Rapid appraisal methodologies for animal traction

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Abstract

Practical methods are suggested that allow small multidisciplinary survey teams to understand the present status of animal power in particular areas. Through flexible, spontaneous and open-ended participatory discussions with key stakeholders, the existing systems of work animal utilisation should become apparent. Personal interviews and moderated focus-group discussions should identify the requirements, attitudes and preferences of the users and potential users, their families, their communities and the relevant organisations and institutions that affect them. Farmers of different gender, age and farming and transport systems and representatives of relevant organisations are asked questions about the past, present and future of animal power in general, and issues relating to the animals, technologies, environment and socio-economic context in particular. Crucial constraints and the potential for improvement will be identified in this way. Questionnaires to obtain reliable quantitative data are avoided until priority areas for information collection have been established through participatory appraisal. New sources of ideas and information are sought out. Information and apparent attitudes are cross-checked through observations, questioning and the opinion of others. The resulting report should cover a wide range of interrelated issues concerning the people, animals, equipment and their physical and economic environment. Options for addressing the limiting factors will have been identified by, and reviewed with, present users, potential users and concerned organisations

Introduction

The methodologies described here are for 'rapid rural appraisal' surveys designed to identify key issues and constraints relating to animal power utilization. The methodologies have been developed to allow small, multidisciplinary teams to survey large areas (whole states or provinces) in a relatively short time (one to eight weeks, depending on the size and complexity of the area). The approach recommended is interdisciplinary, qualitative, participatory and highly flexible. It is based on farming systems 'rapid rural appraisal' and 'participatory appraisal' techniques for interviewing farmers.

There are a very large number of interacting factors that can affect animal power use. These can be categorised as:

- Animal factors (species, nutrition, availability, health),
- Technologies (implements, harnesses, design, supply, repairs),
- Agro-climatic environment (farming systems, land availability, topography, climate, diseases),
- Socio-economic conditions (aspirations, culture and gender, labour, credit, markets, security, services).

A summary of about one hundred factors that can influence the use of animal power is shown in Figure 1. Many of the factors that have been summarised in one or two words (e.g., species, health, soil, cropping systems, technology design, manufacture, land tenure, credit) actually involve a wide range issues that may have to be explored to understand the existing animal power situation, and how it may evolve.

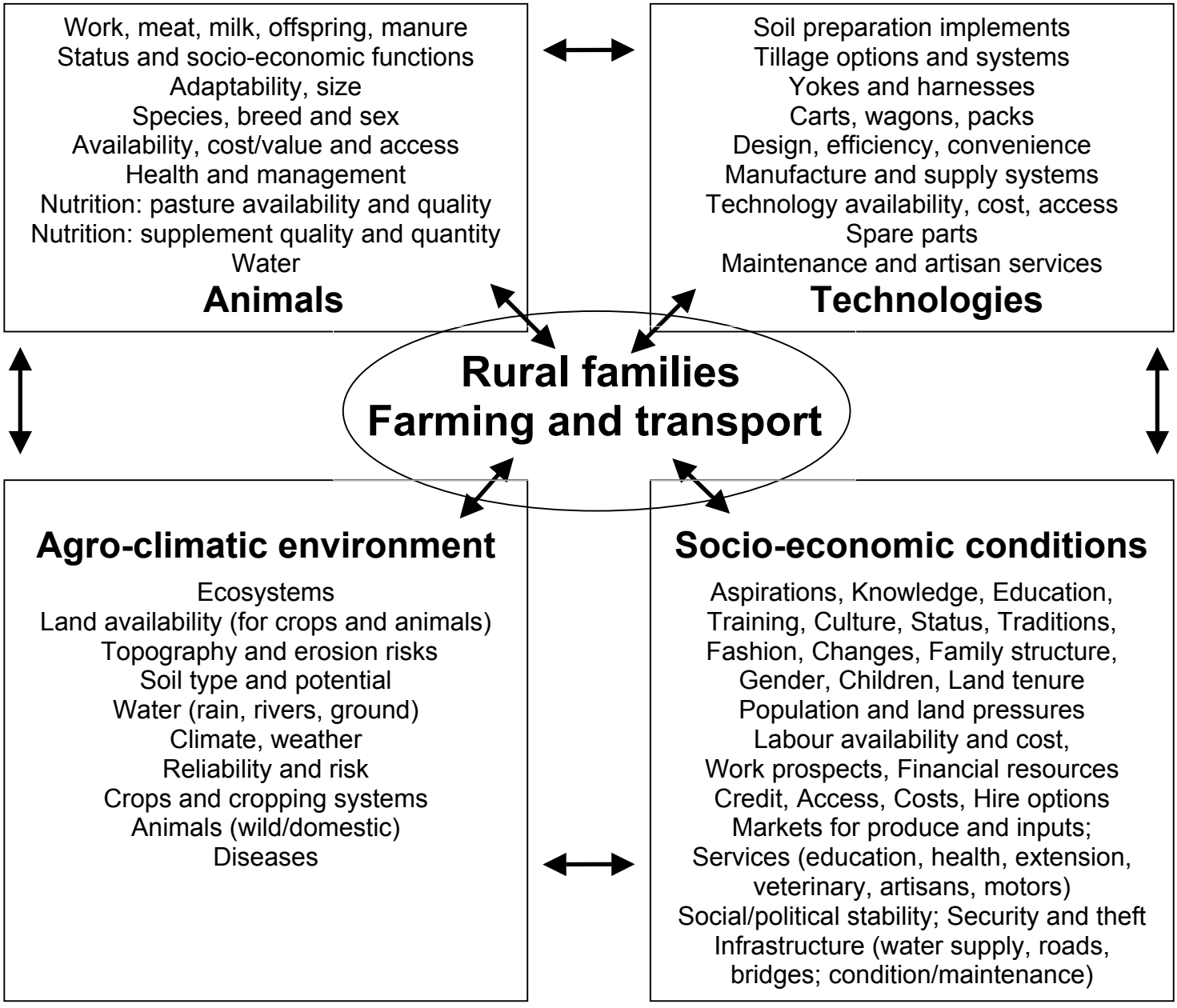
The aim of this methodology is to try to identify the key issues and limiting factors that affect animal traction, directly or indirectly. As noted, such issues may relate to the animals, the equipment or the ecological, social, economic and political environments and to combinations of these factors. If animal traction researchers were simply to collect data on animal numbers and the types of implements, they might miss key issues relating to (say) risk of theft, social status, unreliable weather, lack of spare parts etc.

Structured, quantitative surveys are unlikely to identify all the factors that are crucial in determining the success (or failure) of animal traction in any one village, region or country. Animal traction involves a very large number of variables. If quantitative surveys relating to animal traction attempt to be comprehensive, they have to record a vast amount of information. For example, information relating:

- Animal types (oxen, cows, bulls, horses, mules, donkeys, buffaloes, etc)
- Animal numbers per operation (1,2 and 4 are the most commonly-used numbers)
- Operations (ploughing, harrowing, seeding, weeding, harvesting, crop processing, riding, carting, pulling sledges, pack transport and logging)

- Categories of operators (men, women, children; hired, exchange, family)
- Implement types (with or without wheels, different sizes, various designs)
- Transport types (saddles, sledges, two wheel carts, four wheel wagons, wooden, metal, rubber tyres, etc)
- Farming and cropping systems (swamp rice, terraced hillsides, tobacco, etc).

Figure 1: Diagram illustrating some of the factors that affect animal power use



This short list summarises literally thousands of possible combinations of systems of using work animals, a large number of which may actually exist in an area. In one household, men may hire oxen for ploughing, women may use the family cow for weeding and children may supervise donkeys for carrying water. To record all such basic information as part of a quantitative survey would require very complicated questionnaires and long and tedious interviews. Information relating to animal feeding systems, health practices, artisanal services, farm income, marketing strategies and socio-cultural pressures would require even more complicated questionnaires.

With structured, questionnaire surveys, certain key issues emerge only if the researchers foresee them, or ask the right questions. For example, in the past, some surveys only asked questions about oxen, and thus completely missed the local importance of work cows or donkeys.

Formal, structured surveys may also find it difficult to identify subtle nuances and attitudes. For example, farmers keep work animals for a variety of reasons. In addition to work, they may produce offspring, manure, milk and meat. Their ownership may provide social prestige or wealth, in relation to their quality or quantity. In some societies one fine horse is more appreciated than two mediocre ones; elsewhere two oxen are always better than one, whatever their condition. Farmers may keep work animals longer than is economically optimal, because they become attached to them 'as friends'. If one asks questions about these things (and all the other comparable issues), surveys become excessively complex and with long interviews yielding huge amounts of data to process. Insights and learning tend to get lost in the logistics.

Rapid rural appraisal surveys do not preclude some quantitative data collection. Quantitative survey data can be very important, particularly to demonstrate the changing situations and the significance of animal power. They may be essential in order to obtain the support of certain public sector institutions or donor organisations. However, as comprehensive quantitative surveys are expensive and time-consuming, it is generally best to start with the qualitative methodology described here. Subsequently, data can be collected on a limited range of topics, if judged to be of high priority.

Aim of a survey

The aim of the survey is to understand the present status of animal power in the surveyed areas. This includes the existing systems of utilisation, the constraints and the potential for improvement. It also encompasses the requirements, attitudes and preferences of the users and potential users, their families, their communities and the relevant organisations and institutions that affect them.

Researchers and methodology

A small multi-disciplinary team is envisaged, comprising perhaps three people. It is assumed these will be graduates, or have higher degrees. If possible, there should be at least one woman and one man on the team. Ideally one person should have knowledge of animal management and nutrition (perhaps a veterinarian, animal scientist or livestock specialist). Another person should have an agricultural engineering background, and understand the principles of design and function of implements and carts, as well as soil and water management. Another person should be familiar with social sciences, including economics and gender issues. There are many other specialization that could be useful and relevant, including agronomy, farm management, pastures and extension. All should have some training in participatory methods.

Methodology

People of different backgrounds, experience and academic levels could carry out this type of survey. However, since this methodology requires detailed discussions and not simply recording it is not suitable for implementation by 'survey enumerators' (e.g. the young people with secondary qualifications that are often hired as recorders in data-collection surveys).

If the members of the team do not have the language skills or cultural background to converse directly with the farmers, they should work with partners who possess these skills. This may slow down conversation and can introduce the filtration of ideas by the translators.

It is suggested that the research team should work together for the first few interviews. After this, they may work apart some of the time, sharing their observations as frequently as possible (preferably every day). They should continue to do joint interviews from time to time, to learn from each other's observations and questioning techniques.

Where to go and whom to interview

The aim is to understand the key issues as perceived by the main 'stakeholders' - the persons and organisations concerned directly or indirectly with animal power.

The main stakeholders will probably include:

- Farmers of various types (different farming systems, different farm scale, different gender, users and non-users of animal power, etc)

- Transporters of various types (different transport scale, different gender, users and non-users of animal power)
- Farming families and members of rural communities (women, men and children; animal power users and non-users; single parent families, female-headed and female-managed households)
- Local associations, unions and cooperatives of farmers and transporters
- Local government (village level, provincial level, decentralised national ministries)
- Local agriculture-related services (extensionists, crop-specific agencies, markets)
- Local animal-related services (veterinary services, breeding stations, animal markets, practitioners of indigenous animal health techniques)
- Local services related to equipment (manufacturers, retailers/suppliers and repairers of implements, harnessing systems, carts)
- Local financial institutions involved with (or potentially involved with) animal power (banks, credit unions)
- Local development programmes (government and non governmental initiatives)
- Local training and research organisations (colleges, universities, research stations)
- Other individuals or organisations that are, or could be, influential concerning animal power, including national institutions or relevant international agencies that are represented.

The aim should be to interview a wide range of 'representative' stakeholders. The most important and probably the most reliable informants should be the farmers or transporters who use animal power (or who could benefit from using it). It is these people who are most aware of the reality and complexity of their enterprises and living conditions. It is the users and the potential user that can best appraise and evaluate how animal power does affect (or could affect) their lives and livelihoods. They are most aware of their environment, their actual resources, their commitments and their short-term and long-term problems. Their logic, method of analysis and ways of expressing ideas may be very different to those of the researchers. They may not be aware of all the options and techniques available to them. However, their detailed local knowledge is unlikely to be surpassed by others, including those working in educational establishments or government ministries.

Although the major sources of reliable information are likely to be the animal power users, it is important to contact all types of stakeholders, including the main organisations involved. Indeed, when initiating a survey in a new area, it may be useful to start with introductory office-based discussions. The organisations to contact may include rural development, extension and research programmes, the providers of support services for animal traction and those responsible for programme planning and formulation in the area being surveyed. At the end of each visit, advice should be sought on other individuals or organisations that should be contacted and any other relevant sources of information such as reports and publications.

Farmers and farming systems

Farmers and farming systems are not homogenous. They can be categorised in many ways. The aim should be to interview a wide range of 'representative' farmers and transporters and rural-based stakeholders, ensuring all relevant categories are covered. Naturally some categories will be more relevant than others. In most cases, the surveys should concentrate on those groups for which animal power is more important (or could be). This will depend on local circumstances, but emphasis will often be on resource-poor, smallholder farmers and small-scale transporters.

Examples of farm categories that can be included are:

- Farm size (small-scale, medium-scale, large-scale farms)
- Farm organisations (smallholders, cooperatives, companies)
- Gender (male farmers, female farmers, spouses of farmers)
- Age (include some interviews with old people and with young people)
- Ownership/usage (owners, users who are not owners, non-users)
- Climatic zones (wetter and drier, warmer and cooler areas)
- Topographic areas (hills, valleys, plains etc)
- Cropping systems (maize, rice, roots, fruits, tobacco, cotton, sugar)
- Livestock systems (different breeds/species; rough grazing, pasture, stall-fed; bought-in and farm-bred)
- Farm management systems (irrigation, rain-fed)
- Accessibility (distance from roads and markets)
- Demographic and land pressures (population density; peri-urban influences).

It will be impractical to cover all possible permutations, but in planning and implementing the survey, efforts should be made to ensure that a wide variety of relevant people are contacted in farming systems representative of the area being surveyed. If the aim is to gain a general impression of a wide variety of relevant situations, it is probably unrealistic to identify villages and farms using stratified or randomized sampling techniques. Even if this is done, there is will be an important need for spontaneity: stopping on occasions in areas with interesting animal traction (or lack of it) and asking questions at nearby farms or houses. There is also need for spontaneous follow-ups of leads suggested by the people interviewed.

Interview numbers and timing

The number of interviews required to gain a good impression will depend on the size, variability and complexity of the local farming systems. Each new interview should yield fresh information, but there will be diminishing returns to the time spent. A good initial impression may be gained after just 10 interviews with users in different locations. After the first few interviews (10 or so), the research team should review the initial findings, the types of issues being raised and the types of users and farming systems. It may then be possible to plan a strategy for subsequent interviews, in terms of areas of emphasis, user types and numbers. For a detailed provincial survey encompassing a range of farm types, ecosystems, ownership types and male and female users, a total of between 50 and 100 interviews may be found appropriate. However, with this type of survey quality is more important than quantity. The ability to react to new information and changing perspectives with follow-up interviews (additional types of stakeholders or systems) is more important than adhering to rigid work plans.

Time allocation

Early interviews will generally involve about one hour of discussion. They may take longer if the researchers are shown fields or animals (visual observations are important, particularly in the early interviews). Subsequent interviews can be more rapid, focussing on new information. Researchers should always be open to learning new insights, and time should always be made available to see new things and discuss issues in depth.

In a rapid appraisal survey, most respondents will be interviewed just once. However, there may be value if a number of people have a subsequent interview. These can be used to verify points, collect additional information and see differences relating to time or season. They can also be used to 'bounce' ideas and to gauge reaction to initial findings and recommendations.

How and where to interview

Each interview will be different, being tailored to the unique characteristics of the organisations, farmers and farming systems encountered. In most cases, information is best obtained by facilitating open-ended participatory discussions with one or two farmers, on their farms or in their villages. Here the farmers feel comfortable and the researcher can see the reality of the situation.

On-farm and within-village interviews may permit other family members (perhaps the spouse, children or elderly relatives) to be conveniently interviewed during the same visit. Care must be taken with joint interviews, as different household members may be inhibited from giving accurate responses. One way to avoid this is to have consecutive interviews with different family members or concurrent interviews (e.g., after a joint start, a woman researcher might interview female family members while a male colleague talks to the men).

Interviews will normally start with the researchers appreciating the time given up by the person being interviewed. The researchers should introduce themselves and any colleagues, and explain the objectives of the research, and their desire to gain from the ideas and experience of the respondent.

In most circumstances, formal questionnaires should be avoided as these encourage researchers to concentrate on passive data collection rather than active causal analysis. Questionnaires tend to focus discussion into a range of predetermined issues that are dealt with in a specific order, unrelated to the priorities of that particular situation. It is better to allow the farmers and researchers to explore the issues that arise spontaneously from discussions. It is generally best if a range of open-ended questions are used that encourage farmers (and other stakeholders) to talk from the outset about the issues that are of most concern to them. This can be followed up by questions that gently probe and cross-check the information, drawing on the team's own knowledge and observations. Detailed notes should be taken for future reference.

Large meetings with farmers, can be useful, but they are generally less informative than small, intense interviews. When a large group meet, discussion becomes slower and more formal. Instead of rapid progress through interactive and focussed dialogue, topics are dealt with slowly as people tend to give small speeches. There is little opportunity for rapid clarification of intriguing statements. Certain people dominate the conversation, and although many

people may be present, only some ideas are presented. Some categories of people (notably women) are often under-represented at formal meetings.

Nevertheless, one of the most effective means of learning is by listening (like a 'fly on the wall') to what people talk about to their close associates (family, friends, neighbours or colleagues). It is not easy for researchers to arrange this, for their presence is likely to inhibit genuinely free and critical discussion. However, if a researcher can arrange for farmers to debate among themselves certain aspects of animal traction, there is much scope for gaining new insights. Such moderated focus-group discussions can yield valuable new insights. They should be held for different categories of users or potential users and in addition to the individual interviews.

Current status, retrospective and predictive questions

In each interview a number of different but relevant issues should be tackled. To set the scene and to identify priority areas, farmers should be asked some general, open-ended questions. One of the most helpful introductory procedures involves asking the people being interviewed (farmers or officials) to describe the present use of animals in their area, and about the changes they have observed over the previous ten years. As the farmers describe and explain the changes that have occurred, they will invariably raise many issues relating to local constraints, and the evolutions taking place in the farming systems. Recent changes may well have been affected by supply constraints (capital, land, labour, animals, equipment), environmental issues (weather, disease, erosion), or socio-economic factors (migration, trading conditions, subsidies and credit, project interventions). The interviewers should explore some of the issues most relevant to that farmer. In some cases, people (particularly older people) may be asked to describe longer-term changes, so that an historical perspective on recent events can be obtained.

The persons interviewed may then be asked what changes they anticipate in the next years. Such questions can be orientated towards the farming systems in general or animal traction in particular or to important socio-economic or environmental concerns. The interviewees can be invited to consider the area in general or their farms in particular. This may lead to intense discussion on particular issues considered by the farmers of great importance to their future (e.g. availability of animals, labour, land or finance). They may be reluctant to make predictions, as what will happen in the future will depend on a whole range of issues (climate, prices, supplies, political stability). Some of these issues can be explored, and in the process, the interviewee will be identifying possible limiting factors and ways of overcoming these.

Each interview will be unique, and different topics will be explored. As the survey progresses and some key topics become well understood by the researchers, greater emphasis can be placed on exploring new issues.

Reasons for using animals, preferred options and social aspirations

Another useful line of questioning is to ask farmers why they use or own particular animals and whether they would prefer alternatives (different species, breed or sex). The questions may also relate to different management systems (feeding, age of training or culling), equipment and operations (different cart types, alternative tillage system) and to social and economics issues (gender-related uses, hiring systems). Farmers can be encouraged to explain the reasons for their present choices and what they would really like, if it were possible. The researcher may sometimes stimulate discussion by challenging (gently and tactfully) existing systems, and listening carefully to the farmers' explanations. Many insights can be gained in this way, as the logic of the farmer may be very different from that of the researchers. For example, farmers may acknowledge that certain animals or equipment can be more productive, but they will explain why they are not appropriate or affordable in existing conditions. In other cases, farmers will identify limiting factors, by saying they might change to an alternative if there was less theft, better market prices or more labour available.

Other people and other perspectives

Valuable information and understanding can sometimes be obtained by asking people to suggest other people's perspectives. Thus men (or women) can be asked about what they think is important to women (or men). Owners of animals can be asked the point of view of non-owners (and *vice versa*). Officials can be asked what the farmers may think (and *vice versa*). People with animals in good condition may be asked to speculate on the perspective of those with poorly maintained animals (and *vice versa*). Such types of questioning can often yield new information about attitudes and social pressures, as well as unusual explanations for observed practices.

Visual aids

A set of photographs (preferably A4 colour photos) can be used in conjunction with questions relating to

technologies with which the farmers (or the research and extension staff) appear unfamiliar. These often stimulate much discussion on technologies perceived by some farmers as innovative, for example in relation to the possible use of cows for work, horses for ploughing, donkeys for weeding or women for controlling oxen.

Information reliability and cross-checking questions

Researchers should treat with great respect the observations and comments of farmers and other informants. Their ideas and information will be the source of new insights and valuable research findings. At the same time, researchers must maintain a healthy skepticism in all situations. All the important assertions that are made must be cross-checked with actual observations and with information from other interviews (e.g. other officials, other farmers or family members).

People working in offices may well be living in a 'separate reality' to the actual users of animal power. They may, or may not, be aware of the true situation in the local villages. They may also have their own aspirations and agendas, in which animal power does not figure. Experience from many countries suggests that people working for development-related organisations may sound authoritative, although they are actually quite unaware of recent village-level trends relating to animal power (e.g. changes in utilisation patterns or gender issues). Thus researchers must crosscheck the pronouncements of officials with what they see in the field, and what the farmers themselves say.

Farmers and other users of animal power do not always provide accurate assessments of their true situations and opinions. Farmers may try to be polite and to impress. They may provide the answers and opinions that they think the researchers want to hear. They may over-state, or under-state, the true importance of animal power in their lives. They may give very gender-biased answers. They may have their own aspirations and agendas, and judge that they are most likely to gain external assistance if they say particular things. Experience from many countries suggests that farmers initially may praise a technology or idea, simply because it comes from an 'expert' researcher. They also tend to provide unrealistic 'wish-lists' in the hopes they may gain something.

To help assess the reliability of the information being provided, it is always a good practice to include a few 'check questions'. These can be questions for which the answer is already known. The person being interviewed may be invited to comment on (or agree with) a statement that is known to be incorrect. Another method is to rephrase an earlier question (perhaps using a negative form), and to see if the response is the same. If responses are incorrect or inconsistent, there is clearly a communication problem, and the reliability of the evidence may be in doubt. Check questions can also be used to test for gender biases and uncritical agreement with the researchers' ideas.

When responses appear to be unreliable, there may be scope for gentle challenging of assertions to help establish a clearer picture. The person interviewed can be asked to justify their point of view in the light of other evidence (personal observations and the opinions of other informants). It may be that the respondent is genuinely unaware of the true situation; it may also be the case that there is actually a new dimension to an apparently simple issue.

Visual evidence and personal observations

The researchers must be highly observant. Travelling in the region, within the villages and on the farms, they should make a point of looking at local farming and transport systems. They should note evidence of animal power use and also the lack of it (e.g. people undertaking activities that could be performed using animals). Observations should include the condition of animals and implements, environmental impact (terracing, erosion, etc) and the presence of alternative technology options (e.g. observed use of tractors). Researchers should get into the habit of making small, informal sample surveys as they travel, and should try to account for the differences they observe (e.g. differences in the number or types of ox carts, women using donkeys, or horses pulling seeders). Their observations should be put to local farmers to learn their reaction, and to see what explanations the farmers provide to explain the informal sample-survey findings.

Researchers should always ask some questions based on visual evidence, particularly when there seems to be discrepancies between interviewee's comments and personal observations. Examples of discrepancies that can be tactfully questioned include:

- A male farmer says there is no need for animals although the wife is carrying large loads
- A government official says there is little use of animals although observations suggest they are important
- Farmers say certain equipment is highly valued, when observations suggest it is little used (minimal wear, much rust, punctures, has been in one place a long time).
- Farmers say animal feeding and welfare is not a problem, when animals are in poor condition.

Final check and networking questions

Before each interview ends, the researchers should make sure that a range of issues have been touched on during the discussion and questioning. For simplicity, it is suggested that at least one topic is discussed (at greater or lesser depth) in each of the following four broad categories:

- Animal issues (e.g. animal species, supply, nutrition)
- Technological issues (e.g. operations, implement design and supply)
- Socio-economic issues (e.g. marketing, labour, gender, access to land).
- Environmental issues (e.g. soil conservation/erosion, environmental impact).

In addition, general 'networking' questions should be included throughout the survey (in institutions, in villages and along the roadside). People should be asked if they can suggest other individuals or organisations that have specific knowledge, expertise or skills that are relevant to animal power. They may suggest innovative or expert farmers, artisans, projects or local officials. Such questions can help track down organisations, individuals and locations likely to provide interesting information for the survey or any follow-up initiatives.

The persons interviewed should be given opportunities to ask the researchers questions. When they are thanked, their names and addresses should be recorded, so that they can be sent a copy of the survey report, and, if appropriate, copies of photographs taken.

After each interview or at the end of each day, the research team should review the key issues, the methods of analysis and summarise the lessons learned.

Potential problems

Social disparity

The researchers and the people interviewed may well fall into very different social categories, due to differences in their work, education, income, gender, age, language group, class, religion, ethnic background or other cultural characteristic. Researchers have to find ways of overcoming these potential barriers. The use of interviewers of comparable type (e.g. women researchers interviewing women farmers) may help, provided the researchers are sympathetic. However, the attitudes and general body language displayed by the researchers are generally more significant than the perceived socio-cultural differences. Whatever their social separation, people are more likely to talk honestly to people who convey a concerned and sympathetic interest in their situations.

Confidence

Some researchers (young and old) may find it difficult to cope with the 'uncertainty' of genuinely open-ended and questioning discussions. They may feel the need to reaffirm preconceptions and repeat things to the farmers that they have not actually observed, but have been taught elsewhere. Such 'facts' may even be affirmed by the farmers (out of politeness) and subsequently included in the research findings even though they have not been observed in the field or expressed by the farmers. This danger is also strong if translators have to be used, for they may filter out information they perceive to be 'wrong'.

Gender biases

In many societies there are important gender biases. Many animal traction researchers are male, brought up in male-dominated societies. Communities will often nominate spokespersons that are men. In many such situations, the individuals involved will not notice the gender biases, since they will feel such male-to-male discussions are 'natural' and reflect the 'normal' pattern of gender responsibilities in society. However, it is very important that possible gender biases are acknowledged, and attempts are made to counteract them.

Top-down approaches

Many national research and education systems have been based on the premise that the researchers, extensionists and academics 'know best'. Even if they have received training in participatory methods, most animal traction researchers involved in surveys will have had this 'top-down' background. It is very difficult for people to accept that what is clearly 'wrong' from a conventional academic approach (e.g. incorrect plough adjustment, animals in poor physical condition) may be logical and necessary from the point of view of the animal traction users. Their disapproval may be expressed through their body language or arguments.

The researchers should try to remember that in the past, national experts and conventional academic wisdom have frequently been proven wrong, and indigenous expertise has been shown to have rationality and validity. During this survey, the researchers should strive to understand the users' perspectives, personal needs, aspirations, preferences and logic. They may certainly probe areas where the users' practices differ from conventional approaches. However, rather than dismiss them, they should try to

understand the rationale behind them. Thus instead of reporting that 'ploughs are incorrectly adjusted' it should be reported that 'farmers do not adjust their ploughs in the conventional way because . . . '.

Prejudice against animal power

In most countries of the world, some elements of society perceive animal power as old-fashioned and backward. They aspire to motor power, and do not appreciate the continuing relevance of work animals. Some officials may imply animal power is unimportant. They may paint a very inaccurate picture. Even the users of animal power may be embarrassed to be considered 'old fashioned'. They may be reluctant to answer questions or they may give inaccurate answers. Both officials and farmers may give unrealistic predictions of the demise of animal power, because they aspire to motor power.

Lack of reliable quantitative data

Techniques for obtaining reliable and statistically significant quantitative data are not the same as those described here. If this methodology is followed, the researchers will develop a keen understanding of the key issues and limiting factors, but they will not have the quantitative data to back it up. Even if some basic quantitative data is collected (e.g. animal and implement numbers, operations performed and utilisation days) this will not have been collected from a randomised stratified sample, to allow reliable extrapolation. However such information, together with the knowledge of the area developed, should allow some intelligent estimates to be made.

If further quantitative data is required on specific topics, a questionnaire and randomised sampling procedure can be developed. It may seem extravagant to re-start data collection late in the survey process. However, at this stage, a small and manageable questionnaire can be developed for a small range of specific topics known to be important. Thus starting with the qualitative survey work should save time and resources, overall.

Seasonality

The information, observations and impressions obtained by this type of survey may differ depending on the season. At the beginning of a period of rains, the observations and discussions may relate mainly to tillage, while around harvest the emphasis may be on transport and marketing. In addition to the agro-ecological seasons, occasional markets, school holidays and election campaigns can influence work patterns and expressed priorities. Even the day of the week and the time of the day can influence what is seen and what is discussed. The researchers should be aware of this, and make a point of asking about seasonal differences. Researchers should undertake interviews at as wide a range of times, days and seasons as is practical.

Report preparation

In reporting the survey, the researchers will give details of their methodology and provide an overview of the area, its farming systems and key socio-economic and geographical features. The present status of animal traction will be presented, describing the various uses and giving estimates of scope and numbers where practicable. The roles of the main organisations associated animal power will be briefly described.

For clarity and simplicity, it is suggested that the discussion of the key animal traction issues be analysed in terms of four broad themes, which approximate to disciplinary areas (animal sciences, engineering, socio-economics and geography or ecology). This should ensure that many different biological, technological, environmental and human issues are addressed. However, while such themes may help focus the analysis, in reality there are no clear divisions when it comes to animal traction. Most animal traction issues are multi-disciplinary, interrelated and cross-cutting. Animal feeding (for example) depends on social, economic and gender issues, technology availability and the environment. Carts are not only a matter of technology since socio-economic requirements, environmental considerations and the characteristics of the available animals influence cart design and use. It is therefore important that the four broad areas selected for discussion do not restrict integrated analysis. Depending on the local circumstances, it may be more appropriate to address certain cross-cutting key topics as in an integrated way. For example, subjects such as transport, hillside farming, rice production, gender issues, farm incomes could be discussed as specific topics. In each of these (and other) subject areas, relevant animal, engineering, human and environmental issues would be raised as appropriate.

It is envisaged that most of the final conclusions and recommendations for addressing limiting factors will have arisen from the interviews. As this will have been a gradual, iterative process, the reaction of the main users and other stakeholders to the recommendations should have already been gauged during the survey. In this way, the report should truly reflect the ideas and suggestions of the communities surveyed.

Examples of available reports prepared from surveys using this methodology include Starkey *et al*.,(1991), Starkey and Mutagubya (1992), Starkey (1992), Starkey *et al*., (1995) and Starkey *et al.* (1995).

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