a set of categories is developed for recommendations received; individual responses can be coded accordingly. Often, the review of verbatim records will provide new insights and explanations when the report is being prepared.

STATISTICAL ANALYSIS

Frequencies and Percentages

The first step in any analysis of survey data is to construct a frequency distribution. This is done by listing all response categories and counting the number of observations in each of them. The accepted procedure is to list the categories in the left-hand column and the number of observations in the right-hand column.

Box 13. Use of Percentages in Presenting Data

Percentages can either be very helpful in presenting data clearly or very misleading, depending on the competence (and honesty) of the presenter. Consider the data in this table giving the number of farmers purchasing fertilizer in each of three districts in each of the three years.

Number of Farmers Purchasing Fertilizer				
District	Total Farmers	Year 1	Year 2	Year 3
A	10,000	3,612	4,170	4,670
B	14,000	765	1,241	2,073
C	38,000	21,036	20,217	19,416

We can present these data in terms of the percentage of farms in a district purchasing fertilizer in each year (noting that each percentage is independent of the others—they do not sum to 100 in any direction):

Percentage of Farmers Purchasing Fertilizer			
District	Year 1	Year 2	Year 3
A	36	42	47
B	5	9	15
C	55	53	51

Or we can present the percentage distribution by district of the farmers purchasing fertilizer in a year:

Percentage of Fertilizer Purchasers			
District	Year 1	Year 2	Year 3
A	14	16	18
B	3	5	8
C	83	79	74
Total	100	100	100

Or we can show the index of the numbers purchasing fertilizer in each district, taking the number 1 as the base (100):

Index of Fertilizer Purchasers			
District	Year 1	Year 2	Year 3
A	100	115	129
B	100	162	271
C	100	96	92

- The first table shows that fertilizer is most popular (or more available) in districts A and C; it also shows the time trend, but it disguises the dominance of district C in terms of numbers of purchasers.
- The second table shows the dominance of district C, but disguises the trends in the number of purchasers over time.
- The third table highlights the time shifts more clearly, bringing out the rapid growth in district B and decline in district C, while losing the relative importance in absolute numbers or relative incidence of fertilizer purchasers in the various districts.

Each presentation has a role to play, but each offers a partial picture, which, in isolation, can even mislead.

Table 2. Size of Farms Cultivated by Respondents			
Farm Size (hectares)	No. of Households (f)	Percentage	Cumulative Percentage
0–2.0	35	35	35
2.1–4.0	25	25	60
4.1–6.0	20	20	80
6.1–8.0	15	15	95
8.1–10	5	5	100
N	100	100	

Nominal categories (categories that cannot be ordered on the basis of their own attributes: gender, rural-urban residence, religion, and so on) are usually arranged according to number of observations in each—from the largest to smallest. The categories "not applicable," "applicable," or "no response" are kept at the end, whatever their sizes.

Intervals into which data are grouped should be of equal size, such as $001–100, $101–200, $201–300. However, there are cases, such as distribution of income or rent paid, when sudden jumps occur, and unequal intervals at the high or low margins may be preferred. Interval points should be determined with reference to the number of observations and the objective of the survey. As a general rule of thumb, the number of intervals in a mini survey should normally not exceed six or seven because of the small sample size.

It is always useful to list percentages as well as frequencies. The percentage for each category is obtained by dividing the number of observations (f) in that category by the total (N), then multiplying the result by 100. Cumulative distribution is obtained by summing the percentages in each category and all the preceding categories.

Table 2 offers a simple frequency distribution with percentages. It shows that 60 percent of respondents cultivate four or fewer hectares of land and only 5 percent cultivate more than eight hectares.

Box 13 (on page 27) illustrates how the percentages can be used to draw relevant conclusions.

Often a change of scale is extremely helpful. Table 3 gives data about the number of credits approved by 10 branches of a credit institution.

Table 3. Variations of Transformed Data				
Branch	No. of Credits Approved	Credit Issued in Excess of 100 (126-5)	Percent Difference from the Mean	Percent of the Mean Target (120)
1	103	3	–23.5	86
2	125	25	– 1.5	104
3	117	17	– 9.5	98
4	133	33	+ 6.5	111
5	129	29	+ 2.5	108
6	148	48	+ 21.5	123
7	118	18	– 8.5	98
8	132	32	+ 5.5	110
9	146	46	+ 19.5	122
10	114	14	–12.5	95

Column 2 shows the data with 100 removed from each value, and column 3 shows each value as a difference from the mean. Column 4 gives the percentage with reference to the target of 120 credits.

Often, a mini survey need not go beyond counting frequencies and percentages. Most study questions for a mini survey can be easily answered with these simple techniques.

The Mode, Median, and Arithmetic Mean

For mini surveys, it may be desirable to obtain measures of the central tendency. Such measures include the mode, the median, and arithmetic mean.

- The mode is the category or observation that appears most frequently in the distribution, or the one with the largest number of responses. Most distributions have only one modal category. When two categories are nearly or equally prominent, the distributions are called bimodal.
- The median, a measure that divides the distribution into two equal parts, is computed by locating the middle observation. For an odd number of cases, the middle item is calculated by adding 1 to N (the number of cases) and dividing the sum by 2.

Table 4 gives the membership figures for 9 and 10 farmers' clubs in a project area, arranged by size. The median is (9+1)/2 = 5. Since the number of members in this club is 38, it is the median membership for the farmers' clubs. If there were another club with a membership of 57 (making 10 cases, an even number), the median would be a value between 38 and 42, or 40. The median is not affected by extreme values. Even if the first club had only five members, the median would remain the same.

The most widely used measure of the central tendency is arithmetic average or mean (symbolized by x). It is calculated by adding all the values of the distribution and dividing the sum by the total number of cases. For instance, in computing the mean for the membership of farmer's clubs as shown in table 4,

Table 4. Membership of Farmers' Clubs

Club No.	Membership
1	25
2	30
3	35
4	35
5	38
6	42
7	45
8	50
9	56
10	57

$$\bar{x} = \frac{25+30+35+35+38+42+45+50+56}{9}$$

$$= 39.6$$

Thus the average membership of a farmers' club is about 40.

Range, Variance, and Standard Deviation

Though measures of central tendency give an indication about the most representative value of the distribution, they do not indicate how it is dispersed. For example, two regions may have the same mean for the size of agricultural holdings, but the land might be equitably distributed in only one region. In other words, all farmers in one region might have more or less the same amount of land, but a small minority might own most of the land in the other region. Measures of dispersion give information about the dispersion or variation in the values of a distribution. These measures are range, variance, and standard deviation.

Table 5. Calculations of Mean and Variance for a Distribution

Serial No.	x	$x-\bar{x}$	$(x-\bar{x})^2$	x^2
1	3	–4	16	9
2	3	–4	16	9
3	5	–2	4	25
4	6	–1	1	36
5	7	0	0	49
6	9	2	4	81
7	16	9	81	256
Total	49	0	122	465

Range is the simplest of the three, although not the most useful. Range refers to the difference between the highest and the lowest values of the distribution, and is computed by subtracting the lowest from the highest. Because the range depends on the two extreme scores, it is an unstable measure.

By contrast, variance (s2) takes into consideration the values of all the items in a distribution. It is computed by summing up the squared deviation from the mean, then dividing the sum by the total number.

$$\text{variance} = \frac{\sum^{N} (x_1 - \bar{x})^2}{N}$$

Table 5 shows a distribution of seven cases and the calculation of its mean and variance.

Note: mean $(x) = \frac{49}{7} = 7$

$$\text{variance } (s^2) = \frac{(x-\bar{x})^2}{N}$$

$$= \frac{122}{7} = 17.4$$

The steps involved in calculating the variance (s^2) are as follows:

- The arithmetic average is computed. In this case, the mean is 49/7 = 7.
- The second step is to calculate the difference between the value in each category and the mean. This difference is shown in the third column.
- The third step involves squaring the deviation from the mean, as shown in column 4.
- The squares from the deviations are summed up and divided by the number of cases. In this case, the result is 17.4.

An alternative to making these calculations is to employ a simpler formula that yields a close approximation to the true variance. The most common approximation formula is

$$s^2 = \frac{\Sigma \int x^2}{N} - \left(\frac{\Sigma \int x}{N}\right)^2$$

Column 5 in the table gives x^2 (squares of the raw scores of observations). When the simpler formula is applied to the data in Table 5, we find

$$\text{variance} = \frac{465}{7} = \left(\frac{49}{7}\right)^2$$
$$= 17.4$$

The variance expresses the average dispersion in squared units, not in the original units of measurements. This problem is solved by taking the square root of variance, which is called the standard deviation. Thus s = 4.2 in the example.

Pearson's Coefficient of Correlation

The maximum value of the coefficient of correlation or association (r) is 1, which can be both positive and negative. If two variables are positively associated, it means that an increase in the first variable is likely to be associated with

an increase in the second. The negative correlation suggests that when the one increases, the other decreases; in other words, the association is inverse Thus, a value of r of –.75 is the same as of +.75, as far as the strength of the association is concerned. In everyday usage, an r of .8 and above is considered a high coefficient; an r about .5 is considered moderate; and an r of .3 and below is considered a low coefficient.

There are several formulas for computing r. Probably, the simplest is the following:

$$r = \frac{N\Sigma xy - (\Sigma x)\ (\Sigma y)}{\sqrt{[N\Sigma x^2 - (\Sigma x)^2]\ [N\Sigma y^2 - (\Sigma y)^2]}}$$

A simple example will illustrate this formula. Suppose 10 farmers are tested on their general knowledge, then given another test relating to their knowledge of recent agricultural innovations being promoted by a project. By using the correlation formula, it is possible to determine whether the scores on these two tests are associated (table 6)

When the figures from table 6 are entered in the correlation formula, the following results:

$$\frac{10(1440)-[(130)\ (100)]}{\sqrt{[(10\times1878)-(130)^2]\ [(10\times1138)-(100)^2]}}$$

$$=\frac{1400}{1610}=.87$$

The r of .87 is indeed a very strong correlation. It suggests that general knowledge and knowledge of agricultural innovations are closely related. Farmers who are more knowledgeable about general matters are also well informed about agricultural innovations.

To compute r for grouped data, the midpoint for the intervals is taken and multiplied with the frequencies. Chi square, simple and multivariate regression, and analysis of variance and t-tests can also be used to analyze data. Any standard textbook on statistics will provide more information on these measures.

Table 6. Association (r) between General Knowledge and Agricultural Innovation Scores

No.	General Knowledge Scores (x)	Agricultural Innovation Scores (y)	$(x)^2$	$(y)^2$	xy
1	20	12	400	144	240
2	18	16	324	256	288
3	16	10	256	100	160
4	15	14	225	196	210
5	14	12	196	144	168
6	12	10	144	100	120
7	12	9	144	81	108
8	10	8	100	64	80
9	8	7	64	49	56
10	5	2	25	4	10
Total	130	100	1,878	1,138	1,440

PRESENTING DATA

Constructing Tables

Survey data are invariably presented in tables. The following simple rules help readers readily absorb the data presented in tables and appreciate, without further analysis, the most obvious patterns and relationships:

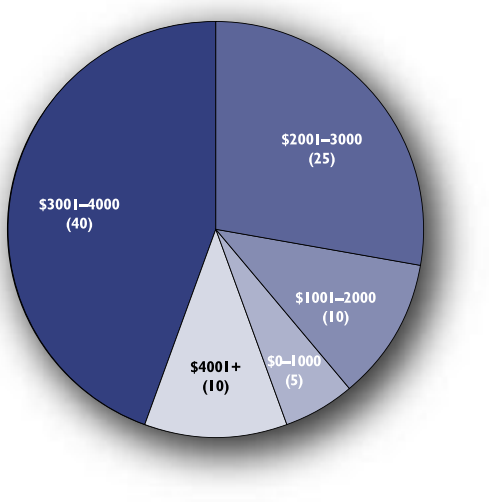
- Limit the number of rows and columns. Numerous columns and rows confuse readers. What is appropriate for the professional journal is not necessarily so in the context of project and program analysis.
- Use clear, self-explanatory column and row headings. Liberal use of differential spacing is needed to highlight comparisons.
- Use clear and unambiguous class intervals in frequency distributions.
- Transform the data into percentages and indexes, as appropriate. Use averages, standard deviations, and other measures to summarize the array of data.
- Present the data in logical order. A commonly used order is from most frequent to least frequent, although reversing this order may also be appropriate.
- Provide a title for the table that summarizes its purpose and content.
- Add a note at the end of the table if there is additional information that can help interpret data, such as statistical significance.
- Summarize in the text the highlights of the table and conclusions that can be drawn from it.

Presenting Graphics

Graphic representation of data can be very useful in communicating findings. Graphs can help dramatize a point without deceiving the reader. With access to a computer, relevant graphs can be prepared very quickly.

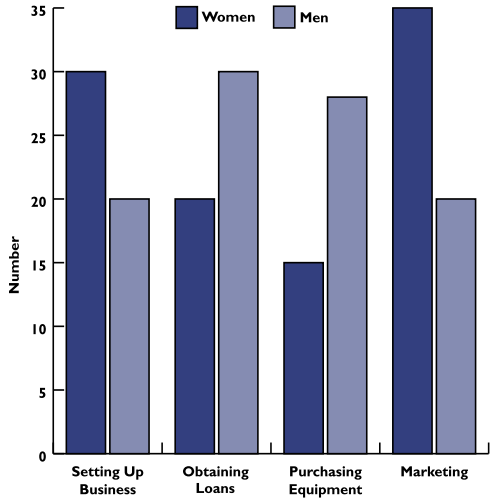
One of the simplest graphs is a pie diagram that shows the proportions of the whole in different categories. A pie diagram would help illustrate the results of a survey that seeks to discover the economic status of 90 participants in a microenterprise project and, in particular, whether people below the poverty line (those earning less than $1,000 a year) were adequately represented The key to presenting this data in a pie diagram is to draw it to scale (fig. 1). The slices should be restricted to five or six; otherwise the diagram becomes too cluttered.

Figure 1. Household Incomes of 90 Participants in a Microenterprise Project



Bar graphs are also useful for presenting survey data. Unlike pie diagrams, bar graphs can provide an overview of many kinds of information at a glance. Suppose there is a need to compare the utilization of technical assistance by men and women entrepreneurs. The sample of 80 was equally divided between men and women. Figure 2 presents these data in the form of a bar graph.

Figure 2. Utilization of Technical Assistance by Gender



Line graphs can also be used to present data. They are most suitable for presenting time series data, and they can also be used to show frequency distributions and the relationship between two variables. A line graph should have a title, scale (when appropriate), and a key that defines lines, values, and symbols.

Collecting data is just one—albeit a central—step in the survey process. The use of the appropriate data management, analyses, and presentation tools is critical to the effective communication of results. To accomplish all these interrelated steps most efficiently, use a seamless process to the extent possible. This applies to the software used in survey data management, starting with data entry, verification, preparation of datasets, analyses, and presentation of results.

In addition to the Microsoft Office complement of software packages, a number of options can be considered for survey data management and presentation. There are integrated statistical software packages that allow researchers to work with different modules for data entry, analysis, and graphical representation of results. Among them are SPPS (Statistical Package for the Social Sciences), SAS (Statistical Analysis System), and Stata.

- SPSS includes capabilities for producing charts and graphs of various types, such as scatter plots, density charts, diagnostic and exploratory plots, probability plots, cross-correlation function plots, and multiple-use and custom charts. The analyst can create tables and maps by using add-on modules. In addition, this software package allows the user to export and import data with Microsoft Excel and Word.
- SAS has add-on features that allow researchers to conduct the analysis and create graphics to represent results. SAS/GRAPH software creates graphs and visuals that help to summarize data and present findings in charts, including vertical and horizontal bar charts, and pie, donut, subgrouped pie and donut, stacked, star, and block charts. These different types of charts can be used to represent sums, averages, frequencies, and percentages calculated from data.
- Stata also offers data management and graphics capabilities. It can generate visuals such as bar charts, box plots, histograms, spike plots, pie charts, scatter plot matrices, dot charts, line charts, area charts, and two-way scatter plots. All these capabilities are included in the base package.

Software packages available in the public domain can also be useful. One example is CSPro (Census and Survey Processing System), a Windows-based, public-domain package developed by the U.S. Bureau of the Census for entering, editing, tabulating, and mapping census and survey data. CSPro is a valuable tool for data management, particularly for large survey data, and can be used to generate tables and limited graphics. It also permits data to be exported to a number of other

platforms where graphical representation of results can be developed.

Other analytical tools available in the public domain include the Center for Disease Control's EZ-Text, a software package that helps analysts to create, manage, and analyze semi-structured qualitative databases. EZ-Text assists the design of data entry templates that are tailored to questionnaires. Response to open-ended questions may be entered into EZ-Text, either as a verbatim transcript (for example, from a tape recording) or as a summary generated from an interviewer's notes. Responses can then be coded in an interactive process. Online codebooks are created, and the code is applied to specific response passages. Searches are then conducted to identify text passages in the data set that meet the criterion or criteria defined by the analysts. Data files from different interviewers or sites can also be merged into one file of combined analyses. The ability to export and import the codebook helps coordinate the efforts of multiple coders, who are simultaneously working with copies of the same database file.

Preparing the Report

The items in a typical academic report—the purpose and scope; conceptual framework; research methodology; summary of data, findings, and their implications; conclusions; and appendices—should appear in a survey report, but in a different sequence. A mini survey report should begin with the summary. It should then move directly to the findings and their implications. This arrangement suits decisionmakers because they are more likely to be interested in findings and recommendations than in methodologies, sampling strategies, or conceptual frameworks. Presenting findings and implications at the end of the report is not a good option. The sections on conceptual framework, research methodology, and data can follow the chapter on findings. An even better option is to put these sections in appendices. A table of contents is always helpful, since it indicates the report's coverage and guides readers interested in technical aspects.

Many survey reports contain an elaborate discussion of the underlying concepts, sampling strategies, and procedures used to design their questionnaires. What is still worse, they include numerous unnecessary tables. The preferred approach is to cover each section, but as succinctly as possible. The emphasis should be on the meaning and implications of the data analysis for the projects and programs investigated, not the methodological aspects of the research.

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U.S. Agency for International Development
1300 Pennsylvania Avenue, NW
Washington, DC 20523
Telephone: 202-712-4810
www. usaid.gov