

Measuring Livelihoods and Environmental Dependence

Methods for Research and Fieldwork

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Chapter 11

Getting Quality Data

Jens Friis Lund, Sheona Shackleton and Marty Luckert

Such things people cannot tell you!

Immediate reaction of a Tanzanian enumerator when presented with a socio-economic household survey questionnaire.

Introduction

Try for a moment to imagine a typical survey interview situation. A stranger walks into the house and starts asking detailed questions about the household. What is really going on in that situation? It is the making of data and it is happening in a manner and environment that is loaded with opportunities for failure! In the interview situation – typically lasting between 30 minutes and two hours – the respondent and enumerator should gain a common and hopefully correct understanding of the real-world experiences that the enumerator asks the respondent to communicate. This brief exchange of information takes place between two or more people that normally are strangers, implying that different pre-understandings of concepts and reality, as well as potential mistrust, should be overcome within a very short time. The enumerator is normally temporarily employed, with no personal interest in the research or the data, other than possibly wanting to minimize the time spent on his work (the interview). In addition, the enumerator must correctly transfer the responses into the pre-designed format of the questionnaire, while keeping the interview flowing. The respondent may want to present him or herself in a favourable manner. If the respondent believes the research is potentially influential, he or she may also want to answer strategically, for example, to complain about politics or economic conditions. Furthermore, the required information will often be regarding sensitive issues such as economic assets, diseases or illegal incomes.

In short, the chances that one will get quality data would from the outset seem rather slim! Unfortunately, the literature on empirical household studies rarely provides detailed information on how research is implemented: in other words, how enumerators were trained; whether and how triangulation was done; and what criteria were used to evaluate data quality. This chapter addresses the issue of how to pursue data quality through attempting to avoid systematic measurement errors, in other words, errors arising during the implementation of the survey that systematically affect the measurement of a variable across a sample (see Box 11.1). A systematic error creates either positive or negative bias in the sample estimate of a variable. The tendency for people to under-report on income from illegal activities is an example of systematic measurement error, and we shall look at how to minimize the risk of recording such errors. This involves a discussion of factors surrounding the interview situation, the enumerators and the nature of the relationship between researcher and respondents. We focus only on systematic measurement error and on the data

Box 11.1 *On measurement error*

Any estimate from a sample (for example, gross income from maize) may be thought of as having two components: the true value plus a measurement error. The measurement error component can be further divided into two parts: random and systematic measurement errors.

Random measurement error is caused by factors that randomly affect the variable estimate across the sample. For example, for an estimate of gross income from maize, random measurement error could arise from the tendency of respondents to include/exclude maize harvested at a point in time before/within the recollection period of three months. Importantly, random error does not have any consistent effect across a sample. The randomly distributed positive and negative errors will sum to zero across the sample. Thus, random error adds variation but does not affect the average value of the estimate.

Systematic measurement error, on the other hand, is caused by factors that systematically affect the variable estimate across the sample. With our example of gross income from maize, respondents may answer strategically and under-report their harvest if they perceive that by looking poor they may attract some external assistance. This can also be an effect induced by some enumerators who, unknowingly, give respondents an impression that appearing poor would be beneficial. In both examples, the error tends to consistently influence negatively the average value of the estimate.

Source: Based on Trochim (2006)

collection situation, as other parts of the research process affecting data quality are covered in other chapters of this book, including sampling (Chapter 4), collecting contextual information (Chapter 5), questionnaire design (Chapter 7), implementing the survey (Chapter 10), and data entry and quality checking (Chapter 12).

Systematic measurement errors

This section outlines a number of underlying reasons for systematic measurement errors that may lead to bias in data. We also provide guidelines on how to detect and avoid or minimize them. We categorize these reasons according to whether they originate with the enumerators and/or questionnaire, the respondents' strategic behaviour and understanding, or bounded knowledge.

Enumerators and questionnaire administration

Personal characteristics and appearances of the enumerator

The problem: The age, sex, ethnic group, caste, attitude and appearance of enumerators can greatly influence the data generated in a survey. An important choice is whether or not to use local enumerators (see also Chapter 10). A major advantage of using local enumerators is their knowledge and familiarity with the area, language and livelihood strategies of the respondents. Local enumerators may also have lower salary expectations and reduce the need for extra lodging and transport. A disadvantage may be that finding experienced and/or sufficiently educated enumerators is difficult, hence triggering potentially higher demands for training and supervision. In particular, enumerators must be able to learn and apply new procedures consistently. Moreover, the familiarity of local enumerators may be a drawback when the research touches upon sensitive issues (for example, incomes, diseases, illegal activities). Many respondents may be more comfortable providing such information to strangers who will leave the area, rather than locals whose lack of confidentiality might have a high social cost to the respondent.

Another important characteristic is the social skills of the enumerator. Some enumerators have great interpersonal skills and can immediately create trust with people they meet. This is not something that can be easily picked up through training, and therefore becomes an important selection criterion. Interpersonal skills can be observed through interaction with enumerators and with respondents in the field. Regarding gender, women may in some cases only share knowledge about medicines for women's health with female enumerators.

Similarly, female enumerators may be best for interviews about domestic affairs, child care or craft production. Male enumerators may be better at asking questions related to typical male activities, such as hunting or timber extraction.

Avoiding/minimizing the bias: Being picky in selecting enumerators is a key success factor. Make sure you see how your candidate enumerators work in the field before making hiring decisions. Some researchers prefer training more enumerators than they need, having informed the trainees in advance that only a subset of them will eventually be hired. Key attributes to consider include: Are they trustworthy? Can they complete the questionnaire in reasonable time without tiring the respondents? Do they understand and follow your directions? Through careful selection and constant encouragement and supervision you can help to build these attributes in your enumerators.

Integrity of enumerators

The problem: Unfortunately, some enumerators tend to take short cuts or have unacceptably low quality standards in survey implementation or even go to the extreme of falsifying data. Detecting such misbehaviour can be difficult, but it may be useful to consider the motives. The motives may include low motivation, confusion about the overall purpose of the survey, difficulties in getting to talk to the household, fear of engaging people with sensitive questions or the desire to please the researcher with interesting results.

Avoiding/minimizing the bias: The first line of defence against careless data collection and falsification is prevention. Workloads of enumerators need to be realistic. Enumerators need to be well-trained to be comfortable asking all the questions and to understand that the researcher is not interested in embellished data. Doing spot checks with households to see whether the enumerator came to ask questions, and letting enumerators know that these checks will occur, may prevent the problem. It may help to explain to enumerators that there are consistency checks built into the survey that will reveal if the data has been fabricated or collected carelessly.

The second line of defence is *ex post* detection. Keeping careful track of data as they are collected is essential, for example, a quick review of questionnaires every evening and follow-up meetings with enumerators to go over perceived 'odd' data (see Table 10.2 in Chapter 10). In some cases, enumerators will have to return to the household to verify dubious data. In short, be suspicious of data appearing too similar or too random. Moreover, systematic differences between results obtained from enumerators can, at the extreme, be an indicator of careless collection or falsification. Yet, differences in the way enumerators understand and pose questions (as well as probing) can also trigger differences. The issue should, therefore, be investigated thoroughly before accusations are made.

Researchers should strive to be present at as many of the survey interviews as possible to get a sense of how the data is being collected. This knowledge will not only help in detecting careless collection and falsification, but can also help identifying other problems and provide opportunities to offer encouragement and recognition for a job well done. If working with a large enumerator team, checks of data quality can be achieved through nominated group leaders with systematized checking of the questionnaires. Finally, creating a good working environment will minimize the risk of such problems occurring. Bonuses, honours, praise and individual care can all contribute positively.

Enumerator fatigue

The problem: Conducting the same interviews day in and day out can be tedious and monotonous. Enumerators may quickly become demotivated and demoralized.

Avoiding/minimizing the bias: Enumerators need constant recognition, support, feedback and motivation for them to give their best. For intensive large-scale or repeat surveys, it is essential to build in activities keeping enumerators interested and enthusiastic. This may include knowledge sharing, feedback meetings highlighting interesting findings, training identified by the enumerators and social activities. One of the authors of this chapter coordinated a demographic and health census of 10,000 households, undertaken by only ten enumerators who worked on this for almost a year. Most of her energy and time was spent keeping the enumerators motivated through regular field visits, accompanying them to households, recognizing their worth by asking them for their opinions and ideas on the process and on the data, providing training, organizing social get-togethers, sharing key and exciting results, and so on.

Probing bias

The problem: Enumerators should not be trained to act like field robots – they will then not be able to develop a rapport with households. But differences between enumerators regarding interpreting, explaining and exemplifying questions may influence the answers. Imagine that a questionnaire seeks to elicit households' forest income over the past year. One enumerator might do this by asking several questions about the household members' daily activities and probe using various examples of forest products that he knows are commonly used in the area – thereby facilitating the respondents' memorizing. Another enumerator might simply state the question once and record whatever the respondent answers without asking any follow-up questions. Clearly the former enumerator will end up with a higher average forest income estimate than the latter.

Avoiding/minimizing the bias: All enumerators should, as far as possible, use the same approach to probing. For example, prompting for open-ended questions should be standardized. The risks associated with probing biases increase if questions are stated in general or abstract ways, which often require further explanation (see Chapter 7). During pretesting of questionnaires, such sources of bias can be detected, for example, by role playing the questionnaire and by regularly supervising how enumerators ask and exemplify the questions. Preventing such sources of bias is best done by spelling out all questions in their entirety, having detailed written guidelines for the questionnaire, and thoroughly training the enumerator team.

Bias arising from choice of respondent

The problem: Households are many-headed creatures and one head may not know what the other is doing. As an example, in many rural areas of developing countries women and children fetch firewood and water, while business and hunting are the domains of men. The division of labour and responsibility in households, however, varies from place to place implying that no rules of thumb can be given. One should be aware that the choice of respondent will in all likelihood influence the answers.

Avoiding/minimizing the bias: There will clearly be a trade-off between time needed to do the survey and the opportunities for getting fuller pictures of household livelihoods. If several household members participate in answering the questionnaire, they can respond to different questions. For example, children may be asked about products that their parents are not likely to know much about, such as collecting fruits and hunting small birds and animals. But dominant family members could object to letting those answer who are best suited. Because of such problems, resources permitting, interviewing individually one adult male, one adult female and one child can give a more detailed picture. No matter what approach is chosen, it is important to document in the sampling procedures who was answering the interviews.

Respondents' strategic behaviour and understanding

Even if enumerators are full of integrity, well-trained and do an excellent job in asking questions, some biases may arise due to respondents.

Strategic answering

The problem: Strategic answering arises as a consequence of push and pull factors. Foddy (1993) uses the term 'threat factor' and provides three overall categories: idiosyncratic, social rejection/acceptance and sanctions/rewards.

First, idiosyncratic questions focus on issues that generate personal anxieties with particular respondents. For example, someone who has recently been robbed may choose to under-report household wealth because of fears that disclosing asset information could increase robbery risks. Or some households may be hesitant to reveal their use of medicinal plants out of fear that it may be frowned upon by the church to which they belong.

Second, questions may also generate fear of social rejection or, conversely, hope of social acceptance. For example, questions regarding sexual behaviour, sexually transmitted diseases, illegal harvesting, behaviour that is likely to cause ridicule, or large dependence on relatives (remittances) can all be seen as potential threats to respondent social status and should thus be posed with care.

Third, questions may also generate fear of political or economic sanctions or, conversely, hope of rewards. Questions regarding illegal activities, political activism or altruistic behaviour can all trigger expectations about sanctions or rewards. Questions related to wealth and income may be sensitive for various reasons. In many settings, being perceived as wealthy carries with it obligations and responsibilities: being generous, providing labour opportunities and relief support to the less well-off. Overstating poverty and understating wealth may also result from hope that those using the research outputs will be more likely to help respondents, for example, by initiating a development project such as building a school. The sheer presence of and impression made by researchers in a rural area can generate expectations of development aid or other rewards, which may result in people trying to appear poor and worthy of assistance.

Finally, the history of a field site may provide important hints as to what issues are contentious. If working with natural resource issues, for instance, sites with previous presence of conservation projects or non-governmental organizations (NGOs) will often display a heightened awareness of what is legal and what is not, and, hence, increase the risk of strategic answers.

Avoiding/minimizing the bias: For all three threat categories mentioned above, strong feelings and strategic answers may be generated even by seemingly harmless questions. In cases where these threats are present, a number of preventive measures may be taken. First, it is of utmost importance to avoid the spreading of false rumours by providing ample information regarding research purposes and to make sure this information is disseminated widely in the community through appropriate channels, such as community meetings, local radio stations or an information brochures in the local language. Second, in every individual interview, this information should be repeated, possibly including background information to sensitive questions. Also the promise of confidentiality should be made

very clear to the respondents at the beginning of the interview. In some cases it may not be necessary to record respondents' full names – at least not while conducting the actual interview. This may make people more comfortable.

To avoid strategic answering, it is also important that the answer options should contain the full range of potential responses, including, for example, illegal activities. A key factor is the level of trust between the enumerator and the respondent. This trust can be strengthened through approaches that make it clear that answers will be held in strict confidence. Typically, in repeated surveys it proves easier to get honest responses to sensitive questions during subsequent household visits, as trust is being built over time. Spending significant time in the village and participating in social activities, for example, in the Friday night local football game or local party are all measures that will increase trust and diminish the likelihood of strategic responses.

Normally the respondent's homestead is chosen as the place to conduct the interview. This may, in addition to facilitating trust, yield the benefit of triangulating household responses, through visible characteristics, such as the telling evidence of a hunting trap lying around in the courtyard or the expensive newly bought furniture in the living room. Using such observations should, of course, be done in a polite, or perhaps humorous, way in order to build a relationship of trust. This also diminishes the probability of strategic biases. If the respondent seeks to avoid doing the interview at the homestead, it could be an indication that something is being hidden.

Another way to check on at least some of the information provided by respondents is to use built-in triangulation in the questionnaire itself. This can be particularly rewarding in research that involves multiple survey rounds where information obtained in previous rounds can be used for validation purposes in later rounds. Box 11.2 provides some examples.

The temptation of the respondent to provide misleading answers may also be diminished if the enumerator demonstrates good background knowledge of the topics and local conditions, including sensitive ones. For example, in inquiring about illegal activities, it is important to have a good knowledge about the level of enforcement of laws and regulations in the communities (Shackleton et al, 2001, pp134–135). In one survey in Tanzania, enumerators often experienced that respondents first explained to have produced 'only two small bags of charcoal'. Normally, however, charcoal is produced in kilns that yield much higher quantities. By revealing this knowledge with a knowing smile, the enumerators made the respondents laugh and reveal the true amounts.

Box 11.2 *Triangulation using information previously obtained in a survey*

It is possible for researchers to use data collected earlier in a survey, to increase the quality of ongoing data collection. For instance:

- Household assets may point towards specific types of income sources. Having recorded ownership of items such as scotch carts, ploughs, oxen, shops and various tools should lead the enumerator to check carefully the income derived from activities related to such assets.
- Household member skills and general livelihood strategies should be elicited in the first survey round to provide a checklist for later survey rounds. Knowing *ex ante* that a household member is a carpenter, house builder, charcoal producer, bike repairman, herbalist, and so on, is valuable in later survey rounds to assure that the income is elicited.
- The household food security situation – food storage – is a strong predictor of future activities to supplement income. Hence, knowing how many months the main staple crop lasts for the household's own consumption is valuable information.
- Household religious beliefs may be related to an unwillingness to reveal certain types of information, for example, the use of traditional medicine or income from certain types of businesses. In such cases, enumerators should be more careful and critical about this type of information.
- Asking households about cash costs and own consumption of various items, for example, agricultural produce, can be a good way of triangulating information on savings, cash income and agricultural storage and harvest.

In general, the information obtained in previous survey rounds should provide some information about data that will be obtained in later rounds. Hence, enumerators should be suspicious of households that suddenly report very different incomes, if the change cannot be explained by seasonality or some other cause.

Finally, the 'threat' level of sensitive questions can be reduced by various techniques in the way the question is posed and the answer options presented. Box 11.3 provides a few examples and references.

Respondent learning in panel studies

The problem: If an enumerator visits a household more than once, then respondents may think that they already know the questions, and proceed to answer them 'automatically', without carefully listening to and thinking about the detailed questions.

Box 11.3 *How to ask about sensitive issues*

Below are five approaches to asking the sensitive question: ‘Did you do any illegal hunting last year?’

Approach	Question
<p>Casual approach Give a numbered card</p>	<p>Did you happen to do any illegal hunting last year? Would you please read off the number on this card that corresponds to what you did [hand card to respondent]: (1) I did do some illegal hunting last year (2) I did not do any illegal hunting last year (3) I did hunt last year but am unsure if it was illegal or not? (4) I did only legal hunting last year (5) I did not hunt last year</p>
<p>The ‘everybody’ approach</p>	<p>As you know, many people do illegal hunting in this area. Did you happen to do any illegal hunting last year?</p>
<p>The ‘other people’ approach</p>	<p>(a) Do you know any people who have done illegal hunting? (b) How about yourself?</p>
<p>The ‘sealed ballot’ technique</p>	<p>We respect your right to anonymity. Please complete this form, indicating whether or not you have done any illegal hunting last year, seal it in the envelope and place it in the box marked ‘Secret Ballot’.</p>

Source: Adapted from Gray (2009, p347)

Note that the last of the approaches, the ‘sealed ballot’ technique, does not permit one to assign illegal hunting to individuals, but only to infer levels among a population of individuals. Another approach to infer levels of sensitive practices among a population is the Randomized Response Technique (RRT) (Gavin et al, 2009). The RRT uses a randomizing activity (such as a coin toss) and asks respondents to remember, but not disclose, the result. Respondents then select one of two undisclosed questions: one sensitive (for example, ‘did you do illegal hunting last year?’) and one asking about the result of the randomizing activity (for example, ‘did the coin toss give ‘tails’?’). Respondents answer only yes or no to the question. The interviewer does not know which of the questions respondents answer, thereby providing a veil that removes disincentives for strategic answers. The interviewer does know, however, the probability that the respondent answers the sensitive question (for example, half the respondents answer the question on illegal hunting) as well as the probability of a yes/no response to the other question (half get ‘tails’ in the coin toss). Thereby, aggregate estimates of illegal behaviour can be obtained.

Avoiding/minimizing the bias: Explaining why the data is being collected repeatedly can help avoiding mechanical responses. For example, explaining that seasonal differences in income and expenditures are a research focus may raise respondent alertness regarding seasonal changes, and thus ensure they treat this interview as being separate from previous ones. Thus an incident from a repeat survey in northern Ethiopia can be avoided: one respondent was very apologetic for answering wrongly last time – what other reason could the enumerator have to come back and ask the same questions again?

Vague/imprecise responses

The problem: Imprecise responses are common in detailed household income accounting studies. Consider the question: ‘How often did you collect medicinal plants in the past three months?’ The following are three possible responses: (a) ‘It depends’; (b) ‘I collect when someone in the family is sick’; and (c) ‘I usually mainly collect in the rainy season’. None of these responses is likely to give you the exact information that you are seeking.

Avoiding/minimizing the bias: One solution could be to take another look at the way the question is posed in the questionnaire – can it be put more precisely? Another is to make sure the enumerators fully understand what data are needed. This sequence will likely require the enumerator to break down the questions into smaller, more specific pieces. For the first response these follow-up questions could provide the information needed: *Enumerator:* ‘What does it depend on?’ *Respondent:* ‘It depends on when we run out.’ *Enumerator:* ‘How often over the past three months have you run out of and gone to collect medicine?’ *Respondent:* ‘Two times.’

Misunderstanding the question

The problem: Respondents may easily misunderstand or misinterpret questions, for various reasons. First, long questions with complex wording run a great risk of being misunderstood (Foddy, 1993). Although misunderstanding may be prevented by using examples or illustrations, respondents may then focus excessively on the latter, rather than the general concept. Second, if the context or purpose of the question is unclear to the respondents, they will likely make their own, often wrong, guess of what information the researcher seeks.

Avoiding/minimizing the bias: Keeping questions short and concise, and avoiding difficult wording, is essential (see also Chapter 7). If questions are clear, then examples may not be necessary. When used, examples should be directly related to the question. For example, if you are trying to elicit expenditures made within the last three months, potential expenditure categories (for

example, school costs) may be used as examples that can also provide a systematic probing structure within open-ended questions.

Respondent fatigue

The problem: Tired respondents may give 'quick' answers in order to finish fast, especially in the latter part of the questionnaire. This behaviour may happen as a consequence of poor timing of the interview (the respondent is tired or has other pressing matters) or because the questionnaire is too long. It may also abound in sites where a lot of surveys have already been done (research fatigue). The result will often be biased answers, because the respondent will tend to answer 'no' in order to go faster through the questions.

Avoiding/minimizing the bias: First, selecting study areas that are not 'over-researched' provides a context that is less exposed to research fatigue. Second, interview schedules should suit the respondents, vis-à-vis their daily routines. Third, in the case of long questionnaires, it is worth adjusting research plans and budgets to allow for interviews to be interrupted for later completion, whether after a short break (for example, offering a cold drink, tea or biscuits) to recharge the batteries of tired respondents and enumerators, or on another day whenever the respondent has more time available.

Bounded knowledge

When designing questionnaires, it is important to remember that human beings may fail to know or recall all the information that interests a researcher.

Recall

The problem: One form of bounded knowledge concerns recall, in other words, respondents' cognitive abilities to fully remember past events and activities. Several studies have documented that quantitative data on income and labour based on long recall may underestimate actual levels (for example, Gram, 2001). A problem often referred to when discussing recall is 'telescoping bias' that occurs when respondents draw/push past events forward/backward in time in relation to when they actually occurred, thereby creating a bias.

Avoiding/minimizing the bias: In general, questionnaire recall periods should match respondents' recall abilities. Shorter recall periods are usually associated with small and frequent events where extrapolation to a longer period is reasonable, whereas longer recall periods typically are associated with infrequent, large or rare events that may be missed out with short recall periods. The problem of telescoping biases may be eased by relating timing to significant events in respondents' lives, for example, did it happen before marriage, before the local bridge was completed or before the re-election of the president? Past

experience regarding recall in other surveys and thorough pretesting can help fine-tuning questions to respondents' recollection ability.

Finally, adequate timing of surveys can help, for example, starting just after the crop-harvesting season will be good if agriculture is the main focus. For environmental incomes, with many extractive products following distinct harvesting cycles, optimizing the timing may be more difficult. Repeated surveys covering a full calendar year might then be preferable.

Differences in perceptions/understandings of definitions

The problem: When designing questionnaires, key definitions cannot be taken for granted. For example, what is a 'forest'? To European citizens, it might mostly be managed plantations with few tree species, to an Amazon dweller it may be a place with tall trees forming a naturally dense crown cover and a diverse understorey, while respondents from the semi-alpine Himalayas may refer to low hillside shrubs. Since responses depend on perceptions, having a common understanding of key words is crucial.

Differing local units also have to be standardized to allow quantities to be properly compared and aggregated. For example, a bucket may hold 10 litres in one village and 20 litres in another, while a barrel may hold 50 litres in both villages. Any comparison between these two villages requires standardization to litres.

Avoiding/minimizing the bias: Being aware of different meanings, units and perceptions is an important step in avoiding such biases. In principle, one must define all key terminology, and ensure that enumerators know and actually apply the terminology consistently when explaining the words to respondents.

Standardization of local units such as handful, headload, bundle, bucket, and so on, is a time-consuming but necessary work component. This may require a separate survey, if there is much variability within the locally applied units. For example, if there are different sized buckets used, then you may have to obtain sizes from a sample of buckets to derive a mean value. It may be necessary to collect data regarding standardization at the community level, so that differences in units between communities are detected. Often price information should be included, so that commodity unit values can be properly compared (see also Chapter 8).

Conclusions

Getting quality data from household surveys in developing countries is challenging. Researchers often operate in unknown territory with only scant knowledge regarding livelihood strategies and practices. In addition, the use of enumerators adds another source of potential measurement error.

In this chapter, we have sought to provide some operational criteria for assessing the quality of livelihoods data and some advice on how to avoid systematic measurement error. A workable approach is to minimize the potential biases arising from systematic measurement error that can distort information from being representative of the truth, and to attempt to detect the direction and severity of remaining biases through replicating results, frequently using alternative approaches. This approach implies a belief that we will obtain high quality data by seeking to avoid biases and to triangulate our data from multiple sources. It also implies that we should be sceptical regarding the quality of data that are not supported by many and good reasons for their truthfulness, for example, that: defy commonly accepted theories; are challenged by other sources; do not fit the understanding of the local context; may be biased by social identity and power relations; and rest exclusively on one single source and cannot be supported by other evidence. But data that are characterized by these features should not be dismissed out of hand. If we rejected all data that defy common theory or our previous understanding of the local contexts, we would also fail to reject wrong theories and to correct wrong understandings of local contexts. In other words, the search for biases should not blind researchers' curiosity, nor jeopardize their ability to challenge common wisdom – arguably, this being one of the noblest functions of science.

Key messages

Several of the potential solutions cut across various of the identified biases. We summarize them in five key recommendations. Giving careful thought and adequate time and attention to these five recommendations will go a long way to minimize the biases discussed, and to ensure that your data – and the research results and conclusions they generate – hopefully can be trusted.

- Take care in selecting enumerators with an eye to their integrity, interpersonal skills and ability to pick up and apply consistently new knowledge, and train them carefully.
- Understand how the local social, cultural and political context may influence peoples' willingness to share desired information.
- Spend time in study sites and participate in interviews to check enumerator performance and consistency, and to get a feel for the reality behind the data.
- Triangulate data from multiple sources.
- Create and implement standard procedures for data quality checking while in the field.

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