Participatory monitoring and impact assessment of sustainable agriculture initiatives

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1 discussion paper

Participatory monitoring and impact assessment of sustainable agriculture initiatives: an introduction to the key elements

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1 About this publication

The pressure is on to prove the effectiveness of efforts that claim to lead to more sustainable development. Over the past 15 years, funding agencies (be they government or non-government) have invested much effort, money and faith in participatory natural resource management (NRM). With the early experimentation period over, there is now growing attention to finding out how effective this work has been, fuelling an interest in participatory monitoring of such NRM initiatives. This interest is being further stimulated by a general push for better accountability and a need for more local level environmental information. Monitoring and evaluation are high on the agenda of most organisations, but few know how to respond in ways that generates useful information for those involved. Increasingly these organisations are looking to participatory monitoring as the way out. However, participatory monitoring is far from straightforward.

This document is a practical, methodological introduction to setting up a participatory monitoring process for sustainable agriculture initiatives. It was initially written to guide the first stage of an action research process on monitoring and impact assessment with small-scale producers, rural workers unions, and non-governmental organisations engaged in sustainable agriculture in Brazil. Those people and organisations remain its main audience.

After explaining the objectives of the research, this document introduces several central concepts and identifies key steps in developing a monitoring system. This is followed by a discussion on the complexity of indicator selection and choosing methods, showing a range of possible methods with examples from the agricultural sector. The paper

ends by reflecting on common pitfalls and specific difficulties faced in Brazil in starting up a participatory monitoring system for assessing sustainable agriculture. Annex 1 provides a description and visual examples of 20 participatory methods that can and/or have been used for monitoring change.

2 The growing interest in monitoring

Since about 1990, at least three trends appear to have greatly stimulated interest in participatory monitoring in the natural resource sector. Each of these trends has provoked interest in monitoring for a specific purpose, thus leading to a wide range of mixed expectations about what participation in monitoring can deliver.

The first, and arguably most significant trend, has been the huge surge of interest in participatory appraisal and planning, in general, and the natural resource sector, in particular (cf IIED 1987-; Chambers 1994, 1997; Selener 1997, Pretty 1996). Participatory natural resource management has become an accepted ethic and practice in hundreds of Northern and Southern development initiatives, with PRA-related work as but one of many similar methodologies being used in over 130 countries. A natural and logical extension of this has been rapidly growing interest in how to ensure wider participation in monitoring and evaluation of locally planned development projects (McArthur 1996; Estrella and Gaventa 1998; Abbot and Guijt 1998). The main purpose of participatory monitoring and evaluation (PM&E) arising from this trend is one of encouraging internal learning to further the objectives of empowerment and locally appropriate development that are central to participatory development.

A second trend relates to the desire to know if environmental regeneration efforts are worthwhile. Pressure is growing within funding and implementing agencies to prove that money granted and used for participatory environmental management is having the promised impacts. Monitoring progress and evaluating impacts have long been considered important to ensure that money is well spent and that objectives

are met. Initially, investments were made in community-based NRM efforts on good faith. Now that the honeymoon period of participatory NRM is coming to an end, funding agencies are asking advocates of such approaches to prove their many claims. They say that, given the large increases in expenditure on amelioration efforts, contributors to the funds (be they tax payers, paying members or the wider public) deserve to know if their money has been spent as promised. The main purpose of PM&E emerging from this trend is externally-driven accountability.

A third trend relates to a more general, global call for more information and more data to provide answers to environmental challenges. This was highlighted during the 1992 Rio conference, for example, in Chapter 40 of Agenda 21: *"Indicators of sustainable development need to be developed to provide solid bases for decision-making at all levels and to contribute to a self-regulating sustaining of integrated environment and development systems."* Many natural scientists have long aimed to provide information about environmental processes and trends to enable more appropriate interventions and warn of environmental change. With the quality of all life so clearly compromised by environmental degradation, there is an urgent call for ever more information via environmental monitoring to enable better planning of conservation and regeneration efforts. Community concern about the environment is also growing at a phenomenal rate. People want to know what is happening in their environment and if their efforts to improve it are effective. Yet the information that natural scientists provide is not always sufficient or appropriate, and their methods can be too costly and time-consuming to be useful for the many situations in which environmental information is required. Many organisations increasingly see that the only way this information can be obtained is through locally-driven monitoring processes, with more involvement of community members in collecting local environmental information. This points to a third key purpose of PM&E, that of providing relevant and specific local information for better strategic planning at different levels.

These three purposes, of more empowerment, better accountability, and improved planning, have created high expectations from many different quarters of what PM&E can deliver. Increasing community involvement in M&E is assumed to bring many as yet unproved advantages (Abbot and Guijt 1998), such as 'more local action', 'cost-effectiveness', 'more accuracy', 'more relevant information', and so on. These claims are similar to all that was promised of participatory appraisal and planning in its early days, and which are now proving to be tempered by the reality of slow and difficult social change[1].

Raising hopes about participatory M&E without a basic understanding of the limitations of what is possible is bound to lead to poor

1 See for example Guijt and Kaul Shah 1998, which discusses the lack of consideration of gender issues in much of what are claimed to be participatory development projects and programmes.

quality work and disillusionment. Not only are difficulties caused by the limited understanding of what monitoring and evaluation actually involves. It also arises from a lack of thinking through the methodological, institutional, and conceptual implications of bringing together multiple stakeholder groups in a participatory monitoring process. Each of these groups has different information needs, priorities, capacities, power to speak, norms for trustworthiness of information, and expectations of being involved. Each group, too, operates from its own sense and understanding about the predictability of change and the value of detailed planning. Combining these different realities and purposes of PM&E raises many questions.

For those organisations and agencies that are developing more sustainable forms of agriculture with farmers, monitoring represents further challenges due to the difficulty of the subject matter. Sustainable agriculture is much more than only developing a technological innovation. It includes creating new organisational alliances and new forms of communicating with widely different groups to increase the scale of impact of these innovations. As the task of creating sustainable agriculture has social, institutional, and policy-related aspects, several objectives can, and in many cases should, be monitored simultaneously. However, technological and environmental changes occur at a different rate than social, institutional, or policy changes, and are not all as tangible as, for example, counting the number of trees that have been planted.

This complex context presents a daunting task for many organisations. On the one hand, the temptation arises to monitor nothing or only the most straightforward of changes. After all, where does one start to make sense of the complexity? On the other hand, some organisations aim to monitor everything, in the hope that some of it can be translated into useful proof of impacts. In both cases, information is often irrelevant and inconclusive, and the monitoring system ineffective and not viable in the long term.

Yet without monitoring and evaluation, it is impossible to know:

- whether activities are being carried out as planned;
- how to improve the effectiveness and efficiency of activities;
- whether the activities are achieving the desired outcomes;
- whether the activities are having unanticipated negative impacts;
- how to convince others of the merit's of one's efforts, for example when influencing policy makers.

There are clearly many functions that monitoring can perform. It can provide information on the efficiency, relevance, sustainability, impact, effectiveness, etc of efforts. It can be a crucial learning opportunity, when insights about what has and has not worked is shared between those involved. It can also help mobilise human resources by increasing motivation as the merit of certain efforts becomes 'visible',

and can strengthen working relationships by the systematic and ongoing exchange of information. Thus essentially monitoring and evaluation is quite simply about communication for learning and decision-making. It is a process that is based on sharing information (see Box 1), thus making it essential to identify between whom information is shared and what information is worthwhile sharing.

Box 1. Monitoring as an information system

'Information is the essential raw material of policy formulation and decision-making. To achieve sustainable development, policy-makers will need to know where they are starting from; where it is they want to go; and when or whether they have diverged from their planned path ... Setting sustainability goals, assessing the current state of the environment, and monitoring the conditions and trends of relevant environmental sectors are information-hungry activities.

...

Monitoring for sustainability requires the creation of an information system. In its ideal form, such a system includes: identified users; a problem focus based on the user's information needs'; the collection of data at a temporal and spatial scale appropriate to the problem; data availability; reporting requirements; and a reporting function to the users, who in turn respond to the reports and fine tune their information needs. Without each of these parts ... an information system will fail to meet the information needs of the actors on the environmental stage.'

Rodenburg 1995: 77–80

Despite the obvious advantages, few organisations carry out systematic and useful monitoring of their activities, making overall impact assessment a difficult task. The challenge of a successful monitoring lies in designing a system of information collection, analysis and use that is systematic, valid and relevant. This task will require several rounds of trial and error and continual adaptation. Furthermore, it is only likely to be successful if certain conditions are met, such as clear understanding amongst participants of 'monitoring', sufficient interest in wanting to monitor, and the skills and means to monitor (Groot and Boon 1994).

The next section describes one context, in Brazil, in which participatory monitoring of sustainable agriculture is being undertaken. The work there involves an action research process in which the ideas and methods discussed in the remainder of this paper are being tested.

3 The challenge of monitoring sustainable agriculture

In January 1996, a workshop in Paraíba marked the beginning of research on participatory monitoring of sustainable agriculture activities in Brazil. The work is being undertaken in two locations: the dry northeast of Paraíba and the inland areas of Minas Gerais in central Brazil (see Figure 1). In both sites, the process involves small-scale producers, rural workers unions, NGOs (see Box 2) and the Sustainable Agriculture and Rural Livelihoods Programme of the International Institute for Environment and Development (IIED) in London, which is guiding and documenting the process in both locations.

The objectives of the collaborative research are threefold:

1. to develop and implement a systematic approach to monitor and evaluate the impacts of sustainable agricultural interventions;
2. to collect quantitative and qualitative data about the impacts of these interventions that are carried by AS-PTA and CTA-ZM, smallholder farmers, and rural workers' unions;
3. to generate discussion amongst other Brazilian NGOs of the PTA Network[2] working with sustainable agriculture about the prospects of monitoring their efforts.

By documenting the process of developing and implementing participatory monitoring and impact assessment methodologies in Paraíba and Minas Gerais over a period of three years, several outputs are envisaged:

- build local capacities amongst NGO staff, rural workers' union representatives, and farmers to continue developing, using and adapting monitoring as part of a continual agricultural innovation process;

2 The two NGOs involved are part of a Brazil-wide network of NGOs engaged in sustainable rural development, Rede PTA, which has 28 members.

- publications in Portuguese and English describing the process and pitfalls of establishing participatory monitoring and impact assessment systems within sustainable agriculture initiatives;
- greater understanding within the PTA Network of ways to establish effective monitoring of their activities.

Figure 1. Map of Brazil showing case sites

It is with the two organisations, AS-PTA and CTA-ZM, that the topics discussed below are being applied and the steps described are being tested. Their context provides a backdrop against which the specific examples and ideas offered in this paper can be placed.

Box 2. Partners in monitoring

Paraíba

- an NGO, AS-PTA (*Assessoria e Servicos as Projetos em Agricultura Alternativa*)
- Rural Worker's Unions (*STR: Sindicato de Trabalhadores Rurais*) in the two municipalities of Solânea and Remígio
- informal groups of farmers experimenting with similar innovations
- community associations

Focus: To set up a system of regular monitoring of key activities that can strengthen the process of developing technologies, the partnership between AS-PTA and STR, and the functioning of farmer experimentation groups and community associations. AS-PTA also wants to collect information to facilitate accountability requirements to funding agencies and to contribute to a national debate about alternative agricultural models in support of smallholder agriculture.

Minas Gerais

- an NGO, CTA-ZM (*Centro de Tecnologias Alternativas – Zona de Mata*)
- Rural Workers' Union in the municipality of Araponga
- Department of Soils, University of Viçosa

Focus: To monitor a collaborative initiative that aims to create a model for sustainable integrated municipal development, which has 28 separate activities ranging from alternative health provision (including medicinal plant use) to traditional maize trials.

4 Definitions

The first step in establishing a monitoring system involves clarifying key concepts. The existing literature demonstrates ongoing confusion about the definitions of 'participation', 'monitoring', 'evaluation', 'indicator', and even 'impact'. It is unlikely that consensus will ever be reached on what these words mean. However, this is not necessarily a problem – as long as these key terms are defined clearly within each situation and with the people who are to use them. Within the context of the Brazil research, and therefore this publication, the definitions and questions raised below are suggested as the basis for discussions.

4.1 Participation

In the context of participatory monitoring, many important questions need to be asked about the 'participants' (or 'stakeholders'). Who will participate in the monitoring and impact assessment, and what will their role be? What motivates different people to be involved? Whose interests should and does a monitoring process serve? What kind of local participation occurs in practice? And what is at stake for those involved? None of these questions can be answered, however, without considering what participation might mean.

Common use of the term 'participation' conceals enormously varying views about its aims and practice. In many situations, participation is ill-defined and meaningless when it comes to implementation. Participation often refers to very basic levels of consultation between agency or NGO staff and community members. It is often used in a normative sense, whereby anything 'participatory' is assumed to be synonymous with 'good' and 'empowering'. In practice, however, it

can hide development activities that are based on manipulation and even coercion.

The great diversity of interpretations has led to more sophistication in defining different types of participation[3]. Generally, these typologies distinguish between different types of participation in terms of varying degrees of control over development decisions and resources between the supposed 'beneficiaries or 'insiders' (farmers, women, etc) and the 'initiators' or 'outsiders' (project staff, planners, researchers, etc).

3 For several typologies of participation see: Arnstein 1969; Biggs 1989; Oakley 1991; Guijt 1991; Adnan et al 1992; Hart 1992; Stiefel and Wolfe 1994; Cornwall 1996; and Selener 1997.

Despite their usefulness in breaking down simplistic thinking about participation, such typologies are limited in several ways (Guijt and Kaul Shah 1998) that make their use to design monitoring and evaluation processes problematic. First, they imply that the level of participation of all participants can be determined at the beginning of an M&E process, and will not change. In most realities, there will be fluctuating intensity of involvement of different groups over time in different monitoring tasks (such as data collection, analysis, dissemination). A second limitation is that the typologies make a simplistic distinction between insiders and outsiders, or 'farmers' and project staff. This hides the reality of high levels of participation by some and none by others within the same group. Viewing all local people as 'insiders', for example, clearly perpetuates a simplification of differences that exist between landed and landless farmers, women and men farmers, etc. For monitoring this means that a supposedly 'participatory' indicator development process may involve farmers but they might all be men, thus hiding women farmers' vital perspectives. A third problem arises due to the judgmental nature of the typologies, the terminology of which includes words like 'coercive', 'manipulation', etc. By expressing negative opinions about less comprehensive forms of participation, they imply that it is possible, desirable, and necessary for everyone to achieve the most intense form of participation irrespective of the situation. However, not everyone will be willing, able and interested to commit themselves to what can be quite conflictual and tedious processes. The local political context will usually strongly influence what is a feasible intensity and form of participation of farmers (see Box 3). Therefore, the likelihood and desirability of achieving 100% local participation in monitoring processes are myths that need to be forgotten.

Many examples of monitoring and evaluation – even those claiming to be 'participatory' – are processes in which outsiders determine indicators, analytical frameworks, and/or reporting frequency and styles. In such cases, local participation is reduced to local people only having the role of collecting information. In a more participatory process, local people can, for example, be involved in designing the system. Time would be spent to clarify and negotiate the goals of the monitoring with them, so that everyone knows what to monitor and why it is

happening. Monitoring methods or instruments would be based on locally available skills and resources and/or would be designed together. It would also mean that data is collected, compiled, analysed and used by those who are affected by the sustainable agriculture activities being monitored.

Box 3. Appropriate levels of participation

AS-PTA knows that farmers will be the managers of ongoing innovation and change, so logically they must also be involved in the whole process of technological development and implementation. Yet the team recognises that not all farmers are equally interested and/or able to participate in all aspects of agricultural innovation. Therefore, it is working with three levels of farmer participation:

- A core of about ten farmers ('*animadores*'[4]), affiliated with and often elected representatives of the rural trade unions. They are involved in strategic planning, farmer-based experimentation data analysis, and designing/implementing the monitoring and evaluation process.
- About 80 farmers, men and women, including community association leaders and individual farmers engaged in joint experimentation. Almost all of the farmers are also involved in key moments of monitoring, evaluation and planning.
- Activity-specific collaboration with the general farming 'public' and community associations, covering over 30 communities and between 400 and 500 farmers, who are keen to adopt particular measures and with whom the monitoring/evaluation findings will be shared.

Source: adapted from Sidersky 1993

4.2 Monitoring

A certain level of monitoring is essential for many activities and is often carried out without being called 'monitoring'. For example, a farmer inspects a crop to decide what she/he needs to do to improve the yield, or a consumer might check how much money remains in his/her bank account to know whether it is possible to buy something. We monitor when we buy groceries (prices and availability), go for a walk (our own fitness, the beauty of the route we are following), take our children to school (children's and teachers' behaviour, condition of the school grounds), and so on.

In this publication, monitoring refers to *the systematic and continuous process of assessing the progress and changes caused by the implementation of an activity over a certain period of time, usually using pre-determined indicators or recurrent questions.* While this definition focuses on monitoring environmental improvement activities, another major area of environmental monitoring involves assessing biophysical phenomena independently of a specific development activity, such as the weather, presence of birds in an area, water quality etc. This type of monitoring is also increasingly involving community members (cf Alexandra et al 1995) but will not be the focus of this publication nor of the research project in Brazil.

4 Animadores are members of the Rural Workers' Union who dedicate an important part of their time to sustainable agriculture activities. They organise meetings and learning trips, visit experimenting farmers, train seed bank members, etc. For this, they receive a small salary from the Union (with the help of Project Paraíba's budget).

Although monitoring has many purposes (see Box 4 and Section 1), the literature suggests that it is generally viewed as part and parcel of sound project management, to help those involved make decisions that increase project effectiveness and efficiency. The assumption is that systematic analysis of activities and their outcomes strengthens the capacity for solving problems related to the implementation of planned interventions. It can help identify where adjustments should be made in plans, schedules and/or budgets. Monitoring also help provide proof of the value and effectiveness of the interventions and, subsequently, can play a role in advocacy or in fulfilling accountability needs to funding agencies (both foreign and local, for example banks). Therefore, a common distinction in a project context is made between 'monitoring the process', ie the implementation of an activity, and 'monitoring the impact', ie the longer term outcomes of the implemented activity.

Box 4. Purposes of PM&E

- impact assessment
- project management and planning
- organisational strengthening or institutional learning
- understanding and negotiating stakeholder perspectives
- public accountability

Source: Estrella and Gaventa 1998

When designing a monitoring system, it is necessary to establish what information is relevant, how it should be collected, analysed and interpreted, and who should be involved in each phase. These decisions depend on the objective of the monitoring exercise, the scale and structure of the activity to be monitored, and the available resources.

It is clear that decisions about who should be involved at what stage is what will make the monitoring approach more or less participatory. Local people are often only involved as collectors of information. In this publication, participatory monitoring refers to processes that involve end-users of information in designing the monitoring system, and in collecting, analysing, compiling and sharing the information. However, as mentioned above, while this may be fine in theory, in practice full participation is impossible and may even be undesirable for those involved. One can ask, for example, if it is necessary and appropriate for farmers to measure indicators that are of interest and relevance only to NGOs. Therefore it is essential for each participating group participating to be clear about with which aspects of monitoring

it does and does not want to get involved. The exact role of all those involved will require explicit and ongoing negotiation and discussion.

4.3 Evaluation

Evaluation, like monitoring, has many different meanings. The word 'evaluation' is rather confusingly used to describe feasibility studies which provide baseline information, as well as periodic assessments (similar to the term 'monitoring') for assessing short term impacts, interim reviews, and longer term impact reviews. Usually, however, the term evaluation refers to *a process of identifying the broader positive and negative outcomes of an activity or process to reach a conclusion about its overall value and whether objectives have been met.* Often such conclusions relate to longer term objectives, such as effectiveness, equity of impact, sustainability, and cost-effectiveness.

In contrast with monitoring, which establishes with a certain frequency what the outputs (desired or not) are of an activity, an evaluation process will try to assess how these outputs contribute in the longer term to the intended objectives, ie the outcomes. Therefore evaluation is usually much less frequent than monitoring activities and is undertaken some time after an activity starts to allow for changes to occur and assessments to be possible (see Box 5). If monitoring data are available, it is a helpful input for evaluations.

Box 5. Monitoring or evaluating maize?

Two farmers are growing maize. One farmer observes her fields regularly. When diseases appear, some biological pest control substance is applied. The harvest is good and the farmer is happy. The second farmer does not observe the field during the growth period. When harvest comes, she is shocked to see that most of the harvest is lost. Monitoring (continuous observation and correction) is practised by the first farmer and not by the second farmer. Both may evaluate at harvest time, reflecting on their strategy and actions and planning for the next period.

"Monitoring is a process of systematic and critical review of an operation with *the aim of controlling the operation and adapting it* to circumstances.

Evaluation involves the comprehensive analysis of the operation with the *aim of adapting the strategy and planning* to circumstances."

Source: Gohl et al 1993:8 (original emphasis)

Monitoring provides information for better management of the crop while evaluation provides information for better objective setting or choice of crop/off-farm enterprise.

Source: Fithriadi 1996:29

People are often apprehensive about evaluation processes, fearing that they are being judged personally on their performance. Indeed there are many cases where conventional evaluations lead to some type of

change that is perceived as negative. Also, as Uphoff (1991) writes: 'There has been a tendency to assign evaluation to the domain of experts by calling for it be very '*quantitative*' and '*objective*'.' However, it is increasingly the case that organisations are viewing self-evaluation as crucial for capacity-building and to ensure ongoing reflection and learning by its staff, rather than as an strategy to exert control or power over them. Alongside this is the realisation that, for learning to be optimal, it is particularly important to design participatory evaluation processes.

As with monitoring, evaluations can focus on various aspects of an intervention: the uptake or sustained use of an agricultural innovation; degree of equitable impact; environmental impact; economic impact, etc. What can be evaluated will depend on the type of intervention, the people involved, and on the timing (sooner or later after the intervention has started). Generally, however, evaluation processes aim to establish:

- a summary of the activities that took place;
- whether the activities achieved the desired objectives;
- to which extent these activities had a beneficial or detrimental impact on the lives of the intended beneficiaries;
- whether the impact is likely to be sustained.

Again as with monitoring, it is possible to evaluate agricultural projects in a more or in a less participatory manner depending on who is involved in what part of the evaluation process. Farmers can be involved in determining the aims of the evaluation and designing the process from aims to methods and use of findings (cf Bandre 1998). Or they can simply be involved in data collection from others or to provide the data themselves, as is often the case.

4.4 Indicator

Indicators are central to most monitoring approaches. An indicator is simply an aid for communicating complex processes, events or trends to a wider audience. It is *a quantitative or qualitative characteristic of a process or activity about which changes are to be measured.* For example, a road sign tells you the distance to a certain location – it is an indicator to establish how far you have travelled and how far you still have to go. One example comes from the residents of Seattle (USA) who chose 'the number of wild salmon returning to spawn' as an indicator of overall watershed health (Sustainable Seattle 1995). In Uganda, community members chose 'the incidence of families eating certain bananas that are normally reserved for brewing beer' as an indicator for the extent of hunger (Rennie and Singh 1996).

These examples show that an indicator is only meaningful to someone if it relates directly to the information they need and if they know how to interpret or 'read' its meaning. Indicators are always only a

proxy for a more complex reality, and therefore must be relevant enough and accurate enough – rather than perfect.

By measuring or assessing the same indicator over time and identifying a change in the value of that indicator, progress or deterioration can be measured. For example, 'the number of people trained in the control of banana weevil' is a quantitative indicator of a training programme. If 100 are trained in the first year and 124 in the second year of a training programme, you know that progress is good (assuming that you are trying to train as many people as you can). However, it does not tell you anything about the quality of the training nor whether the new knowledge is being applied by those who were trained. To find out that kind of information, you will need to use other indicators that allow qualitative or longer-term outcomes to be assessed.

A common pitfall (also see Section 8.1) in setting up a monitoring process is selecting too many, ambiguous, and/or irrelevant indicators. To avoid this, careful selection of indicators is essential. Alternatively, a system can be chosen that is not based on indicators (see Box 6). However, in this document, the focus is on indicator-based monitoring.

Box 6. Monitoring without indicators?

A particularly innovative example has been developed by the Christian Commission for Development in Bangladesh (CCDB). Each credit group funded by CCDB reports, on a monthly basis, the single most significant change that occurred amongst the group members related to: people's well-being, sustainability of people's institutions, people's participation, and one other open-ended change, if they wish. The report asks for the 'facts' (what, when, where, with whom) and an explanation of why that change is the most significant one of all the changes that have occurred. This last aspect ensures a process of reflection and learning by the group members, an aspect that is missing from most M&E systems that seek numeric data without any interpretation of the numbers. So instead of pre-determined questions, CCDB's monitoring aims to find significant examples related to its long-term development objectives.

Source: Davies 1998

Indicators are best selected after carefully considering what information is needed for which group of people. If a sustainable agriculture initiative is being monitored, then it means being very clear about what that initiative aims to do – ie its objectives. Indicators can only be identified once consensus exists about the objectives but even then several indicators may be appropriate to measure each objective (see Box 9, Section 6). Also, most activities have several objectives (shorter-, middle-term and longer-term). For example, a project aiming to encourage farmers to plant along the contour will have a short term objective of 'training as many farmers as possible', while the long term

objective might be 'decreasing soil erosion'. As it would be too costly and time-consuming to monitor them all, it will be necessary to prioritise which objectives are to be monitored before identifying appropriate indicators.

Section 5 discusses indicators in more detail.

4.5 Impact

Impact can mean many things but, in the context of a project, it generally refers to the effects of an intervention on its physical surroundings, the people involved, and/or organisational context. It is used to refer to short term *outputs* or *products*, medium term *results*, and longer term *consequences* or *outcomes*, which can cause confusion. For example, intercropping pigeon pea has as its direct, immediate output – dry season fodder for livestock, as its middle term impact – increased nitrogen content in the soil, and as its longer term, indirect outcome – increased income and decrease in soil erosion.

In many cases of impact assessment within development projects, impact refers to the longer term results of an intervention. As the period over which impacts are assessed can be wide-ranging, it is important to clarify what types of impact will be assessed in each monitoring situation with those involved, to avoid confusion about immediate versus longer term changes.

Project impact assessment consists of two basic elements: tracking changes since the start of the intervention, and establishing the causes of these changes and how they might be linked to the intervention (Berlage and Stokke 1992). This publication refers mainly to the first element: how to start tracking relevant types of changes. Establishing cause-effect linkages is more complex and is not as simple as comparing 'before' and 'after' situations, as many other external influences will have occurred and affected the situation simultaneously.

Casley and Kumar (1990:117-121), for example, explain how easy it is to create a misleading figure about production gains – a very basic type of impact that many agricultural projects seek. Annual variation of rainfall is a major cause of changes in production figures, and even in irrigated areas available water fluctuates by 15-20% annually. The average coefficient of variation around cereal production trends from several countries is in the order of 15 %, they say. Trying to detect if an intervention has increased production yields by 4% for example would become a highly dubious statistical exercise unless many years of reliable yield data can be collected. This is usually beyond the life span of most interventions, not to speak of the resources that this would require. Casley and Kumar conclude: '*... the determination of yield or production trends [according to strict statistical requirements] in rainfed smallholder farming areas may be impossible within the implementation periods of most projects*' (p 119).

Another option is to compare 'with intervention' and 'without intervention' situations, in the hope of establishing clear causal links. However, obtaining data for the 'without' situation can be time-consuming and costly. Furthermore, in participatory programmes, it can be very difficult to obtain. Farmers who are not adopting certain measures are unlikely to be willing to monitor their farms or to have them monitored by other farmers (see Box 18 in Abbot and Guijt 1998). Usually, any changes that are observed in with- and without-intervention cases will need to be discussed and analysed in detail in order to make any relevant or sensible interpretations of impacts caused by interventions.

Much can be learnt from the unexpected. An important feature of thorough monitoring and impact assessment processes is being able to identify the unexpected outcomes of an intervention. This is where the use of pre-determined indicators quickly becomes quite restricted as pursuing only these will preclude valuable learning experiences that occur from seeing the unknown, the unplanned and the unexpected. Certain methods are particularly helpful for allowing the unexpected to surface, such as impact flow diagrams (see Annex 1).

A final comment is needed about the accuracy of impact-related information that is being sought. Often excessive accuracy of data is pursued when approximations are enough. Chambers (1997:38–42) discusses how measurements often mask 'bogus precision' and that judgements and opinions are usually good enough: "*What often matter are judgements of trends and of relative amounts, and insights into causality*" (page 41). He urges people to aim for 'approximate precision' as well as accepting 'optimal ignorance', or knowing only what you need to know. When thinking about impact and the accuracy with which impacts need to be known, the adage 'it is better to be approximately right than precisely wrong' can be a useful reminder about what is important – as long as approximations are not distorted and presented as more precise than they in fact are. The accuracy with which impacts need to be known determines what unit of measurement is required (see Box 7), and thus strongly influences the final choice of indicator and method (see Sections 6 and 7).

Box 7. Accuracy and units of measurement

Farm Activity — Terracing and hedgerows

Objective — To maintain soil fertility by reducing erosion and provide an adequate source of green manure from the hedgerows for soil fertility

Priority Indicators and Unit of Measurement

- level of soil erosion –> little, much
- water retention capacity of soil –> very good, good, bad
- quantity and quality of green manure from hedgerows –> enough, not enough, very little

Farm Activity — Plantation of ginger

Objective — Generate Rp. 500,000 net income from ginger grown on 0.5 ha after 8 months

Priority Indicators and Unit of Measurement

- quantity of ginger harvested –> kilogram
- quantity of ginger marketed –> kilogram
- expenditures for input for lime –> rupiah (Rp)
- income from marketing –> rupiah
- time for harvesting and marketing –> number of months

Source: Fihriadi 1996

5 The key steps[5]

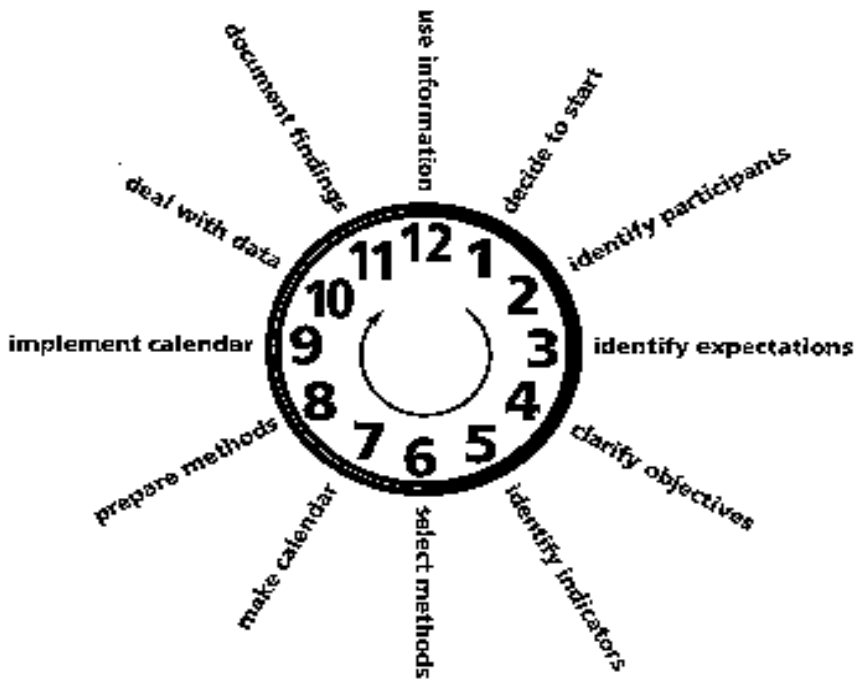
Planning an indicator-based approach[6] to participatory monitoring involves answering a series of questions and some basic steps. This process can be visualised as a cycle (see Figure 2) with answers needed for each question before implementation of the monitoring process can start.

The steps do not, however, necessarily follow each other in a strict sequence. For example, the formulation of objectives and the identification of the indicators will be an iterative process. The objectives form the basis for the selection of indicators, and the indicators help in formulating objectives more clearly. An objective might initially be 'to reduce soil loss' but if the indicator 'tonnes of soil lost per hectare per year' is not feasible to assess for technical or financial reasons, a more realistic indicator might be 'number of hectares under contour planting'. This means the objectives being monitored might need to be adjusted to become more realistic as well, such as 'increasing area planted under soil conservation measures'. The difficulty of directly measuring (change in) soil loss may well be overcome by discussing with farmers what local indicators of soil loss they commonly use.

The final choice of indicators will also depend on what is possible to achieve with the methods. Some ideal indicators may be difficult to match with a reliable or feasible method of measurement. For example, while the preferred choice of indicator may be 'nitrogen content of the soil', measuring this might be too expensive and time-consuming for an organisation. In these circumstances, an alternative indicator may need to be found, or the method of measuring nitrogen may require adapting.

5 Inspired by Pietro 1983; Feuerstein 1986; Mikkelsen 1995; Narayan 1993.
6 While indicators might seem a prerequisite for any monitoring approach, one example with a different perspective is described by Davies 1998. Therefore, these steps do not represent the only way to set up a participatory monitoring process.

Figure 2. The key steps in setting up a monitoring system



1. *Make the decision to start a participatory monitoring process.*

This is not a decision to be taken lightly. Many consequences arise from opening up the choice of indicators, methods and analysis to include a larger group of people with different views. A participatory process means working with several different (groups of) people. The more people there are, the more complex and expensive the process usually becomes, and the longer it may take to negotiate compromises. Also, clarify what it is hoped a participatory monitoring process can achieve that would not be possible with an externally-driven and implemented approach. In some cases, project staff may need information that would simply be a waste of local people's time to collect. In that kind of situation, participatory monitoring may not bring any additional benefits

2. *Identify possible participants.*

Make a list of people or groups involved with the agricultural development activity that is being monitored. Who has a perspective or knowledge that is essential? Whose capacity for monitoring should be strengthened if sustained monitoring is desirable? Invite all the relevant groups/people to join the monitoring process, explaining that all steps will be negotiated with everyone. These questions will need to be repeated regularly during the process as those involved in the activity being monitored might change.

3. *Identify what each of the participating groups expects from the monitoring process.*[7]

Discussing people's objectives of the monitoring – ie why they are

7 The objectives of the monitoring are distinct from the objectives of the activity being monitored. For example, if the development intervention is 'revegetating degraded land', then the monitoring objectives might include 'assessing the impact of revegetation on catchment health' and 'motivating local people to maintain revegetated areas by involving them in assessing the sustained impact of their efforts'.

interested in monitoring and what they hope to get out of it – will help clarify to what extent each group is willing and able to participate in different tasks. It can also help to motivate participants in the systematic work required. An outcome of this stage is the clarification of who would like to be a 'partner' in the process. This might seem like a repeat of the first step, but who participates should constantly be reassessed during the process. Equal interest in all the different tasks cannot be assumed.

4. *Clarify (or identify) the objectives of the work being monitored.*
Normally, project objectives will be formulated in a prior planning phase and should be clear and available to everyone (usually in written form). However, in the context of participatory monitoring which involves more than one group, project objectives are not always specific or shared enough to allow for joint monitoring. These must first be understood and clarified, and agreement reached.

5. *Identify and select indicators.*
This is likely to be one of the most difficult steps as each objective can be measured or assessed with many different indicators (see Section 6 below). The choice of indicators will depend on several factors, particularly the availability of data and the ease with which it can be recorded. One common way to help clarify whether an indicator will work well is to see it if is 'SMART': Specific, Measurable, Attainable, Relevant, Timely.

6. *Selection of methods.*
The choice of method depends on the indicators, available time, skills, technology, and resources. It may well be possible to find one method that can be used to assess several indicators at once. As monitoring requires assessing as well as recording information, for each indicator methods of collecting, registering, analysing and sharing the information should be considered.

7. *Decide frequency, timing, and responsibility of monitoring.*
To get the best quality and most useful data, it is important to identify the key moments in the year when each indicator is best measured. One obvious example is yields, which are best assessed at harvest time and can be measured immediately or shortly after harvest by asking farmers. The frequency of measurement will also need to be determined and depends on the rate of change of the indicator. Social changes happen at different rates than biophysical changes or institutional changes. For example, if weather is to be measured, daily measurements are necessary. If attitudinal changes regarding pesticide use are to be assessed, then monitoring once every 6 months might be sufficient. If soil loss is to be measured, then frequencies will depend on the frequency and timing of rains and the winds.

At this stage, it is also essential to clarify the following questions, the answers to which can be compiled as an 'annual monitoring calendar':

- who is going to collect and register which bit of data;
- who is going to collate data;
- who is going to analyse data;
- who is going to disseminate the final findings, how are they going to do it and with whom will they share it;
- where is it going to be carried out (which community/field, what is the sample size);
- with which method;
- when will all this happen (how often and which month/week/day).

8. *Prepare and fine tune the methods.*
Test the methods and any tools that are to be used for measuring the indicators to ensure that they are relevant, practical, trustworthy and feasible to apply. Consideration should also be given to training those who will do different parts of the monitoring to enable them to be confident with carrying out their tasks to the standards required.

9. *Systematic implementation of the monitoring calendar.*
It is important to be systematic in the collection of data in order to understand what changes are occurring where and when as soon as they occur. It is impossible to obtain an objective picture upon which to base an understanding of cause and effects without comparable data or information. For example, monitoring plant growth every week for two months, then stopping for two weeks before starting again, will not provide a useful record from which to assess if plants are growing at the expected rate. However, systematic monitoring has to be balanced with flexibility. It may be necessary to adjust some methods or indicators during the process if it becomes obvious that they are not going to provide relevant or accurate information, or if external factors change. Therefore continual review of the relevance of the information or validity of methods should happen as the monitoring is being implemented.

10. *Dealing with the data.*
After data is collected, it needs to be collated, analysed, and shared with the relevant people or groups. As far as possible, those who participated in the data collection (and even those who are to use the information) should take part in the analysis to avoid misinterpretation of the data and findings.

11. *Documentation of the findings.*
The content of the findings and the format in which they are to be presented will depend upon the target audience(s), or end users of the information. It is possible that the same data and findings may be presented to several groups but they may need to be reformulated or presented in different ways to make them meaningful for each case.

12. *Using the information.*
Finally, the data and analysis should be used by each relevant group in decision-making processes, to solve problems, and/or for the planning

of future activities. The findings of the monitoring may be used to reorient the objectives/plans/projects of farmer experimentation groups, rural worker's unions, NGOs, funding agencies, researchers, and/or policy makers where appropriate, to improve the achievement of objectives or limit unanticipated negative impacts.

6 Indicators

As indicators are so central to monitoring and identifying them is a complex process, this section discusses the process of participatory indicator identification in more detail.

For any single activity, there are endless possible indicators to monitor progress and many ways of classifying them. For example, indicators can indicate changes in:

- the presence of something (eg numbers of seed banks or farmer-led field trials);
- the type of access to an innovation or new service (eg are the worse-off or the better-off participating in new crop trials?);
- the level of use (eg the frequency with which each farmer uses a rotating fund or other credit source);
- the extent of an activity or coverage (eg number of members of the bank or number of people involved with maize trials);
- the relevance of the agricultural innovation (eg do seed banks resolve a key production bottleneck or not?);
- the quality of an innovation (eg the quality of seeds in the seed bank or the effectiveness of an integrated pest management approach to banana weevil control);
- the effort required to achieve some change (eg the labour required for new land preparation based on contour line ploughing).

Selecting indicators is probably the most difficult step in establishing a participatory monitoring system. First, this is because each activity (and each objective within each activity) can be monitored using a range of different indicators. This depends on which aspect (see list above) or over which time period changes are being tracked (short,

middle, and/or long term). Second, the chosen indicators are likely to change over time as the external environment changes and as project objectives and activities are adjusted. Therefore indicators must be reviewed regularly to ensure that they are providing information that is relevant. Third, bringing different people together in a participatory process to select indicators reveals their different information needs and expectations of monitoring (see Box 8). It also provokes discussions about what each considers is 'trustworthy' information.

Box 8. How participation influences indicators

Different communities or groups will give priority to different indicators because of their different experiences, social contexts, and information needs. The choice of indicators is also likely to be influenced by differences in gender, age, and social or economic status (eg a farmer who employs labourers versus a farm labourer). The more communities or groups that are involved, the wider the variety of indicators that may be identified.

Who to involve in indicator selection will depend on what is being monitored and for what purpose. Often, the extent to which project or programme aims are being met must be reported to funding agencies and is essential to improve project management. Take for example, an NGO working with a Rural Worker's Union, farmer experimentation groups, and community associations to develop more sustainable forms of agriculture. In this case, the different groups first have to agree on project objectives after which indicators are selected that correspond with those objectives (Guijt and Sidersky 1996).

Decision makers at every level and scale will find very different kinds of indicators relevant to their decisions. Therefore, reaching a consensus about objectives and indicators will usually require negotiation. For example, municipal-level development programmes in Ecuador involve many different kinds of farmers and other natural resource users, indigenous assemblies, community associations, government extension staff, municipal councillors, and even international funding agencies (Torres 1997). Each operates at a different scale with more immediate and local or longer-term and broader objectives. In practice, they may agree on a wide range of indicators but then may wish to divide data collection roles before collectively analysing the findings. Or they may wish to collect and analyse everything together.

Source: Guijt 1998

6.1 The subjectivity of indicators

If multiple and diverse views of reality are recognised as fundamental in participatory monitoring, then the idea of 'negotiated', rather than pre-defined and 'objective', indicators becomes relevant. Realising that indicators are usually negotiated and subjective highlights that monitoring data will only ever show a partial view on the world. Clearly then, an indicator is simply a means to help communicate complex changes to a wider audience. Indicators describe and express conditions and often require some kind of simplification or approximation of a situation. It often means reducing data to a symbolic representation of a programme/project objective that is relevant and significant

for the people who are going to use the information (see Box 9). Therefore, the most crucial question to help select indicators is understanding who the end-users and end-uses of the information are: 'Will this indicator enable us to find information that can help us solve the problems we have identified and to give those we want to communicate with credible and relevant information?'. As indicators usually need to be communicated, they must be represented in some kind of language or format that is common to those who are to use it.

Box 9. Indicators as simplifications of reality

A sustainable agricultural development project in the Philippines had as its overall goal: helping farmers in the integrated management of farms (animal husbandry, agroforestry, and fish farming) to achieve more sustainable systems. As it was not possible to measure everything related to 'integrated management' and 'sustainable systems', the following indicators were chosen as simplified descriptions of four key objectives:

- economic efficiency: net profits of the family
- biological matter recycling: number of bio-resource flows generated on the farm
- species diversity: the number of individual varieties cultivated or used
- natural resource capacity: derived from dividing biomass output (in kg/ha) from all natural resource types by the number of system resources.

Source: Lightfoot et al 1993

6.2 Types of indicators

A simple way to organise indicators is to identify those which measure the success of the implementation of the activities and those which measure their outcomes. *Process* or *output indicators* measure how the activities were planned and implemented. *Impact* or *outcome indicators* measure the effect of the activities in terms of its ability to meet its objectives. Tables 1 and 2 and give a simple example of the difference between output and outcome indicators for training farmers in pigeon pea intercropping.

Table 1. Possible output indicators of a training course on intercropping pigeon pea

Steps in process	*Output-related indicators*
• diagnosis of training need	• number of farmers interested in testing pigeon pea
• preparation of workshop	• number and diversity of farmers consulted on desirability of a training workshop on pigeon pea intercropping
• implementation of the training activities	• number of training meetings held in the way and at the time planned
• quality of the training courses	• qualitative evaluation by the participants
	• the level of participation in the discussions

Table 2. Possible outcome indicators of a training course on intercropping pigeon pea

Shorter to longer term impacts	*Outcome-related indicator(s)*
• learning impact for participating farmers	• the number of farmers aware of the advantages and disadvantages of pigeon pea and how to plant it
• extent of application of new knowledge	• the number of pigeon pea plants in the fields of the trained farmers
• outcome of applying knowledge	• an increase in the yearly milk production for those cattle fed on the new pigeon pea crop
• sustained achievement of the objectives	• an increase in milk production continues for several years and an increasing number of farmers
• wide-spread relevance of the innovation	• number of farmers increase planting pigeon peas and/or keep the existing plants • number of farmers not originally trained starting to use pigeon peas, as they find out about the potential benefits

Differentiating between the process of implementing an activity and the longer term impact, or outcome of that activity is only one approach to find out which indicators are most relevant. A more detailed version of this process would first involve developing an objective tree, which links more immediate to longer term objectives (see Table 3), and then finding indicators for each level of the objectives. One common distinction is to identify four different levels of 'impacts' for which to select indicators:

- *inputs* resources used in the activities (eg money, labour, seeds);
- *outputs* the immediate product after using the inputs;
- *outcomes* the consequences of the outputs afterwards;
- *impacts* the broader and longer term aims.

Understanding the different levels and time periods that an indicator

can relate to is critical, as monitoring often focuses on the immediate, more tangible, and easily accessible information like 'the number of farmers trained'. Yet to know if training efforts are worthwhile, the effect of those trained farmers on their fields and households is essential.

Table 3. Four levels of objectives and related indicators for a workshop in pigeon pea intercropping

	An objective tree (hierarchy)	Indicators
Input	hold a training course (venue, materials, facilitators, knowledge, participants) ↓	the extent to which all the inputs were provided as planned if the training course took place
Outputs	trained farmers ↓	number of farmers trained
Outcomes	participants may apply their knowledge on their own field and/or teach other farmers who adopt the technology ↓	the number of people who are intercropping pigeon pea and attended the workshop plus those who did not attend
Impacts	changes to quality of life arising from cultivation of pigeon peas	• increased milk production from cattle fed on pigeon pea • increase in yields of subsistence crops (due to improved soil quality after nitrogen-fixing takes place) • income from crop surplus

To avoid ambiguity and problems of validity and reliability, indicators should ideally be as specific as possible and include:

- the objective or target it is aiming to achieve;
- the characteristic that will be measured;
- the time interval;
- spatial coverage.

For example, selecting an ambiguous indicator such as 'improved soils' will lead to much confusion when selecting methods, as many aspects can be measured that relate to 'improvement': soil fertility, depth of soil, moisture content, soil erosion, etc. A more useful indicator would be, for example, 'within two years, 50% reduction in the number of visible soil sedimentation spots in each field'. This indicator

clearly states what will be measured – visible soil sedimentation spots; the expected standards and time frame – 50% reduction in two years; and the location – each field.

Another distinction that is commonly made is that between qualitative and quantitative indicators. Quantitative indicators provide numeric information, while qualitative indicators give statements that convey opinions and experiences. The strong focus of conventional monitoring on quantitative data has led many people to urge for more use of qualitative indicators as they feel these provide more in-depth information. However, both types of indicators are quite interchangeable and compatible. For example, to assess the quality of training farmers in a new agricultural technology, it is possible to gather the opinions of farmers who attended the course and make lists of their views about strengths, weaknesses, and areas of improvement. Alternatively, a more quantitative approach would be to ask the farmers to indicate whether they are satisfied with the quality of the training on a scale of 0 to 5, and then count the numbers of farmers in each category. Therefore, almost any topic that needs to be monitored can be assessed using either quantitative or qualitative indicators – it is simply a matter of what kind of information is needed.

Yet another way to classify indicators is based on examining three elements: pressure-state-response. This model is used for environmental monitoring (OECD 1994) and requires identifying indicators that describe:

- human activities that create environmental *pressures*, such as people's agricultural practices or changes in land use;
- the *state* of the environment, such as the extent of land degradation or water quality;
- people's *response* to negative effects, such as how many farmers created biodiversity niches or by how much pesticide use has been reduced.

However, this approach has not been participatory to date and is based on conventional scientific monitoring. Data related to this model is mainly collected to help formulate appropriate national policies and for state-of-the-environment reporting requirements.

Given the never ending list of possible indicators and indicator types, how can the indicator selection process be streamlined? The following suggestions come from a wide range of experiences (cf Woodhill and Robins 1998; Narayan 1993; Rugh 1986).

- Be clear about the objectives of the monitoring process, as it will help focus on those people for and with whom information is to be generated. Then choose indicators only if they help achieve the objectives of the monitoring process.
- The clearer the objectives of the sustainable agriculture activity that need to be monitor, the easier it is to develop indicators to monitor how it is being implemented and its impact.

- Indicators must generate information that will be used. To avoid falling into the trap of collecting a great deal of irrelevant information, always keep the end-use and end-user of the final information in mind. Avoid the temptation of choosing indicators that may well provide fascinating information but which have no clear audience.
- Indicators are easier to monitor and analyse if they are chosen by the people who are to do the data collection and analysis. They will be more likely to be credible if chosen or validated by the end-users of the information.
- Choose indicators that are feasible to monitor, analyse and disseminate with the available resources (human and financial). But keep in mind that monitoring is not just data collection, so information analysis and dissemination must also be included in the budget.
- Clarify whether quantitative or qualitative information is required, or both – and make sure the indicator reflects that need.

7 Methods to collect and register information

7.1 Methods galore

Once the indicators have been chosen, appropriate methods must be found or created. Just as there are many possible indicators for one objective, so there are different methods that can be used for each indicator (see Box 10). Some methods will be more specific and accurate, some more general; some will focus on particular types of information while others can include a wide range of information. There are visual methods, such as photographs and maps. There are writing-based methods, such as using a tape measure to measure the number of hectares of a crop, and those that are oral and record people's experiences and opinions, such as taped interviews. Even drama can be used to monitor changes.

Box 10. Different methods to assess the same indicator

Monitoring the incidence of insects, including pests, in a field can be done in different ways.

- Draw a sketch map of the field and walk around the field with it, locating on the map where there are particularly significant insects. Return to these sites to monitor their presence.
- Identify a set route or transect that you will walk through the field at regular intervals and count insects seen on route.
- Walk randomly through the field and write observations in a notebook as you walk.
- Identify a plot within the field that becomes the sample plot, and where the presence of insects is counted regularly and recorded on a form.

Table 4 shows a range of possible methods and the types of topics they can deal with. These are described in more detail in Annex 1, particularly how they can be used in a group setting.

Table 4. Twenty participatory methods

Methods	*Examples of topics*
1. biophysical measurements	• weight of harvest or size of seed bank • frequency of using baits for banana weevil control • number of plants/m²
2. forms	• anything, eg planted area, harvest, level of inputs
3. diaries	• labour invested, inputs applied, difficulties encountered and solutions tried
4. photographs (or video)	• visual comparison of vegetation density and ground cover from before and after introduction of agroforestry/intercropping
5. maps	• location, size and production, problems, and sustainable agriculture practices • number of adopters and type of agricultural innovation in a municipality
6. transects	• location of pests, soil erosion
7. well-being or social mapping	• distribution of activities between types of families • changes in the level of well-being in the families (who benefits, who does not)
8. impact flow diagrams	• impact of banana weevil control or planting along contour lines • impact for NGO staff of setting up a participatory monitoring system
9. systems diagrams	• level of labour, chemical and money inputs into a field • nutrient flows between different parts of the agricultural system
10. matrix scoring	• relative merits of different maize varieties, cash crops, pest control measures • key disadvantages of different land preparation techniques
11. relative scales and ladders	• capacity to have effective meetings • capacity for autonomous adaptation and innovation of agricultural technologies
12. ranking and pocket charts	• changes in land preparation practices • changes in relative importance of different sources of information about agricultural innovation • changes in relative influence of production-related problems
13. calendars	• production/productivity of different crops • number of seed bank members • amount and/or cost of inputs
14. daily routines	• intensity of labour per task • key bottle necks in daily activities

Table 4 *continued*

15. institutional diagrams	• the importance of organisations working with small scale maize production
16. network diagrams	• type and quality of the relationship with other organisations/ communities and frequency of the visits of different organisations
17. dreams realised	• personal/organisational aspirations that have been realised about farmer household's well-being, organisational strengthening, etc
18. critical event analysis	• most significant positive change in autonomous agricultural innovation • most significant negative changes in strategic alliances
19. case studies	• any combination of indicators, eg changes in the type and seriousness of the problems faced and strategies for dealing with them
20. participatory theatre	• main changes in relative values and use of natural resources • changes in social relations (including those of gender)

As was discussed in Sections 4 and 6, the essence of monitoring is a regular and continuous noting of the same kind of information to be able to observe changes in that information over time. Irrespective of the method that is chosen to assess such changes, monitoring implies repeated use of a method. For example, returning to a map or flow diagram every 2 months to update the information, or completing a matrix after every harvest to compare performance of the different varieties, or returning to interviewees every 6 months to follow up on questions from a questionnaire. If, from one monitoring moment to the next, methods are switched, then information can be distorted and comparisons become difficult and findings dubious.

Although there is no lack of lists of monitoring methods, many of them are quite confusing as they do not clarify what tasks each method accomplishes, for example whether the method helps to *analyse* findings or whether it is useful for *registering* data. It is common to find a list of monitoring methods that refers to different types of meetings, such as 'group meetings' or 'semi-structured meetings' without specifying how these can best be used for information collection, analysis or dissemination. Such lists will then also include 'forms' or 'charts', which are ways to register or disseminate findings. The list may also refer to a certain medium, for example 'drawings' or even a broad approach, such as 'Participatory Action Research', without specifying what kind of drawings or research that entails when there are many possible types of diagrams, drama, or written records. That confusion can arise over what the mechanics of monitoring involves is clear.

When deciding which method to use, it is important first to recognise that monitoring comprises several activities and, therefore, that several methods might be needed for each indicator. A first step is *obtaining* the information – through observation, talking, measuring

size or weight, counting, etc. Then the information must be *registered* or recorded in some way, for example numbers on a card or symbols on a diagram. Then information must often be *compiled*, for example if it comes from several different farmers or communities. It must also be *analysed* to give it meaning, and finally disseminated. Some methods can perform several of these roles at once (see Box 11). In many cases, however, it will be necessary to use a sequence of methods to collect and analyse different kinds of information at the same time (see Box 12).

Box 11. Versatile methods!

Take the example of a participatory map that has been selected to help assess if there are more farmers adopting a certain land preparation technique this year as compared to last year. The group of farmers involved in land preparation training construct a map of their area on which they identify which households have started using the technique this year, as compared to last year – this is the data collection. They add up the total number of farmers adopting the technique – this is the data compilation. They compare the values for the two years and discuss why there are so few (or so many) new adopters, and what can be done to improve the work or sustain the impacts – this is the data analysis. As this group of farmers is the intended audience of the monitoring work, they have shared in the monitoring at the same time as conducting it and therefore the dissemination has occurred simultaneously.

Box 12. A possible sequence of methods

Suppose that you are an NGO staff member, working with a group of farmers who are conducting trials with traditional maize varieties. During regular meetings, which include visits to farmers' fields, the group decides what it wants to know, observe and register about the trials, ie what indicators to monitor. The group walks around the farm of one of the members on a transect that the farmer has chosen, seeking information to help assess the indicators. The owner shows what she is trying out and achieving with the trial. She decides what should be photographed of the trial on her farm. It is also possible for the other farmers to take pictures of an interesting aspect to evaluate at a later stage using the sequence of photos. Questions to guide the discussion could include:

- What do you plan to try out next year and why?
- Compared to what you set out to do with your experiment, what did you achieve and why?

On a form (one for each farm participating in the maize trial), one of the farmers writes down the quantitative data that the group has heard about and observed: labour, inputs, number of live plants, etc. It can also include some qualitative information, opinions of what could be improved, innovations, etc. This form stays with the farmer (perhaps with a copy for the NGO that is facilitating the process) to be used on the next visit to her farm. During subsequent visits, the same indicators are assessed and compared to data from previous visits. In this example, a transect, photographs, peer group discussion, and a form were the monitoring methods used.

7.2 Choosing a method

Choosing a method that is appropriate and feasible depends on factors

such as the unit of analysis, whether qualitative or quantitative information is required, etc. When considering which method would be most suitable, the following questions might prove useful to guide the decision.

- *Which task does the method need to accomplish?*
  As mentioned above, consider whether a method must be able to assess, register, compile, analyse, or disseminate information. Most methods listed in Table 1 can be used to both register and analyse the information but not all can be used for dissemination or collecting data.
- *What unit of analysis does the method have to cope with?*
  Some methods are better for monitoring changes at a smaller household level, while others are only suitable if many households are involved or a certain geographic area is covered. For example, an impact flow diagram can look at the consequences of a project for an individual farmer, for her/his entire household or farm, the farmer experimentation group of which he/she might be a member, or an implementing NGO. It might even be possible to construct an impact flow diagram to look at consequences at a broader scale, for example a municipality, but this becomes much more difficult to verify.
- *What context and medium would be most appropriate?*
  Consider in which context the information is being collected, registered and analysed: individually or group-based. The methods listed in Table 1 and described in Annex 1 are possible for individual or group-based indicator assessments alike. Also consider how the people involved prefer and are able to communicate, as this determines the choice of medium: written, oral, visual, or dramatic. Some of the methods are visual, while others are based on written information.
- *Is the method to be used for quantitative or qualitative information?*
  Depending on whether quantitative or qualitative information is being sought, there will be some selection of methods that are better suited to one or the other type and analysis of that kind of information. The choice between quantitative and qualitative methods will also depend on the available skills. Quantitative methods are useful when you require numeric information, such as 'how much ...', 'how many ....', and 'the frequency of ....'. Qualitative methods are more appropriate when you want to understand attitudes, opinions, experiences, and priorities. For example, 'why do you think this happened?', 'how do you think this will affect you?'. However, as discussed in Section 6, these are not necessarily mutually exclusive. For example, opinions can be clustered into groups and then counted, so becoming quantitative.
- *What criteria can be used to make a final assessment of the suitability of the method?*
  The most fundamental question to get right is whether the method can

really produce the information required. There is no point selecting a fun or cheap method unless it can exactly produce the kind of information being sought. But there are other criteria that can be used to check if the suggested method is likely to be suitable or not (after Mikkelsen 1995):

- validity: do the people who are to use the information believe the method is valid, ie able to measure the desired information?
- reliability: can you be sure the method will work when you need it?
- relevance: does it relate to the indicator being monitored?
- sensitivity: is it able to pick up variations sufficiently and be adapted?
- cost-effectiveness: is it producing useful information at relatively low cost?
- timely: is there not too much delay between information collection, analysis and use?

Choosing a method may seem to involve a bewildering array of questions and choices. If all else fails, look to Box 13 for some basic tips.

Box 13. Tips to help find appropriate methods

- As far as possible, the data collection, analysis and the use of the results should be undertaken by the same people. They should agree that the method is appropriate and understand it.
- Consider whether the method complements the basic philosophy and approach of the project. If the project is a participatory technology development project, stick to methods that make inclusion of farmers easier. Better yet, involve them in designing the methods.
- Each methods should only deal with a limited number of indicators (eg avoid using a form to register 23 questions!). Simplicity of methods is key. Avoid the temptation to extend the use of a method to include other information that, while interesting, is not absolutely essential.
- Methods must use the least amount of time possible outside of everyday work. Look for ways to incorporate the use of the methods into other daily tasks.
- If possible use different methods to verify the information collected as one particular method may give distorted information.

Source: adapted from Rugh 1986

8 Issues to consider at the outset

Over-enthusiasm and scepticism alike can lead to monitoring systems that are not viable or helpful, and other pitfalls to avoid when developing a participatory monitoring process. These are discussed in brief below, followed by several observations that were made at the start of the Brazil research process (see Section 3) and that await clearer answers.

8.1 Avoiding common pitfalls[8]

8 Based on Guijt 1997.

- *Lack of clarity about the end-use(r).* Often data is collected in monitoring efforts – even those that are participatory – that is never used as it turns out to be uninteresting for those for whom it was collected. It is fundamental to know who is going to use the information that will be collected and in what way. These people can then identify exactly what information they need and how they will use it. This will help focus the monitoring work, the analysis and presentation of findings. It might be useful to develop a flow diagram of where each type of information is going and to reassess this continually (see 'Monitoring the monitoring' below).
- *Assuming local ignorance.* In many cases, where community-based monitoring systems are developed, little time – if any – is spent on understanding the – perhaps very detailed – local use of indicators and existing feedback systems for sharing information about local change. Not using and building on these systems as a starting point is a waste of precious time, resources and insights.
- *Assuming local interest.* Many participatory monitoring systems are initiated with the assumption that local people will be keen to be

involved (see Section 4). But local people are not necessarily interested in the same kinds of information that an NGO or government department or researcher might be. Therefore, data collection on a voluntary, unremunerated basis (as often happens in participatory processes) is unlikely to be sustained unless the information has some direct relevance or value for community members.

- *Imposing indicators and methods.* It is common for organisations or individuals keen to build local monitoring systems to impose their idea of useful indicators or types of indicators and appropriate methods, particularly if they are driven by accountability needs of funding agencies that have stipulated certain indicators. Local people may well be only marginally interested in such processes and information. However useful it might be for the external organisations, this extractive approach to monitoring is unlikely to be sustainable or have a strong local learning impact, or strengthen local organisations.
- *Excessive amount of overly detailed indicators.* A common mistake is to want to collect too much data – but data does not necessarily lead to useful information. Some people are noting the growth of DRIPS – Data-Rich Information-Poor Syndrome (Corvalan et al 1993). Everyone becomes enthusiastic about all the information that appears interesting and is technically possible to collect. However, in hindsight, much of this is never used. If careful thought is given to the end-use of the findings, then the collection of data can be limited to the bare essentials.
- *Inappropriate frequency.* Data often needs to be collected at certain moments and with a certain frequency to be of use. Different aspects of sustainable agriculture initiatives change at different rates. Social changes may be more rapid than institutional changes, which in turn may be quicker than biophysical changes (Tisdell 1995). It is also important to know when the information that you are seeking is most likely to be available. An obvious example is harvest time for collecting yield data. But sometimes frequencies might be too little (eg once a year for diseases, when this should be twice – in the hunger period and in the post-harvest period, for example). They may also be too often, thus wasting time and resources.
- *Starting too big/detailed too soon.* Monitoring is a concept and process that almost always requires new skills and much discussion. It is better to start simply and to monitor only some aspects of sustainable agriculture. Then, as experience grows and capacities are built, the monitoring system can slowly be expanded to include all the important aspects that are needed for good project implementation and to make overall impact assessment possible.

8.2 Determining the level/scale to be monitored

It is important to determine at which level or scale the change is to be

monitored, as this will influence the indicator, the methods, the sample size, etc. For example, what does the observation 'an increase of 25% of farmers taking up fennel again as a cash crop' represent? Is the increase at a 'community' level, within a farmers' association, in a municipality, or a larger region?

Normally ascertaining the appropriate level or scale is fairly straightforward, as the unit of analysis will correspond with the population that is being targeted for a particular agricultural innovation. For example, all farmers in the project area or specific communities on which the project has focused. It will also be influenced by the available resources for project monitoring and evaluation, and by the type of agricultural change that is being monitored. But suppose that farmers are not concentrated in communities and are very dispersed, then what will be analysed? Will uptake of the innovation be measured for the entire rural municipal population, even if spontaneous diffusion is likely to have occurred? Or will samples of certain communities be chosen? Often the organisations involved do not have sufficient funds to monitor comprehensively at a high level, such as all the communities in which they are working.

Choosing the appropriate level and unit of analysis is a challenge in Brazil, where communities are not concentrated settlements, the level of social organisation is not very formalised, and it is difficult to find a community that identifies itself as a cohesive group of people. In most cases, 'a community' is little more than a group of houses and has been created by external pressure, such as the Church or extension services. Local level monitoring can perhaps better be carried out at a *sítio* (neighbourhood) level. Some possible units of analysis to consider are:

- community or farmer associations;
- the municipalities for indicators at the level of a union, eg number of farmers who are members of the union that are adopting a certain technology;
- special interest groups (connected to a specific activity);
- the family/farm.

The final choice of what scale at which monitoring will take place will depend on what is being monitored and will therefore be indicator-specific.

8.3 Establishing a starting point for comparison

Monitoring builds on an initial appraisal of a situation by repeating assessments of the same situation over time. This process enables changes to be documented and analysed. To be able to make such a comparison, information about the initial starting point or situation before any intervention has taken place is required. This is what is commonly known as the 'baseline' of information. But given that it is possible to collect all kinds of information about a situation and that

projects are not always clear about their detailed activities from the onset, how much time and effort should be invested in establishing a baseline?

Participatory projects, such as is the case of AS-PTA and CTA-ZM, evolve slowly – as discussions with farmers and farmer organisations deepen, a joint situation analysis is undertaken, and initial innovations are suggested and started. It is common for such development programmes to start tentatively with small interventions and, only later, to undertake more substantial and focused projects that will require monitoring against baseline information. Given the uncertainty about the final orientation of such projects, how can one determine early on what information to collect for the baseline?

Identifying the correct point in time and/or the condition against which the current situation should be compared is complex and can produce distorted impressions of change. If small early interventions have influenced the status of, say, farmers' incomes, taking a baseline later on, when it is clearer what the focus of the programme will be, will require comparing achievements against an incorrect starting point.

Another difficulty in determining what the content of a baseline should be is caused by the lack of a clear definition of sustainable agriculture or agreement about its basic principles. For example, is it more important to know whether to measure biodiversity, or soil fertility, or biomass, or all of them as part of the baseline? Furthermore, as sustainable agriculture is far more than a technical change, baselines should also deal with the economic situation, with institutions, with a growing knowledge base, etc. Clearly, the scope of a baseline could potentially be enormous and, therefore, costly and time-consuming.

Box 14. Appraisals to find the baseline for comparison

The Aga Khan Rural Support Programme (AKRSP) is an Indian NGO that supports local village institutions (VIs) to use their natural resources in a sustainable and equitable manner. AKRSP helps these VIs to carry out their own appraisals and plan their development priorities. As part of the pre-project appraisal, local people prepare detailed maps of their village which incorporates their analysis about the available resources, how these are used, ownership, problems and constraints. These detailed maps represent an inventory of resource-related issues and are used as the basis for planning village projects. All the proposed activities are depicted on the maps, and include: soil and water conservation, minor irrigation, forest plantation and protection, etc.

These maps are kept in the villages and are displayed in a convenient location that is accessible for all members of the VI. During meetings and project reviews, these maps are used to monitor the project activities and resolve problems.

Source: Kaul Shah 1995

The only alternative to not having a baseline is simply indicating whether there is an improvement or a decline from the first measurement (see Box 14). In Brazil, the NGOs are using the first year of monitoring data as their baseline, plus some supplementary data they have collected previously or that already existed from other sources. They simply cannot afford to collect more. This has clear implications for funding agencies and the scientific community alike. It requires the development of approaches that do not depend on the use of baseline data, or the provision of sufficient funding and time to enable a baseline to be developed.

8.4 Avoiding distortions

While it is important to limit the distortion of information collected through monitoring processes, it is impossible to avoid entirely. Distortions will inevitably arise at various points in the process. Knowing when this is likely to occur can help in designing the process. The same types of errors can occur as in any survey process: sampling and non-sampling errors.

Sampling errors occur in the selection of who will be approached to provide information, or, in the case of participatory processes, who chooses to participate. Non-sampling errors are usually much larger and more diverse. These can include, for example, ambiguously or incorrectly worded questions that confuse those who are expected to provide clear answers. The choice of people who are to collect the information can also bias the answers. For example, if a rural union representative is given the task of finding out what farmers think of the union's management, it is likely that their answers will be biased in some way as they might well want to avoid being too critical to the very person who they think is the problem. When data is registered or analysed, errors can easily occur. For example, incorrect interpretation of the person who is registering the information or physically recording the information incorrectly.

Another different source of distortion occurs when factors external to the activity being monitored are provoking changes in the indicator being monitored. For example, an enormous increase in the number of farmers planting fennel without pesticides may be identified two years after the start of AS-PTA's extension work. However, at the same time, a new governmental rural credit scheme for planting fennel may also have been introduced. Assessing the relative influence of the AS-PTA's efforts in the light of the subsidy may, therefore, be very difficult. Many monitoring processes simplify cause-effect linkages for ease of monitoring but fail to deal with the effect of external factors that affect the indicator being monitored (see Section 4.5).

8.5 Negotiating with the participating groups

In participatory monitoring, working with a range of partners means integrating different objectives with different time scales and different scales of operation. For example, the area of operation of farmers is smaller than that of a municipal-level union. Different people will have differing interests in monitoring different indicators. A farmer may have no wish or need to measure soil fertility, yet this might represent an important indicator for the NGO. Alternatively, the farmer might find it essential to know if the organic matter content is improving while the NGO finds the adoption rate of mulch more important. Who, then, will monitor what?

As more and different stakeholder groups cooperate to keep track of change together, they will need to make compromises on whose indicators count more, which objectives to monitor, what methods are feasible and valid, who is involved in which way, and so on. It is inevitable that not all the different perspectives will merge smoothly or can even be reconciled. As the negotiated indicators reflect the norms and values of those involved, and their relationships, participatory selection of indicators to monitor change is a social and political process. How to negotiate this and when to renegotiate different aspects of the monitoring system are questions that may be answered as the research process in Brazil proceeds.

Another complication is related to the stability of those who are participating. Rural trade unions in Brazil are elected and, therefore, do not provide any guarantee of continuity of those who are involved in the monitoring process. Also, over time new groups may emerge, such as farmer experimentation groups or community associations. As new partners join in the work, their ideas of what is important to monitor and how this can best be done will require clarification and will lead to continual adjustments to the monitoring process.

8.6 Monitoring the monitoring

Having monitored an activity and recorded and analysed information, how can the value of the monitoring process itself be assessed? Many questions can help judge whether the monitoring process is fulfilling its objectives, such as:

- Is the data collected useful for those involved and helping them to achieve their aims?

  This can be monitored by developing a diagram that shows who should – ideally – be receiving what kind of information and when, and checking that against what information is actually being communicated.

- Is the data registration and analysis feasible for the participants to carry out in the long term?

This can be assessed by finding out, for example, how difficult or easy the monitoring is, and whether there is any spontaneous use of this by others who were not initially involved.

Besides usefulness and viability, other indicators can be found to evaluate the success of the monitoring process itself. For example, to help assess how participatory the monitoring system is, the questions in Box 15 may be helpful. Consider carefully how to monitor the development of the participatory monitoring process, and if possible identify some relevant indicators for the process itself with those involved.

Box 15. Assessing how participatory the system is

Assess whether there are low, medium or high levels of participation of all potentially interested people and groups in the following aspects of the monitoring process:

- initiating the process;
- setting the questions to be answered;
- the application of the methods (more or less interactive);
- who uses the final information.

Also, is the purpose of the system for local learning or only for external accountability? Is the facilitator facilitating or driving the process?

Source: adapted from UNDP 1997

9

But a first step

This paper is intended as a brief introduction to the subject of monitoring in the context of sustainable agriculture initiatives. It is but a first step in the Brazil research process and may prove helpful for others who are also starting out. Many aspects have not been covered, including how to construct a sample in a participatory manner, whether or not to use a control group, or how to negotiate indicators with many different groups and participants.

Since the process started in Brazil, many experiences have taken place in both Paraíba and Viçosa that have strengthened the understanding of what is possible and where problems may arise (Abbot and Guijt 1998; Sidersky and Guijt forthcoming). Methods have been tested, implemented and adjusted. Indicators were selected, measured, refined and even discarded as not useful. New people and groups have joined the monitoring process. As the Brazilian process unfolds, further lessons will emerge, and be documented and shared. In the meantime, this paper offers some ideas of how to start and the critical questions to consider.

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Annex 1

A description of twenty participatory monitoring methods

This Annex describes 20 methods that can be used within the context of participatory monitoring. The methods that have been included here focus on those that can be applied in a group context but many can also be used with individual farmers. Only twenty methods are discussed so it should not be seen as a complete list[1]. For example, conventional biophysical measuring methods are discussed as a group under Method 1 while there are clearly endless possible methods that fall within this category. These conventional methods should be seen as complementary to the other methods suggested here. The methods are not described in exhaustive detail, and, in the absence of documentation on actual practice, some examples are not from direct monitoring experiences. However, all of the methods have been adapted to show how they can be used for monitoring, or are accompanied by explanations to illustrate this use.

Readers will notice the use of two similar terms: 'data' and 'findings'. 'Data' refers to unprocessed opinions, quantities, etc, while 'findings' refers to the set of data that is interpreted and is given meaning through analysis. The term 'monitoring event' refers to each time the next set of data is collected, the frequency of which will vary depending on the indicator.

Each method starts with a brief description of the focus of the method, followed by three sections:

● Units of analysis and possible topics

This paragraph identifies the level of analysis for which the method is suited, ranging from farmer or farm household to municipal level. 'Interest group' refers to any group of local level people who meet for a specific purpose, such as seed bank members or a farmers' experimentation group. 'Municipality' is the highest level of analysis discussed in this paper, as this is the highest level for the Brazil research project (see Section 3 in main text).

This paragraph also gives several examples of the types of themes or specific topics for which the method is likely to be appropriate. The topics listed are but a few examples of what is possible.

● Task and medium

As monitoring consists of several tasks – collecting data, registering it, analysing the aggregated data set, and disseminating findings, methods must be found so that each of these tasks is fulfilled. Some methods are able to deal with all the tasks (such as Mapping, Method 5), or with sharing analysis and sharing simultaneously. This paragraph identifies for which of these tasks the method is suited. Also, each method is based on different media: words, diagrams, photographs, or drama. This will be important to consider as some contexts and situations might benefit more from working with one medium than another.

1 Other useful references on methods are Pietro 1983 and Feuerstein 1986.

● How

This section describes briefly how the method can be applied, particularly in a participatory and group context. It mentions specific points to consider when thinking of monitoring as this requires a comparison over time to be made. Each method includes one or more diagrammatic or written examples of its application related to natural resource management, and where possible, agricultural development.

1. Biophysical measurements

Measurements and counting are, of course, the very basis of monitoring. There are an endless number of possible methods that can be used to assess the many biophysical indicators that relate to agricultural development. Therefore, this description is not a discussion of a specific method but rather a recognition of the role of biophysical monitoring in sustainable agriculture. Biophysical measurement can easily be combined with the other methods described here, for example first establishing the range of impacts with an Impact Flow Diagram (Method 8) and then selecting which impact will be monitored more precisely using scientific monitoring methods. Contrary to common perceptions perhaps, biophysical measurement can be a very participatory process, when a range of people/groups help to identify the appropriate method or are trained in the method and then collect and analyse data.

Unit of analysis and possible topics

- field/micro-catchment/community/municipality: biomass production or soil erosion loss from selected plots, quality of irrigation water, incidence of pests and predators, vegetation cover, chemical composition of organic fertilisers, plant density

Task and medium

- Good for gathering data. Other methods will be needed to record the data, normally Forms (Method 2), while group discussions can be used to analyse the (aggregated) data and share the findings.
- Counting, weighing or other forms of measuring do not involve a medium as such but will depend on various types of equipment and skills. The recording of the data can be either written or diagrammatic.

How

The first step is being completely clear what indicator will be monitored (which sounds easier than it is; see Section 6 of main text). Then discussions are needed about the required degree of accuracy. If a very high level of scientific accuracy is needed, then expertise will need to be sought to find an appropriate method. The suggested method might then need to be adjusted to make it compatible with local conditions, skills and resources. Alternatively a method can be developed together that is mutually acceptable (see example below) and that is a compromise between high level of local accuracy and scientific accuracy. Simple methods that provide good estimates may well be better if complex but more accurate methods are likely to be applied incorrectly, leading to precise but wrong data.

In Brazil, farmers, NGO staff, union representatives, and university academics were deciding which method could assess 'the percentage of vegetation cover', which is one of the chosen indicators for monitoring local agroforestry development (IIED/CTA-ZM/STR-Araponga 1997). A simple wooden frame was suggested by academics with 4 quadrats about $1m^2$ in total. This was to be placed on the ground in several sites within the agroforestry plot to estimate visually the surface area covered by vegetation. To record this information, the academics suggested a form for writing down percentages. While the wooden frame was acceptable, the farmers thought the form would be too complicated. The academics then suggested a form with pre-drawn quadrats which the farmer could shade to depict the area under vegetation. Again, the farmers felt uncomfortable about recording with pen and paper.

They finally agreed on the use of wooden sticks or rulers, on which the farmer scratches a mark

to indicate the estimated percentage of vegetation cover in terms of a certain segment of the ruler after using the frame. Each stick will have several scratches as the wooden frame is used in several different sites in the agroforestry plot per monitoring event and an average rate of vegetation cover is determined. Each farmer uses a new stick for each measuring event. When the farmers meet to discuss their agroforestry activities, they will bring their measuring sticks, record the measurements on paper together, and discuss the findings and their significance for their plots. While perhaps less accurate than pen on paper by scientific standards, the scratches are acceptable to and comfortable for the farmers, thus minimising distortions caused by unfamiliarity with a method based on pen and paper.

2. Forms

Forms, or data sheets, go hand in hand with biophysical measuring (Method 1). Forms can be used for any indicator. It is the most common way in which monitoring data is recorded and many of the methods discussed here can be put on a form (such as Calendars, Method 13, and Maps, Method 5). A form is like a questionnaire but instead of questions, the selected indicators are represented. Though similar to Diaries (Method 3), forms are based on pre-determined indicators while diaries are usually more open-ended. Forms can be participatory when the contents are decided on by the full range of people involved, when they do the interviews themselves or fill in the forms, and when the data from the forms are analysed together.

Unit of analysis and possible topics

- individual farmer, farm property, interest group, organisation: any indicator you wish (see Method 1) – area planted, production, household size and education levels, expenditure on seeds or other inputs, labour hired (see Figure 1)

Task and medium

- Good mainly for recording data, but can be used for gathering and analysing data with a group of people, and sharing findings.
- Forms can be written or with diagrams (such as symbols representing each indicator). Diagram-based forms can show aggregated data and are therefore good for noting and assessing trends on a calendar (see Method 13).

How

Once the indicators have been identified, these are written or symbolised on a form. Alternatively, it may be that the groups feels more comfortable using questions than indicators, so indicators can also be reformulated as key questions before being put on the form. The form is then filled in by respondents, individually or in a group setting, or by others in discussion with them (again, individually or in a group). Answers from these forms usually need to be collated at some point and therefore require subsequent treatment. At each monitoring event, return to the person, household, group or organisation that is being monitored and fill in the same form. By comparing whether answers are changing over time, discussions can be held to find out what those changes are and why they are occurring.

It is easy for forms to become extractive, with little involvement of different stakeholders other than in providing information. Therefore, if forms are to be used in a participatory monitoring process, care must be taken to make clear plans for collective design of the forms and, particularly, joint analysis of data.

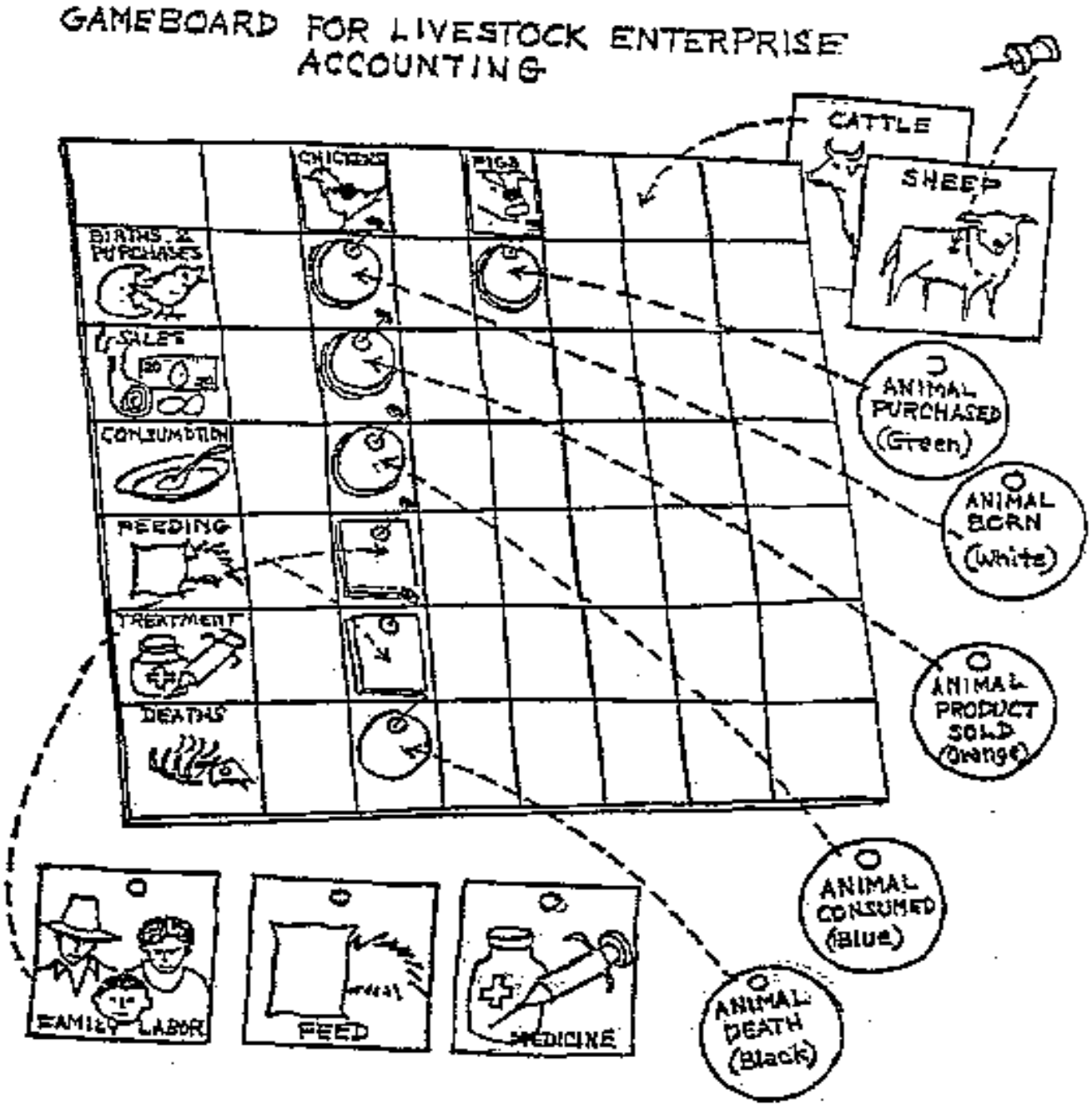
Hatch (1980) explains how Bolivian farmers noted technical agricultural information about various crop and livestock tasks. The data was so valuable that it was later compiled into a people's textbook. Figure 2 shows one very visual way that was used to record costs and production in Bolivia, Peru, Panama and Costa Rica. Each farmer copies the grid onto a hard board and places a nail in each square. During the appropriate phase of crop enterprise, the farmer places one counter on the nail, each time one unit of input for each category of production costs has been made. A different type or colour chip is place for each unit gathered in the box 'Harvest Production'. This data represents a running account of each farmer's inputs and outputs, which can then be aggregated, if necessary, on a single written form. Either words or pictures can be used to record the aggregate data.

Figure 1. Farmer's form to monitor cucumber plantation, Indonesia

	Activity	Labor	Expenditure	Yield	Income
Week 1 (first week Aug.1995)	land preparation sticking	households' members, external (8 persons)	Rp.40,000 for external labour		
Week 2	plantation fertilizing sticking	households' members,	seeds: Rp.30,000 fertilizer: Rp.75,000		
Week 3	weeding fertilizing	households' members,	fertilizer: Rp.25,000		
Week 4	weeding pesticide	households' members	pesticide: Rp.5,000		
Week 5	weeding	households' members			
Week 6	harvesting marketing	households' members, external (3 persons)	Rp.15,000 for external labour	cucumber 1,500 Kg residues	Rp. 250,000
Week 7	harvesting marketing	households' members, external (3 persons)	Rp.15,,000 for external labour	cucumber 1,500 Kg, residues	Rp. 200,000
Week 8	harvesting marketing	households' members, external (3 persons)	Rp.15,000 for external labour	cucumber 1,000 Kg, seeds 7 liters	Cuc: Rp. 100,000 seeds: Rp.60,000

Source: Fitbriadi 1996

Figure 2. Diagram-based form (or 'gameboard') for farm enterprise accounting



Source: Hatch 1980

3. Diaries

Diaries are records of events over time that can be kept by individual farmers or groups. Diaries are not simply records of facts, such as how much of a certain input was applied, but also include people's or the group's reactions and opinions. They can be more or less structured, and are not necessarily based on pre-determined indicators (as with Forms, Method 1) but can describe general themes. They can be very focused, for example dealing only with a specific varietal trial, or can describe broader developments. They can provide more detailed and qualitative information than Forms (Method 2) and Critical Event Analysis (Method 18). Process documentation (cf Shah 1997; Mosse 1998) is a type of diary for which entries are written during the life of a project, with detailed descriptions of processes, why events happened, problems and people's reactions, etc.

Unit of analysis and possible topics

- individual farmer/farm property: labour input and constraints, use of inputs, difficulties encountered and solutions tried, achievements (see Figure 3)
- interest group: same as above, plus range of different experiments that group members are undertaking, important decisions that the group makes
- community: same as above, plus key events in community life, record of attempts to rectify problems and what did and didn't work
- organisation: same as for any of the above

Task and medium

- Good for recording data. Data gathering and analysis and the sharing of findings may require other methods, such as measurement, focused group discussions, and compilations of recordings/photographs/video shots.
- Entries can be written, video-taped sequences, photographs, tape recordings. There is no reason for diagrams not to be included but this can be quite time-consuming and therefore is less likely to be appropriate.

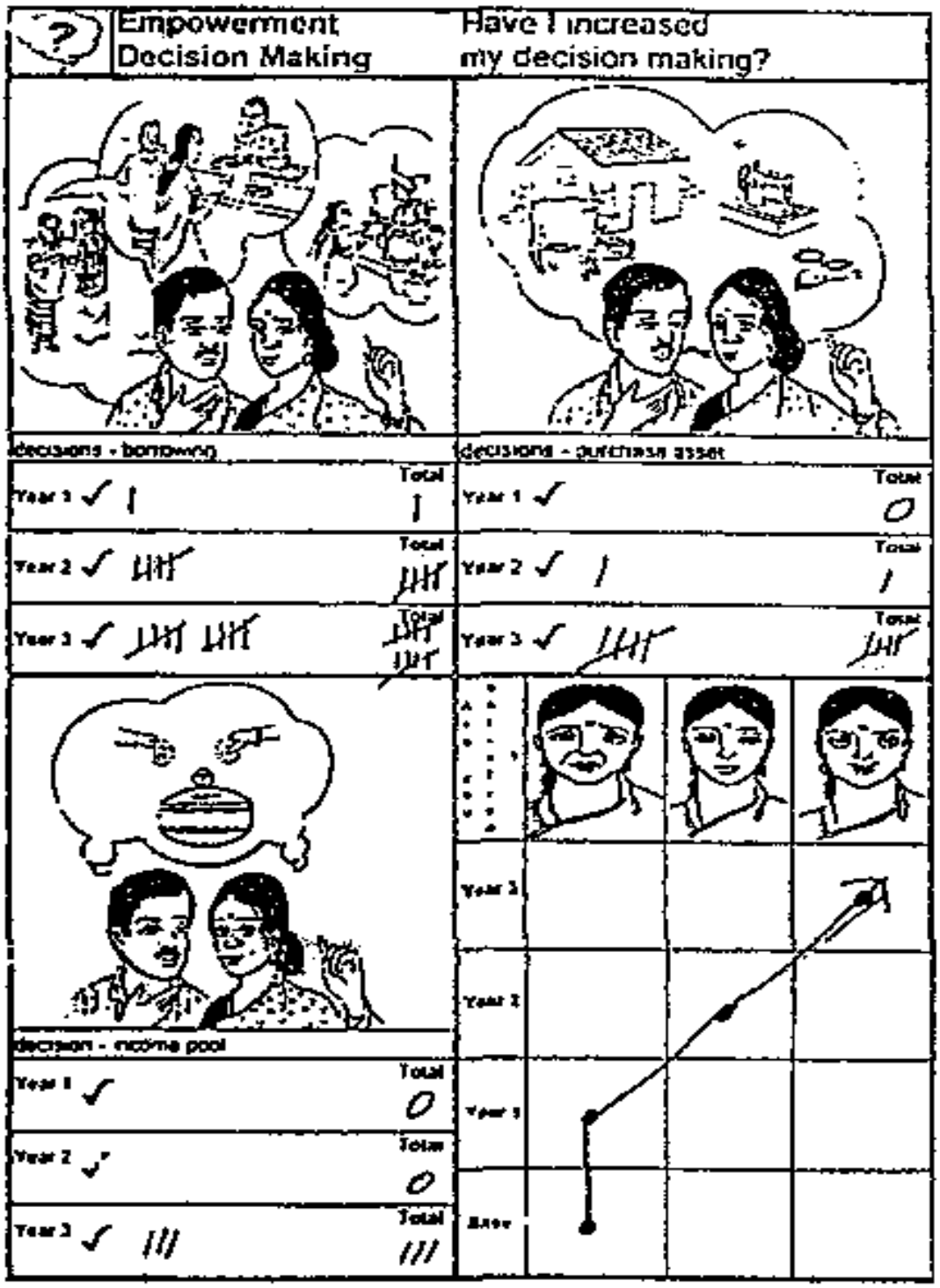
How

It is important that the idea of a diary is introduced and starts early on in the life of the agricultural development project or programme so that the learning process is optimal. The diaries can be written based on group discussions, for example as annexes to the minutes of the meeting. Alternatively they can be written by individual farmers who then meet to compare notes and analyse any changes that are particularly significant and require action.

A specific example in which diaries are used is that of self-recorded wildlife surveys by hunters (Marks 1994, 1996). Hunters keep records of the wildlife sighted in the areas where they move, together with details of their times and activities when in the field. Hunters are encouraged to make 10 or more trips each month but they decide for themselves the dates, times and places to visit during each foray. Other residents kept journals of events, activities and rainfall, which help to broaden the framework for subsequent analysis and interpretation of the specific hunting data.

Figure 3 shows part of a pictorial diary of change, or learning diary, that was developed for a women's rural micro-credit programme (Noponen 1997). It shows a personal gathering of criteria of socio-economic satisfaction as a series of symbols in the outer edge of the form. As goals are realised, these are entered into the appropriate column for the reporting period in question. Members record changes in their diaries and share them at monthly meetings. Groups then compile a yearly group aggregate of all socio-economic impacts. Group-based monitoring of group functioning and collective action is also undertaken.

Figure 3. Pictorial learning diary of change, India



Source: Noponen 1997

4. Photographs (and video)

Photographs or video sequences (and GIS images) are excellent at helping to track changes that are large enough to be discerned by a camera (or satellite). By taking shots of the same spot at regular frequencies, or using a time series of GIS images, changes can be identified and discussions provoked about the causes of such changes, whether they are sufficient, what other action might be needed, etc. Photographs and videos can be combined with a range of other methods, such as Diaries (Method 3), Critical Event Analysis (Method 18) or Participatory Theatre (Method 20).

Unit of analysis and possible topics

- farm property/community/micro-regions (see Figure 4): photographs from hand-held cameras of infrastructure, vegetation cover, biodiversity, plant growth and quality, soil erosion, seeds in the seed bank
- micro-regions or -catchments/municipalities: aerial or GIS images for vegetation cover, human settlement patterns, soil erosion, infrastructure (including irrigation works)

Task and medium

- Good to record and analyse data, and share findings.
- Visual, with additional written explanation or conclusions if necessary when analysis of images takes place.

How

After deciding what indicators are to be monitored, the person or group takes photographs of fields, parts of fields, seed bank, the community, etc focusing on images that will show the selected indicator(s). After analysing/discussing the first set of images, they are stored in a safe and accessible place, in a manner that will allow easy comparison with the next sequence of pictures. This might require careful coding and, for example, pasting in a picture book.

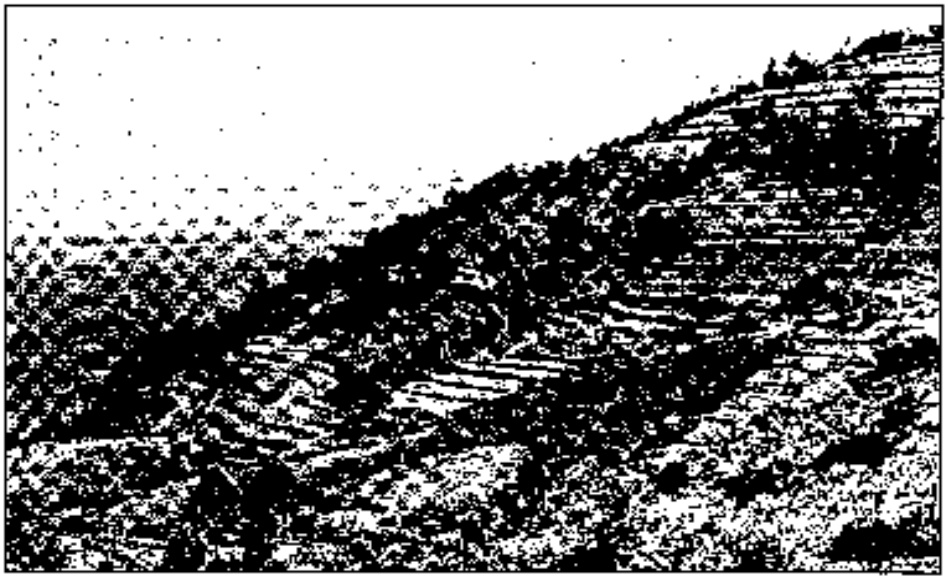
Return to the same site and take a new set of pictures for each reporting period (at the change of season or key moments, such as just after germination, just before harvesting, etc). Place the different sets of images side by side and discuss any differences that can be seen, why these might have occurred and what might happen as a result of these changes. Implications of discerned changes for current agricultural innovations can be discussed. These analytical discussions are repeated for each set of new photographs.

In the case of aerial photographs or GIS images, obtain a series of images from different years, eg 1950, 1960, 1970, etc. Mount the images for easy comparison. Discuss what changes can be seen, why these might have occurred and what might happen next with or without appropriate action. New discussions are held for each new set of images. Here are two examples of how people have used photographs for monitoring or evaluating changes.

"Most projects have a gathering of photographs that have been taken by a project staff member... In one.. workshop, 30 photographs from the work project were selected and village people were asked to arrange them in chronological order, from the beginning of the project to the present. Women and men were asked to identify the tasks or activities that women were involved in and undertook. This led to a discussion about why women had been involved in so few activities. This in turn led to further discussion about why the project policy was to train only men. Community people themselves made the distinction between women's present ability and women's potential to be trained to undertake new responsibilities. This discussion led to a reconsideration of women as technicians in the agency training programme." (Narayan 1993:108)

"We first asked the village chief to select two male and two female participants. We then walked around the village in two groups, the male researcher with the men, and the female researcher with the women, ... to show us whatever they wanted ... about their village in preparation of the pictures they would take. We then gave each of these two groups a 35 mm camera with which to take pictures of their lives and history. Finally the two groups arranged the photographs in an album in the order chosen by them to tell the story they wanted to tell. The photographers then presented the books to the rest of the village.... The picture book is continuing to provide us with an easy way to exchange information ... As the research advances, we are using the picture book as a place to document, and therefore make public to all the villagers, the research output created with the villagers... It allowed us to progress to other methods for discovering the locally-relevant factors that cause soil and water conservation technologies to change." (Mazzucato and Niemeijer 1996:20-21)

Figure 4. Photographs showing changes in land use and vegetation cover, Kenya



Source: Tiffen et al 1994

5. Map

Maps refer to a geographic area, and can therefore help locate biophysical, economic and social indicators that have a geographic distribution. Maps, as referred to here, are a visual representation by people of how they see a physical area and therefore will not be as precise as formal maps or to scale. Aerial photos (Method 4) and formal maps can also be used if they are of the scale desired and are understandable to all involved.

Unit of analysis and possible topics

- farm property: each field/plot with production, pests, localised problems, where innovations are being tried, location and level of chemical inputs, gender division of control, responsibility and labour input in different land use units (see Figure 5)
- community or region: the number of farmers adopting technological innovations, the number of years that each farmer has continued to use a new technology, and the type of innovation being adopted (see Figure 6 and Figure 7); the quality and quantity of natural resources; sources of water and water levels; migration levels; income sources; level of education; levels of spontaneous diffusion of innovations
- municipality: the number of communities with seed banks; the number of experimenting farmers per community; the number of communities in which the NGO is actively engaged in agricultural innovation

Task and medium

- Good for recording, analysing and feedback. If several maps are made with different groups or for different indicators, and aggregation is required, the data from the maps can be compiled onto a single map or alternatively onto a chart.
- Visual medium, with additional written comments (on the diagram or attached to it) that can include quantities.

How

Ask people to draw the unit that is being monitored, which could be their community or part of it, the municipality, the farm, etc. They decide how they want to represent this, on paper with writing or using local materials such as sticks, stones, seeds, etc. It will be most effective if those who are to be involved in subsequent monitoring events are also involved in the original map construction. Those involved might wish to make several versions of the map until they are happy with the final result. Irrespective of how the maps are constructed, a paper-based copy is needed to enable monitoring of changes over time.

What is put on the map will depend on what is to be monitored. If it is a detailed monitoring exercise, then people can include their analysis about available resources and their use, key problem areas, and of course, the proposed innovations. Social issues, such as ownership or gender-differentiated use of natural resources may also be monitored and can be included. A map can also be used for only one topic, such as maize trials. The larger the number of topics to be included, the more complex the maps will be and it might become helpful to make several maps, one per issue (see below).

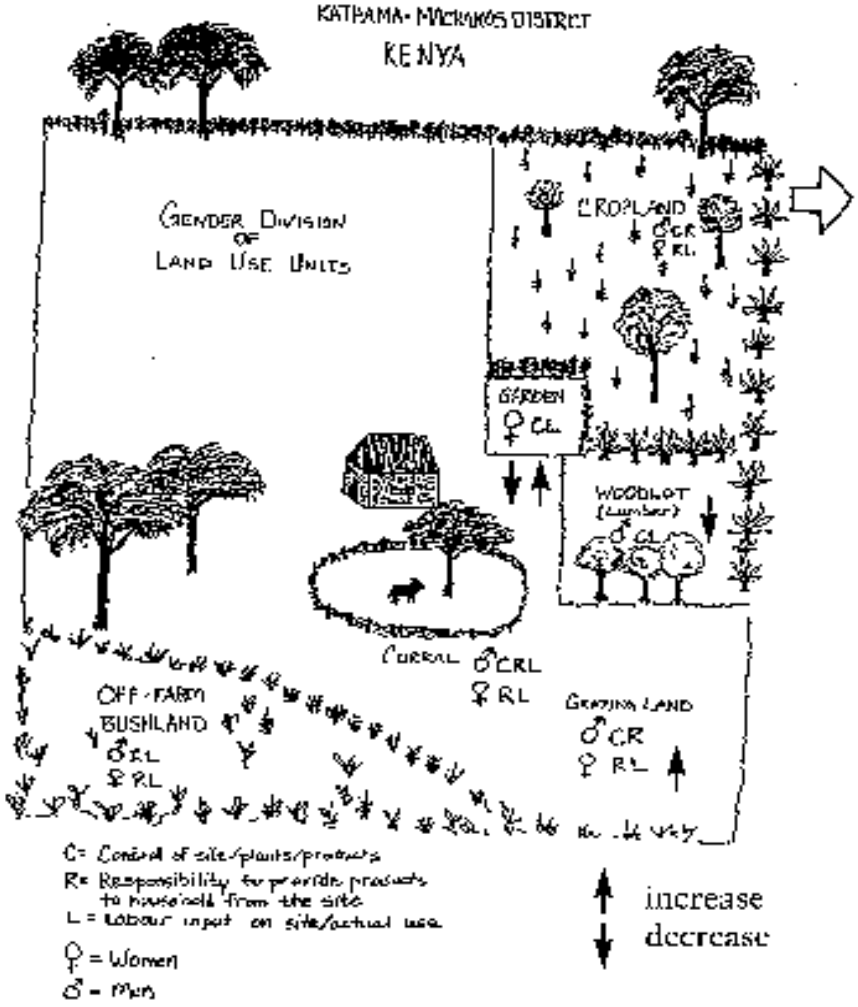
The map is then used to document and analyse changes that are observed from one monitoring event to the next, such as numbers of farmers adopting banana weevil control measures or contour planting, or changes in gender-specific use of tree products. Any problems arising from project activities that are identified can be discussed and solutions suggested. A copy of the map must be kept in

a safe place for use during meetings and should be stored where those who use it can have easy access to it.

There are two ways to document the changes from one monitoring event to the next. A 'base map' can be made which shows basic infrastructure. An exact copy of the base map can be used each year (and thought will need to be given to how to make such copies as the maps can be very large). Any changes in the basic infrastructure will be marked on the new map in addition to the data related to the indicator being monitored. Comparing the series of maps will make an analysis of changes possible. This approach will help avoid inconsistencies in map style and format between monitoring events that may make comparisons difficult. After the fist map-making, there is no need to make a new map but only to add any significant changes such as new building or roads or land uses.

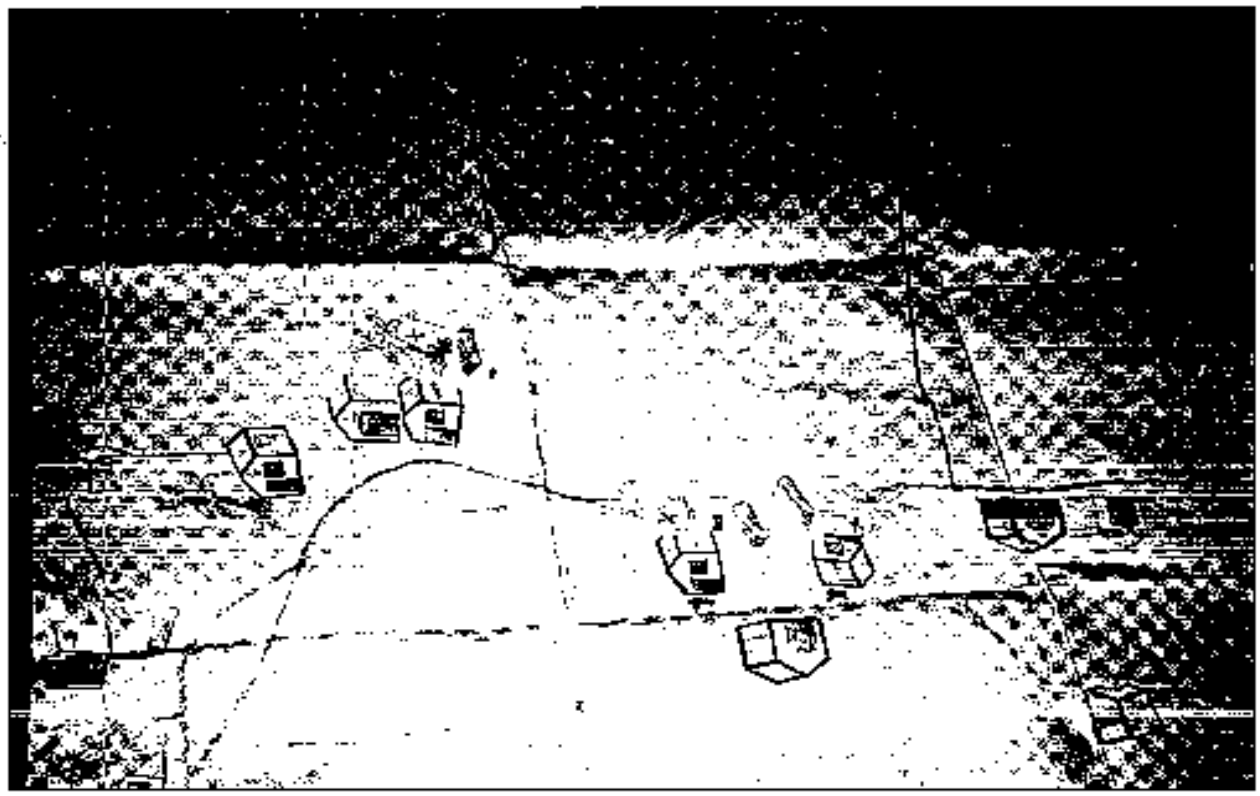
Alternatively, the same map can be used by colour-coding indicators for each new year or monitoring event. While the second option is much easier for direct comparison and analysis (as all the data is on the one map), it can get messy if too many indicators and years of data are stored on the one map. As with all the methods, much time is needed to facilitate a collective analysis of a time sequence of maps and to understand overall trends.

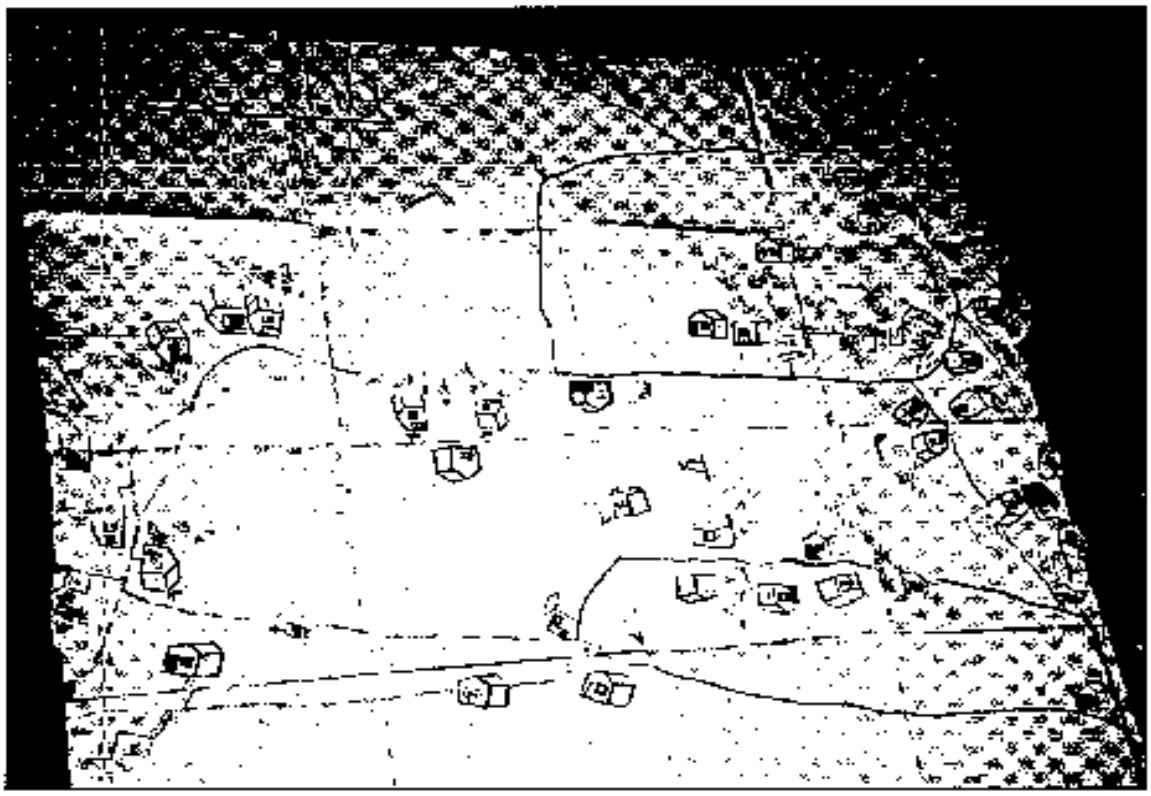
Figure 5. Map showing gender division of land use units, Kenya (arrows added to original diagram to show fictional example of monitoring – focused use of mapping)



Source: based on Rocheleau and Edmunds 1997

Figure 6. Colour-coded community map to monitor use of banana weevil control measures, Brazil

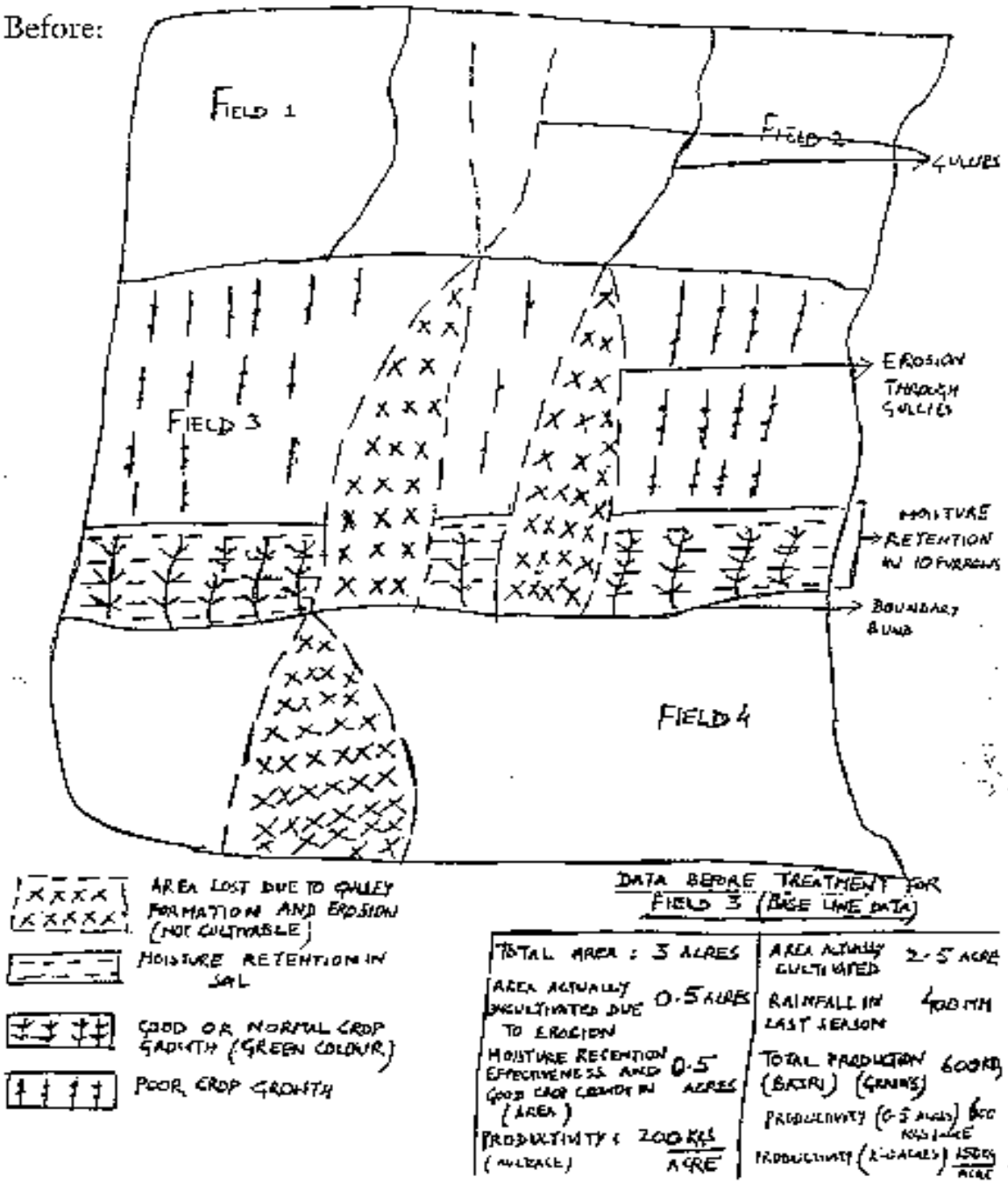




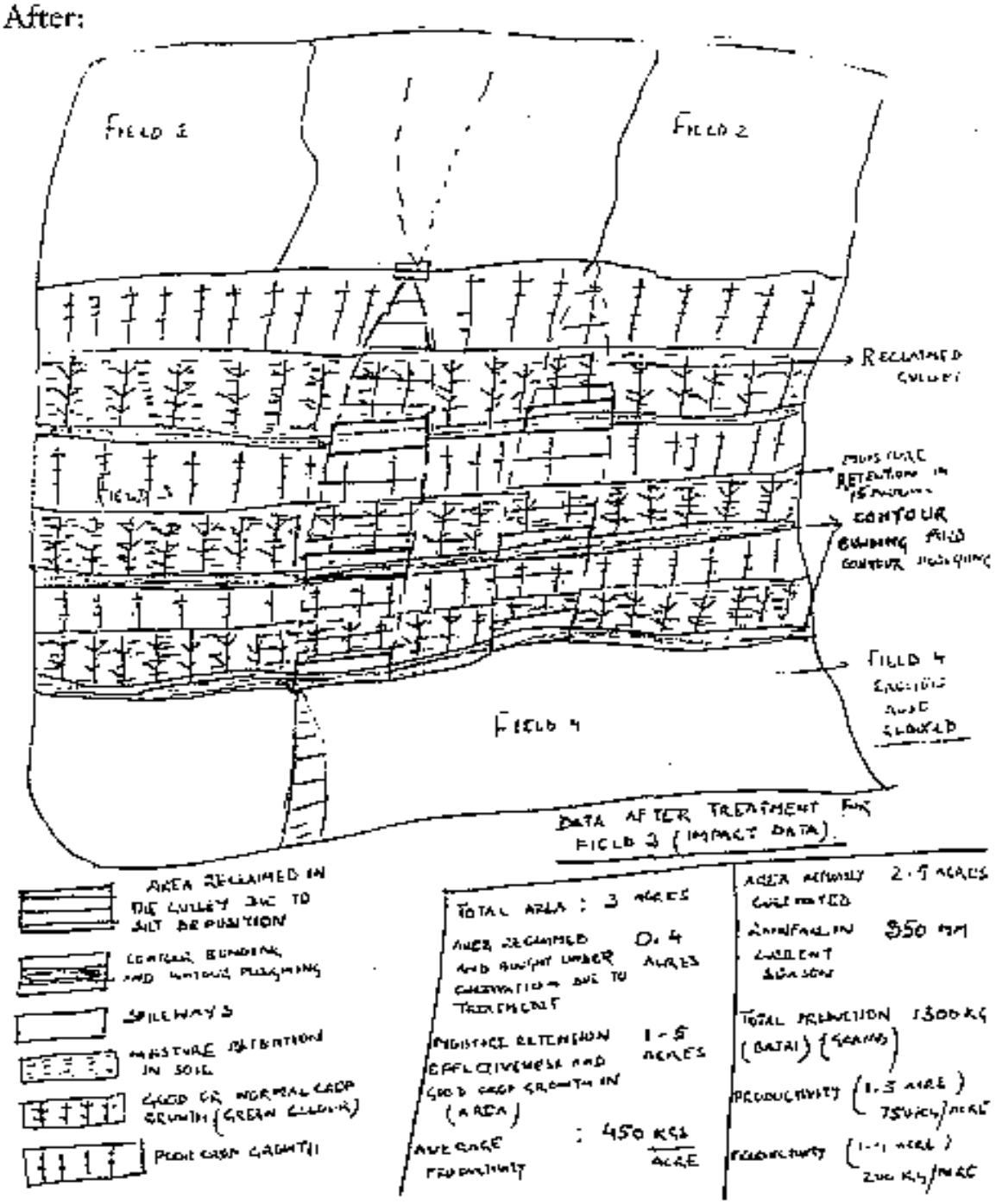
Source: AS-PTA photo library, Brazil

Figure 7. Status of fields before and after soil and water conservation measures, India

Before:



After:



Source: Shah et al 1991

6. Transect

Like maps, transects allow for monitoring of information that has a geographic distribution. However, instead of taking a bird's eye view like a map, they are based on structured walks through the area being monitored to observe the indicators selected. This can be just a few fields or the entire community, taking an hour or up to a whole day. Transects consist of two elements: the walk and a diagram that records the walk. The diagram is usually a cross-sectional view of the route (see Figure 8).

Unit of analysis and possible topics

- field: productivity of different crops, incidence of pests, weeds, soil erosion, etc; variation of use of chemical inputs in different zones; quality and quantity of natural resources; use of innovations in different zones
- farm property: same as above (see Figure 8), plus areas of highest degradation or other key problems; areas of new land use opportunities; location of any regeneration activities and impact/degree of implementation
- community: same as above, plus changes in land ownership; areas where collective action is required
- region/municipality: same as above, plus changes in major ecosystem zones; spontaneous diffusion of innovations

Task and medium

- Good for observing data, while the diagram can be used to record and aggregate data, and share findings.
- The method is based on a walk to observe changes, with a diagram or written document to record what has been observed and/or measured en route.

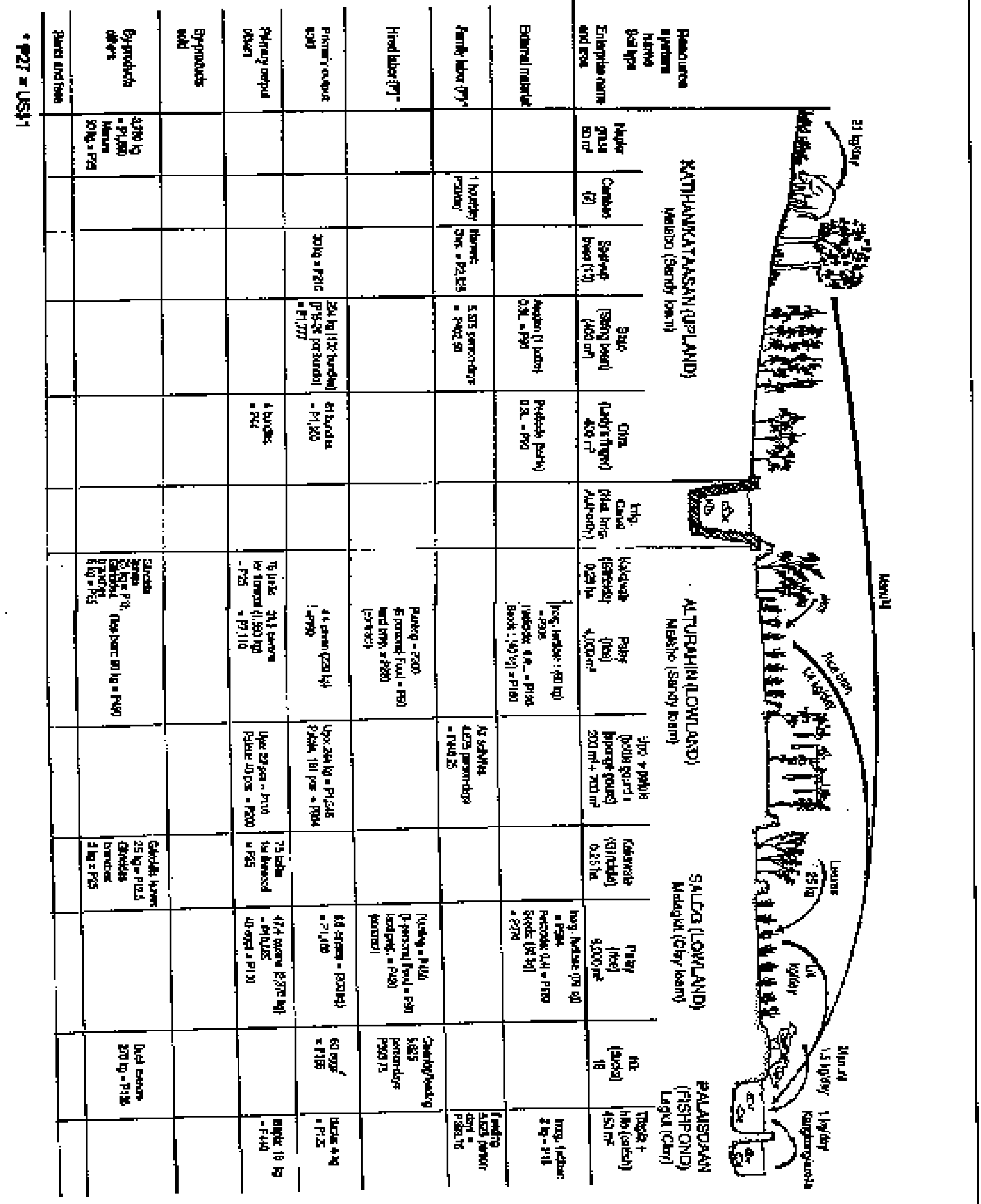
How

If there is a map of the area, it can be used to decide together what the route will be. The same route should be walked each time to keep the basis of observing changes stable. Previously, indicators that people want to observe, measure, record and analyse on the way will have been identified and these form the basis of observations and measurements during the walk. As the walk proceeds, participants can use their curiosity to probe for and include other unexpected observations. Indicators do not have to be visual but can also include topics such as land ownership or which solutions have been tried where for which problems.

Draw what has been seen and discussed on a schematic diagram and use that as the basis for subsequent monitoring transect walks. The drawing is usually a cross-sectional view of the path that has been walked with the findings below in a table format (see Figure 8). However, if this is too abstract, then it might be more useful to simply draw the walk as a bird's eye view line on a map, with the related information written alongside.

The frequency of walks will vary considerably, depending on the indicator(s) that are being monitored and the rate with which the monitored changes are likely to change. If monitoring pests, this might require a daily walk, whereas monitoring soil erosion would perhaps require 4-6 monthly walks. Comparing the different observations for each zone serves as the basis for discussing why changes might have occurred. You can walk with any notes or diagrams from previous monitoring events to trigger your memory and to make immediate comparisons possible.

Figure 8. A farm transect with wet season monitoring data, the Philippines



Source: Lightfoot et al 1993

7. Well-being or social mapping

While there are two methods that are commonly used for well-being ranking, only one – mapping – will be discussed here as it is a more open, group-oriented process and therefore better at provoking the discussion that is so essential for interpreting the data in participatory processes[2]. Well-being or social mapping is based on a map of human settlement as it aims to track socio-economic information related to households or individual farmers. This method allows for the specific monitoring of changes in relative well-being of a gathering of households or individuals. Very specific criteria for well-being can be used or a general assessment of overall well-being can be made.

It is important to understand that this method allows for relative ranking and not absolute assessments of people's wealth. (If – and only if – mutually desirable, then the relative rankings can become quantified but this will depend on what purpose that information will serve and if all those involved agree to open their wealth to public scrutiny in what is likely to be considered a socially sensitive exercise). This method is also useful for establishing local indicators of well-being that can then be monitored more specifically with other methods. Furthermore, it can be used to establish a sample of families or individual farmers that will be monitored by selecting a limited number from across different well-being groups.

Unit of analysis and possible topics

- any interest group (a group of families, eg a community or Community Association members, or members of a farmers' experimentation group): distribution of adoption rates of innovation amongst different socio-economic levels (see Figure 9); group members' involvement in innovations who benefits from an innovation/programme and who does not; changes in relative well-being as a result of agricultural innovation (see Figure 10)

Task and medium

- Diagram-based, and if desirable with quantities and indicators of well-being in writing.

How

First a discussion is needed to clarify what 'household' means locally, as local definitions of terms like 'household', 'compound' or 'extended family' vary considerably. Then, after making a map showing each 'household' (or compound or family) of the unit or sample that is being monitored, ask the participants to classify each household according to its level of well-being in comparison to others. This usually requires some initial discussion about broad groups or levels of well-being in the community (often about 3 to 6 levels). Each level can be given its own symbol or colour code.

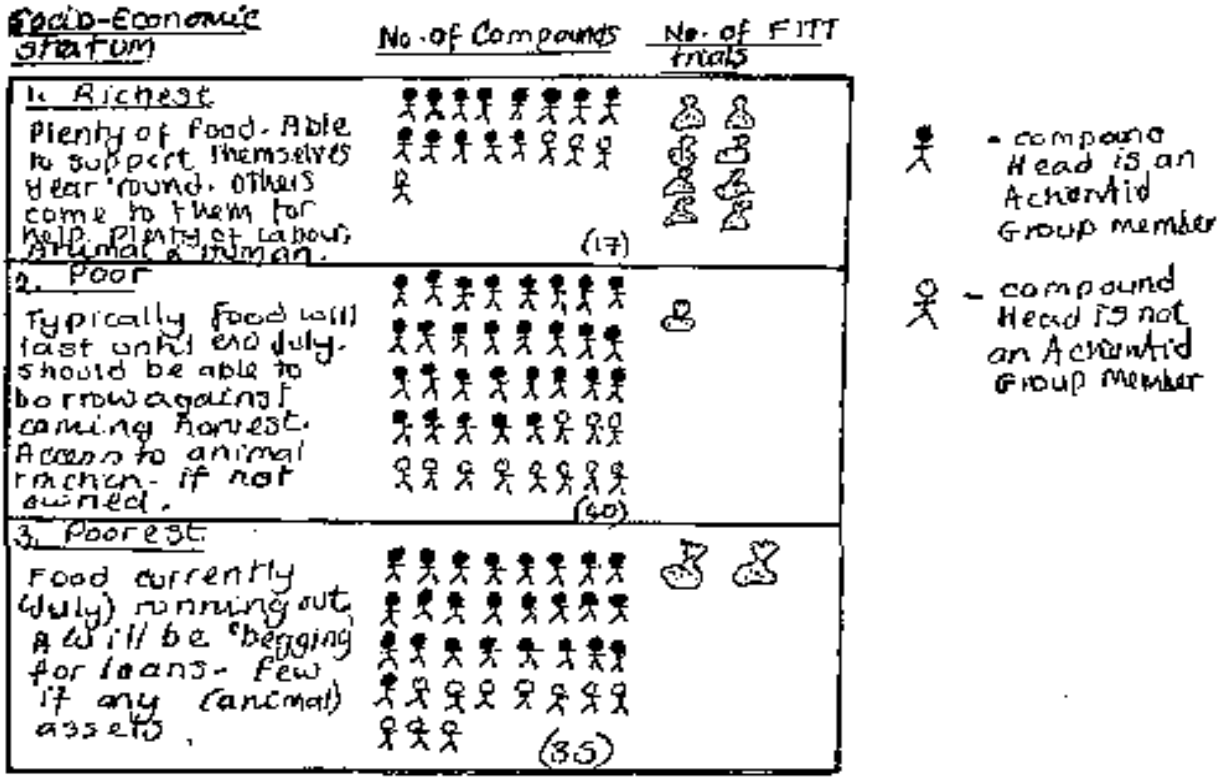
The ranking starts with any two households, which are compared quite simply in terms of which is better off than the other. If they have different levels of well-being, then they each receive a separate colour code or symbol on the map. One by one, other households are compared to those first two. This can lead to the identification of new levels if they are worse-off or better-off than the households already classified. They may be identified as of a similar level of well-being of an existing group of households and thus receive an existing code. In this way, each household is ranked within a level of well-being and receives a code/symbol.

Tracking the position of each household from year to year and assessing which households adopt certain innovations can help understand whether adoption of new agricultural practices is having an

2 For information about the second method which uses cards, refer to: 'Wealth ranking in Smallholder communities'. B. E. Grandin. 1988. Intermediate Technology Publications, London.

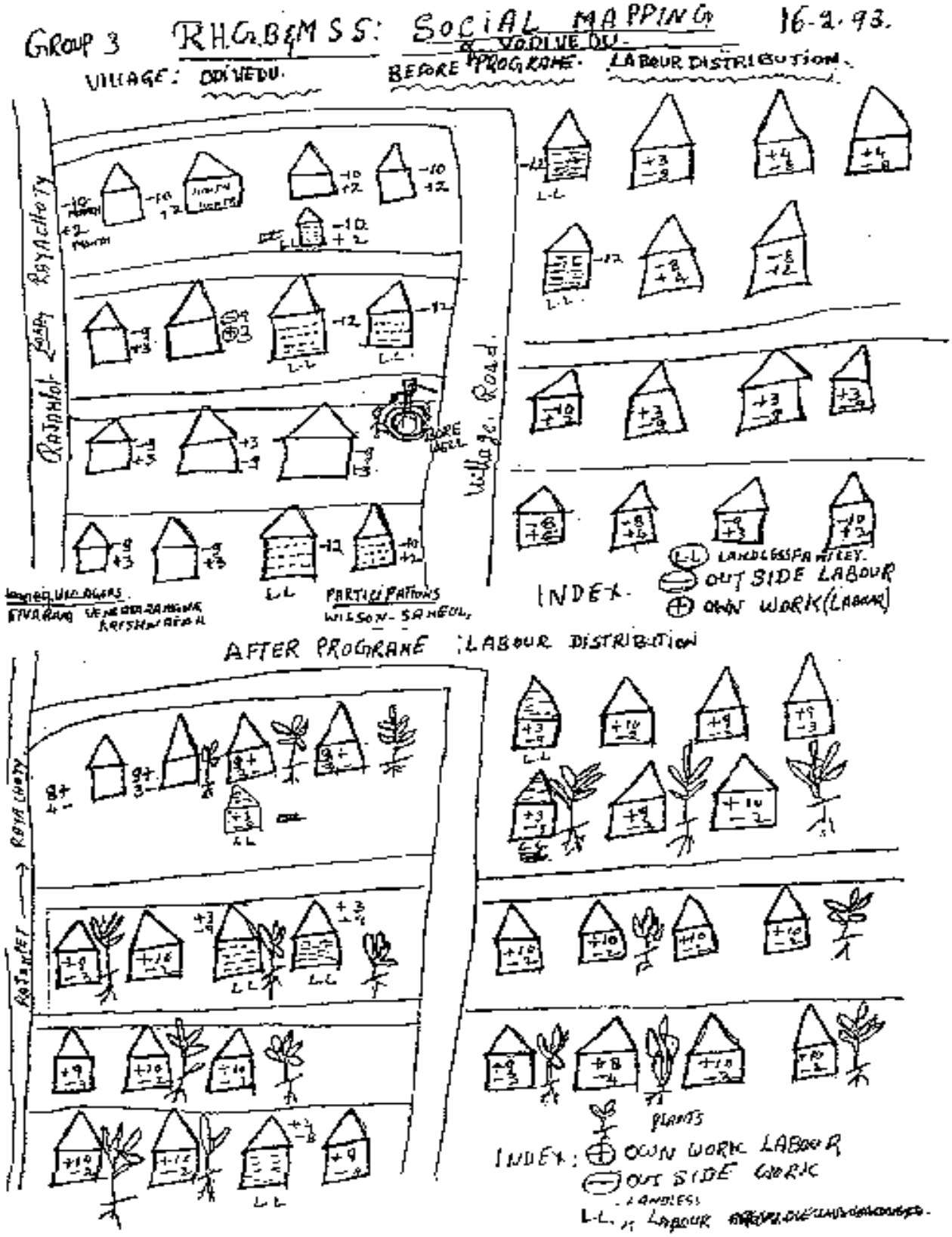
impact in terms of well-being and if adoption rates are evenly distributed amongst the different social groups. By discussing what well-being means at each monitoring event, it is also possible to track changes in the criteria of well-being. But this will all depend on what indicators of change have been selected.

Figure 9. Monitoring of distribution of adopters amongst different levels of well-being, the Gambia



Source: Sarch 1992

Figure 10. Social map showing before and after programme, showing changes in months of dependence on outside labour for income, India



Source: Mascarenhas 1994

8. Impact flow diagram

An impact flow diagram is an open-ended method that helps identify a wide range of impacts: positive and negative, expected and unexpected, and direct and indirect. To work well, the topic of an impact flow diagram must be very specific, not something as all-encompassing as 'environmental degradation'. The topic can be a project or programme activity, an event, a trend, or a phenomenon.

Unit of analysis and possible topics

- farm property: farm level impacts resulting from integrated pest management measures, membership of seed banks, contour planting, use of rotating funds
- interest group (see Figure 11): the tangible and intangible results of starting to meet collectively and experiment together; long-term impact for members of farmer experimentation groups of changes in sources of on/off-farm income
- community: impacts of community level planning for improved resource management and local development, including agricultural improvement (see Figure 12)
- organisation: consequences for local community-based group for entering into partnership with an external NGO
- maybe even a municipality (though verifying the impacts that emerge in the diagram becomes difficult at higher levels): consequences of the lack of well-functioning community associations.

Task and medium

- Good for recording and analysing of data, and feedback of findings. If several impact flow diagrams are made with different groups and aggregation is required, these can be compiled onto a single diagram which then forms the basis of the feedback.
- Diagram-based (although photographs of the impacts can also be used), with impacts either symbolised or written and additional written comments (on the diagram or attached to it) that can include quantities.

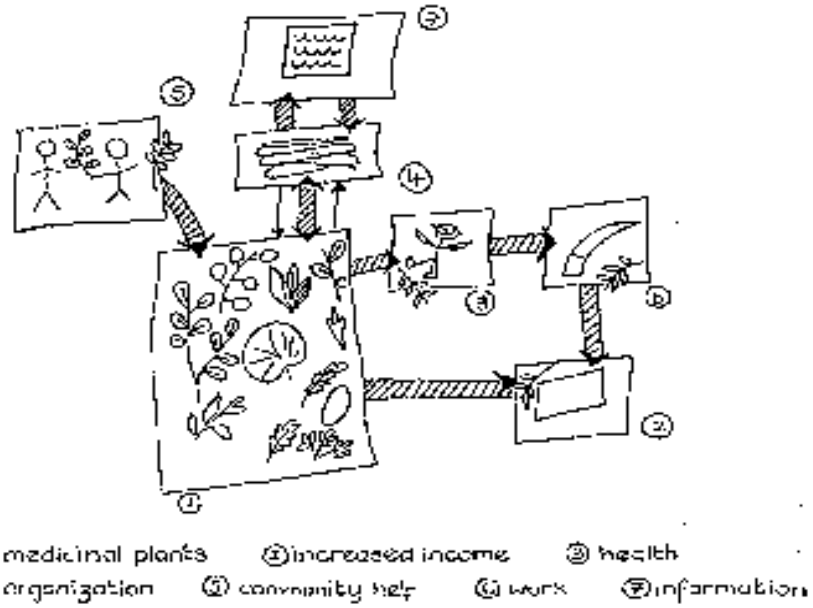
How

Start by symbolising the topic in the centre (on the ground or a large flip chart). Ask what has happened as a result of that activity (or trend/event). As each consequence is identified, it is symbolised or written down. These consequences are the 'impacts' of that activity, and may be positive or negative. They should be placed on the diagram to show how cause and effect are linked, eg with arrows or lines. If arrows are to be used, make sure that everyone is clear about what arrows mean as they are not a universal symbol. It is good to probe for indirect consequences that result from the immediate impacts (see examples below).

If quantitative information is needed, then questions can be asked about the amounts related to each impact that has been identified. For example, if farmers say 'we've noticed increased production', then they may be able to estimate or measure how much that increase is worth, or how many of the farmers involved in the trials have noticed an increase. Or if women say that improved relations with their husbands has led to a decrease of wife battering, they may be able to count the number of households in which it has stopped. You can also ask if the impact has been equal for everyone and symbolise that on the map, with different groups having their own symbols. For example, if controlling banana weevil with a non-chemical alternative requires more labour input, who has provided this input – women or men, and what has been the impact of that for the women, men or children involved?

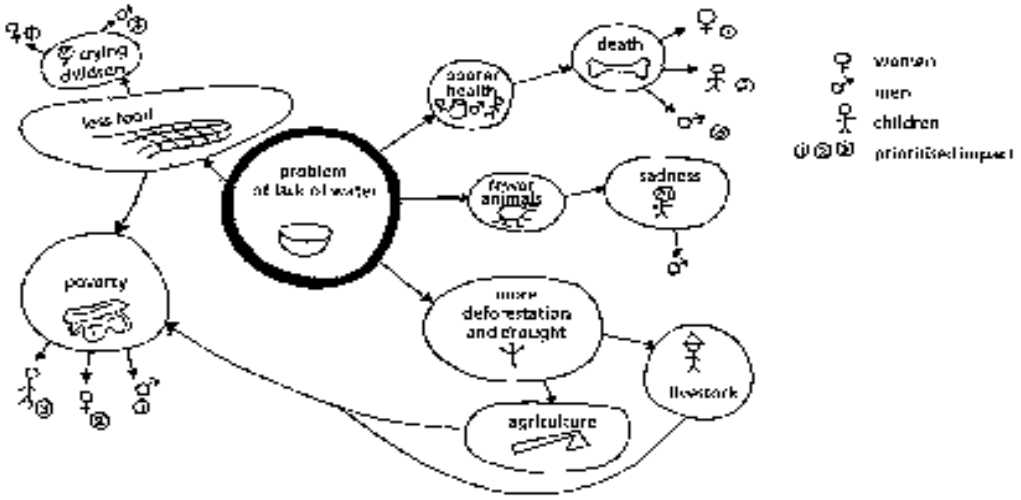
Repeat the exercise regularly, and use this as the basis for discussing why changes might have occurred. A sequence of impact diagrams about the same topic can be compared over time, for example, a series of three impact flow diagrams – one constructed 2 months after the changes started/occurred, one after 6 months, and one after 1 year. This can help those involved understand if certain impacts are becoming more widespread, are transient, or are being sustained. Alternatively one impact diagram can be used for several years, with symbols representing the changes over time and whether there is an increase or not (see example).

Figure 11. The impact of women's work with medicinal plant project, Brazil



Source: Guijt 1996

Figure 12. The gender-differentiated consequences of decreased access to water, Burkina Faso



Source: Guijt 1996

9. Systems diagram

Systems diagrams allow for a detailed analysis of flows of inputs and outputs, according to predetermined indicators or as they are identified through an open-ended discussion. As the name indicates, this method is good to monitor a unit that is a 'system', particularly a farm or other natural resource management area such as a forest. However, an organisation or a larger geographical region can also be considered a 'system'. System diagrams can help to analyse the inputs needed to make the system work and its outputs. It also shows how the inputs and outputs are linked and where bottlenecks are occurring or will occur in future.

Unit of analysis and possible topics

- farm property: the use of chemical inputs, labour (see Figure 13), money, organic matter; the amount of harvested produce; the amount of biomass taken off farm (see Figure 14)
- an organisation: financial inputs from different sources and use of money for different activities; main sources of ideas and with whom/which other organisations these are shared
- possibly a region: the number and types of agricultural policies that are being applied to the region; the amount of agricultural produce leaving the region; the number of out-migrating or returning farming families

Task and medium

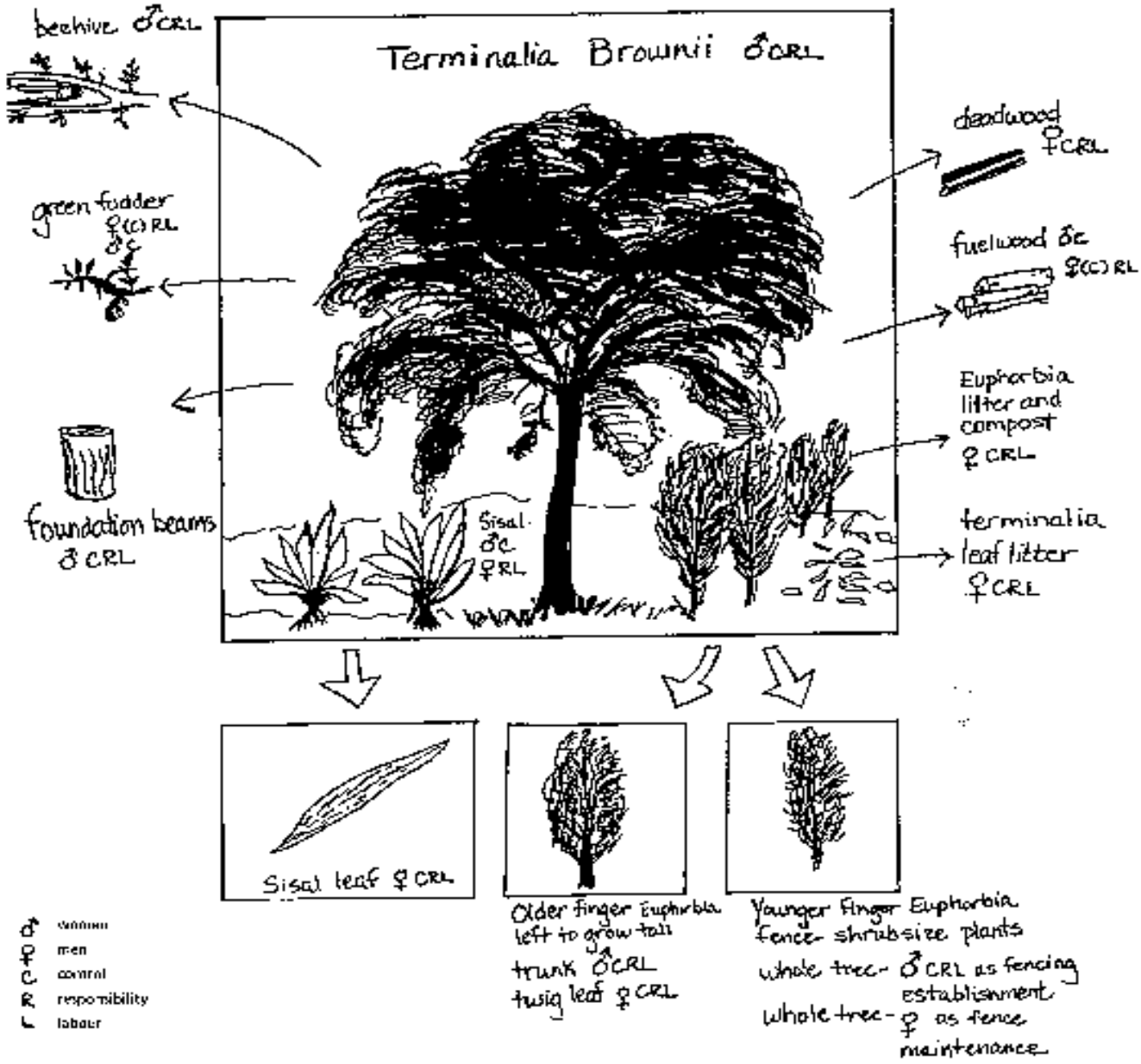
- Good for recording and analysing data, and feedback of findings. If several systems diagrams are made with different farmers and aggregation is required for a community or region, these can be compiled onto a single diagram.
- The method is diagram-based, with inputs and outputs either drawn, written or symbolised with examples or photographs of the real object, and with additional written comments (on the diagram or attached to it) that can include quantities.

How

Start with the topic in the centre, for example a farmer's property. Ask what main activities take place. These are then symbolised around the central topic on the diagram and linked to it with arrows. Ask what inputs are needed for each activity to happen, and what the outputs are of each activity. These inputs and outputs are placed (represented or written) on the diagram to show the linkages. As the discussion progresses about the inputs and outputs for each activity, each activity becomes a kind of sub-system and linkages emerge between these sub-systems. For example, an output from the activity of crop production, like fodder, will be an input into the activity of livestock management.

At each monitoring event, changes in the inputs and outputs are noted either on the system diagram itself or on a flip chart next to it. Comparing changes in the types and quantities of inputs and outputs is the basis for discussing why such changes might have occurred. Gender/age/well-being-differentiated analyses of systems diagrams are also possible and allow for better tracking of how changes affect different members of a household or different types of households.

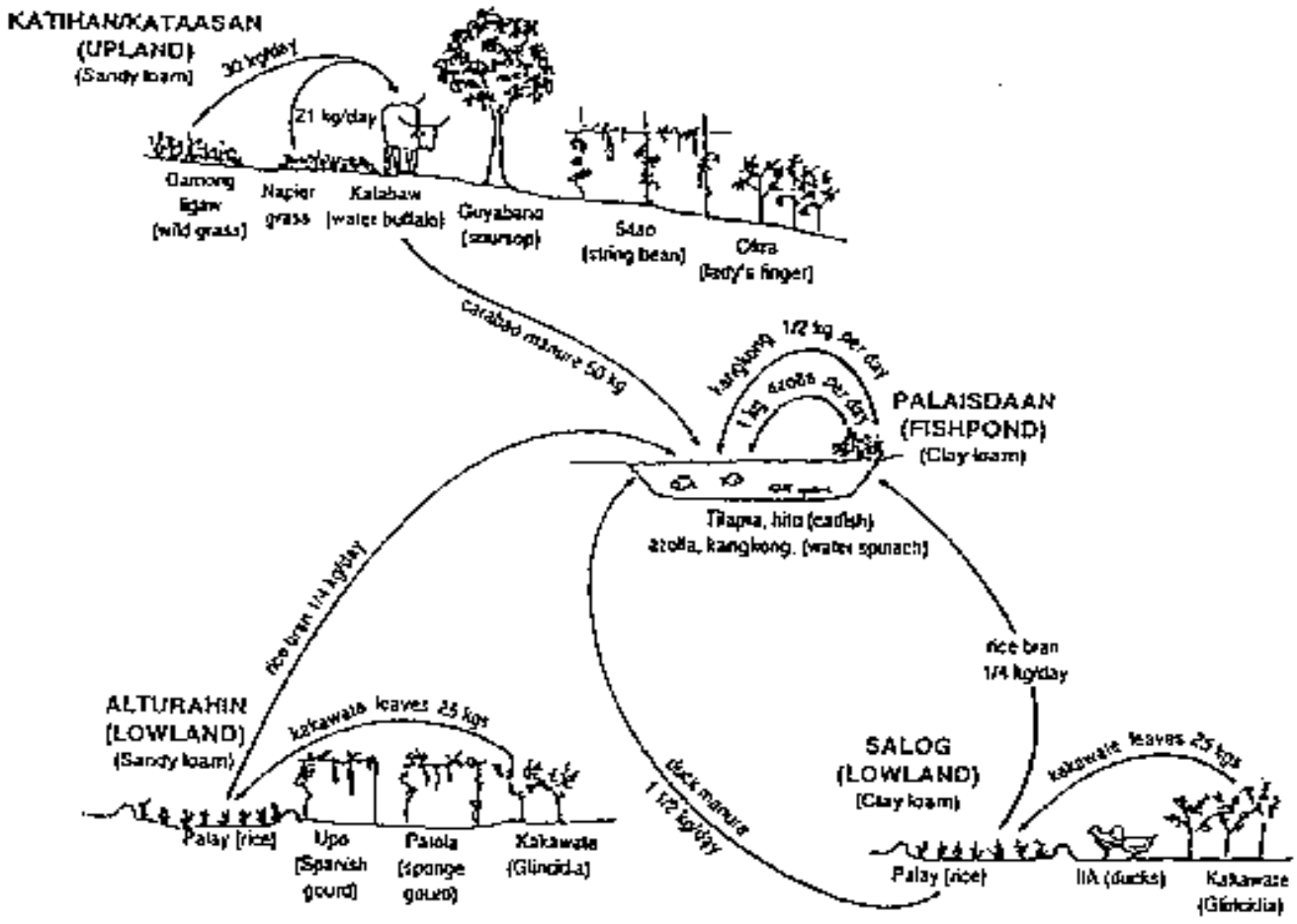
Figure 13. Systems diagram of gender division of plants and products from joint tree management, Kenya



As changes occur in the gender dividion, these can be indicated at each monitoring event with symbols, such as ↑ increase, ↓ decrease, ↔ stable

Source: Rocheleau and Edmunds 1997

Figure 14. Bioresource flow model, wet season, the Philippines



Source: Lightfoot et al 1993

10. Matrix scoring

A matrix is useful for a relative comparison between different options or varieties of a specific issue, problem or decision, such as the main types of land on which farmers work, types of maize that they grow, or different forest management activities. It is an excellent method for analysing in detail why people prefer one option above the other. In a monitoring context, it is therefore suited to assessing changes in people's preferences or in the reasons for their preferences. Although the results are recorded as numbers, the greatest value of matrix scoring comes from the discussions that are provoked as the group or individual comes to a decision about the final score of each option.

Unit of analysis and possible topics

- individual farmer: changes in preference for source of different agricultural credit sources; changes in types of income sources and opinion of these enterprises
- interest group: comparison of trials with maize/bean varieties carried out by group members (see Figure 15); comparing relative value/sustainability of different agricultural enterprises; comparing preferences for different types of pest control
- organisation: comparing different experimentation methodologies; assessing relative value of different types of partnerships; changes in perception of merits of different funding sources; which type of innovation is best to invest more time/money in (see Figure 16)
- community or region: changes over time of the existence of certain phenomena (see Figure 17)

Task and medium

- Good for recording and aggregating data, and sharing findings.
- The options and criteria can be presented in a diagram, symbolised with examples of the real object, or in written form.

How

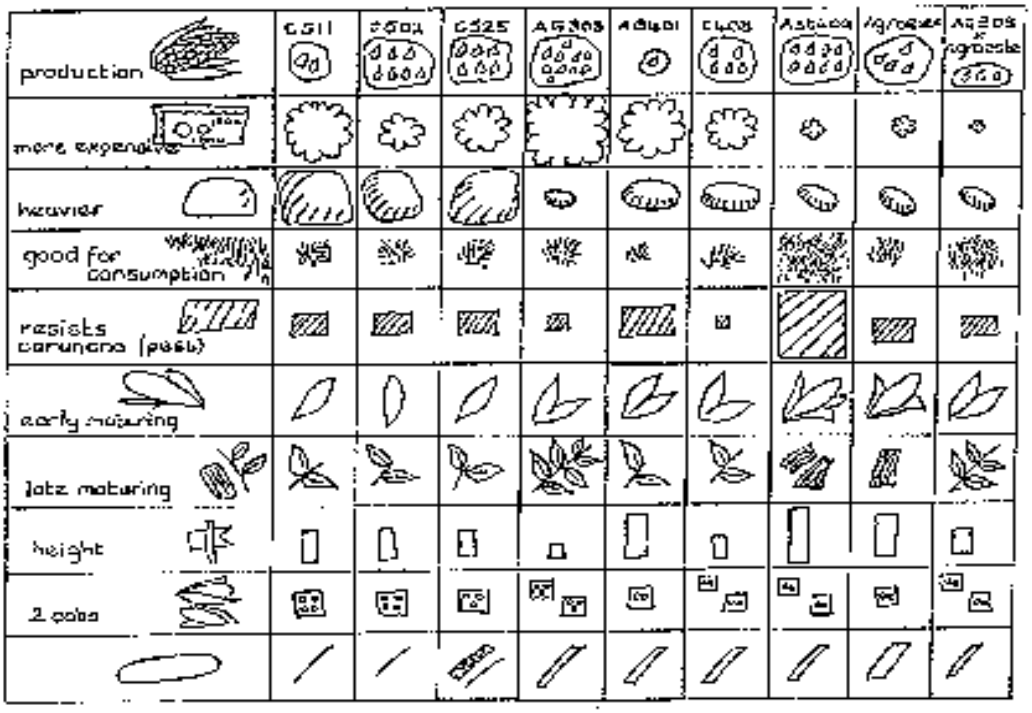
First, each option or variety about the topic being discussed is represented and placed in a row. The group then identifies the criteria that will be used to compare each of the options by discussing the advantages and disadvantages of each option, for example the pros and cons of each variety of maize. Each criterion is symbolised and placed in a column to create a matrix. The group then evaluates how well the options satisfy each criterion, by comparing the options and giving them a relative score. For example, the extent to which each of the different maize varieties sustains production levels over time, with the variety that gets the most points being the one that sustains production best over time. They can use stones, seeds or numbers for the scoring, with more stones indicating higher scores and therefore better ability to fulfil that criterion. There are different ways to establish the number of points to use for scoring but, in general, more discussion and reflection is provoked if a certain number of points, for example 40, is used per criterion and not a maximum number of points per box, as is common.

Repeating the exercise after every harvest or each year can help for a continual assessment of new varieties or options as they appear and are tested. Comparing a series of matrix scoring exercises can then stimulate a discussion about why changes between the different scoring exercises might have occurred.

A matrix can also help to make longer term historical comparisons. When used in this way, the comparisons are made between different periods of time and the degree to which certain phenomena existed or were considered important (see Figure 17).

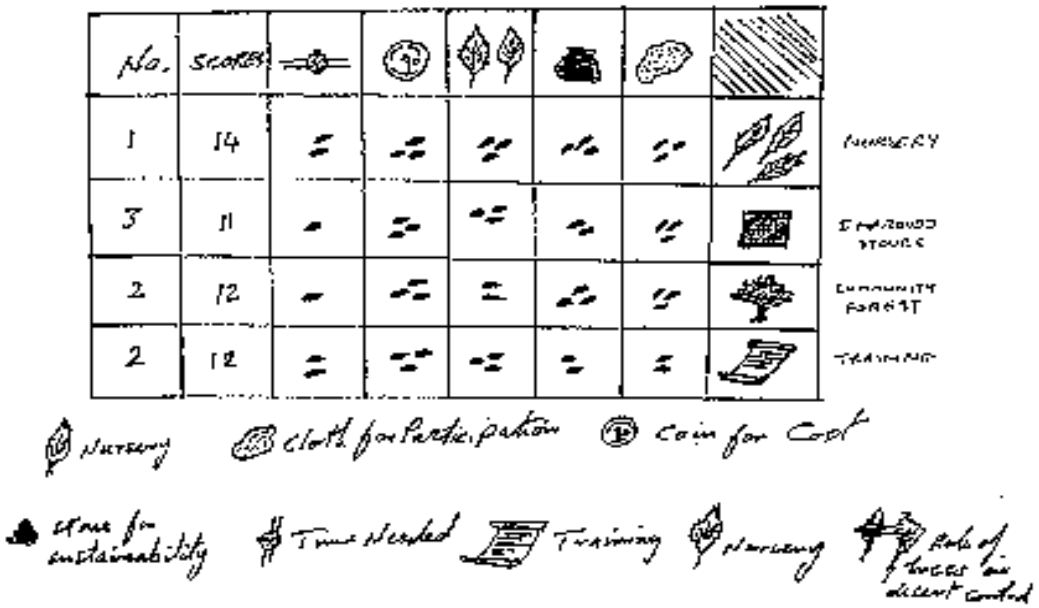
Matrix scoring can also be a useful method to help identify key indicators that can then be monitored regularly using other methods. The indicators are selected from amongst the criteria (ie the advantages and disadvantages of each option) that have been identified, such as 'sustained productivity'.

Figure 15. Monitoring of traditional maize variety trials, Brazil



Source: Guijt 1996

Figure 16. Matrix comparing different forest-management activities, Sudan



Source: Quinney 1994

Figure 17. Historical matrix comparing coping strategies in times of crisis, Senegal

PERIOD / SOURCE OF LIVELIHOOD	Until the end of swamp rice >25 yrs ago	Until the Chinese rice project 15-25 yrs ago	Period of Chinese rice project 12-15 yrs ago	End of rice project to fertilizer problem 3-12 yrs ago	PRESENT (past 3 years)
Millet	12	19	7	22	30
Groundnut	8	19	5	24	40
Rice	15	6	19	5	10
Maize	8	17	8	20	32
Findao Grain	4	4	4	4	5
Gardening	14	18	5	20	40
Tree Products	20	20	20	20	45
Cattle	18	20	20	20	20
Sheep and Goats	17	20	20	20	20
Money from Relatives	5	5	10	25	30
Fishing	8	8	10	8	10
Pumpkins	7	7	10	10	20

Source: Schoonmaker Freudenberger 1994

11. Relative scales or ladders

Ladders or scales are useful for making a relative qualitative comparison of 'before' and 'after' situations related to a specific indicator. This method is particularly helpful for qualitative assessments of less tangible changes, such as attitudes and degree of cooperation. While this method also involves ranking/scoring, it differs from Matrix Scoring (Method 10) in that it only looks at one indicator at a time and gives it a rank or score by comparing past and present conditions related to that single indicator.

Unit of analysis and possible topics

- individual farmer (see Figure 18): self esteem or self confidence, awareness about an issue, growth in analytical skills, capacity for autonomous decision-making, productivity of cash crops, indebtedness
- interest group (see Figure 19): degree of participation of group members, access to certain benefits, cooperation amongst group members, ability to maintain collective facilities (eg a water pump or seed bank), ability to gather debts
- organisation: efficiency of meetings, amount of resources mobilised, planning capacity, leadership, internal communication, external linkages and awareness (see Figure 20)

Task and medium

- Good for gathering and analysing data. Another method for recording the discussion and aggregation may be required. Alternatively, if aggregation of opinions is needed, another ladder can be used on which the aggregated findings can be placed. Ladders or scales can also be used to share findings with others.
- This method an be diagrammatic (as in a ladder with symbolised indicators) but the questions (or indicators) are written if they are difficult to depict.

How

First, the group must choose its indicators. These can be formulated either as statements or questions. Then there are several ways to compare changes in these indicators over time.

One way is visual, using a ladder for each indicator (see Figure 18). Locate the '0' mark in the middle of the ladder, and not at the bottom as in the example, as either an improvement or a deterioration may occur. At the first monitoring event, an assessment is made of where they think they were before the intervention started, towards the left of the ladder. Then they indicate on the right side of the ladder where they think they are now as a result of the project or activity. At each monitoring event, eg monthly meetings, the person or group makes a new assessment is made of where it feels it stands on the ladder in relation to each indicator that is being monitored. This forms the basis for discussing why changes have occurred and what action might be required to reinforce positive changes or limit deterioration. The ladders can be used for individual farmers' assessments of change and then discussed collectively, or the group can discuss until a consensus is reached about the status of the changes being monitored.

Another method is by using the same set of questions each time and seeing how answers to the questions, for example on a sliding scale of 1 to 5, vary over time. The questions represent a sliding sale of opinions about a single indicator. Ask the group to reach consensus or each person to vote, for example choosing between a scale of 'strongly agree', 'agree', 'don't know', 'disagree', and 'strongly disagree' (or 'most satisfactory', 'satisfactory', 'unsatisfactory' and 'very unsatisfactory'). They can also chose between a range of points or a range of more or less happy looking faces. For

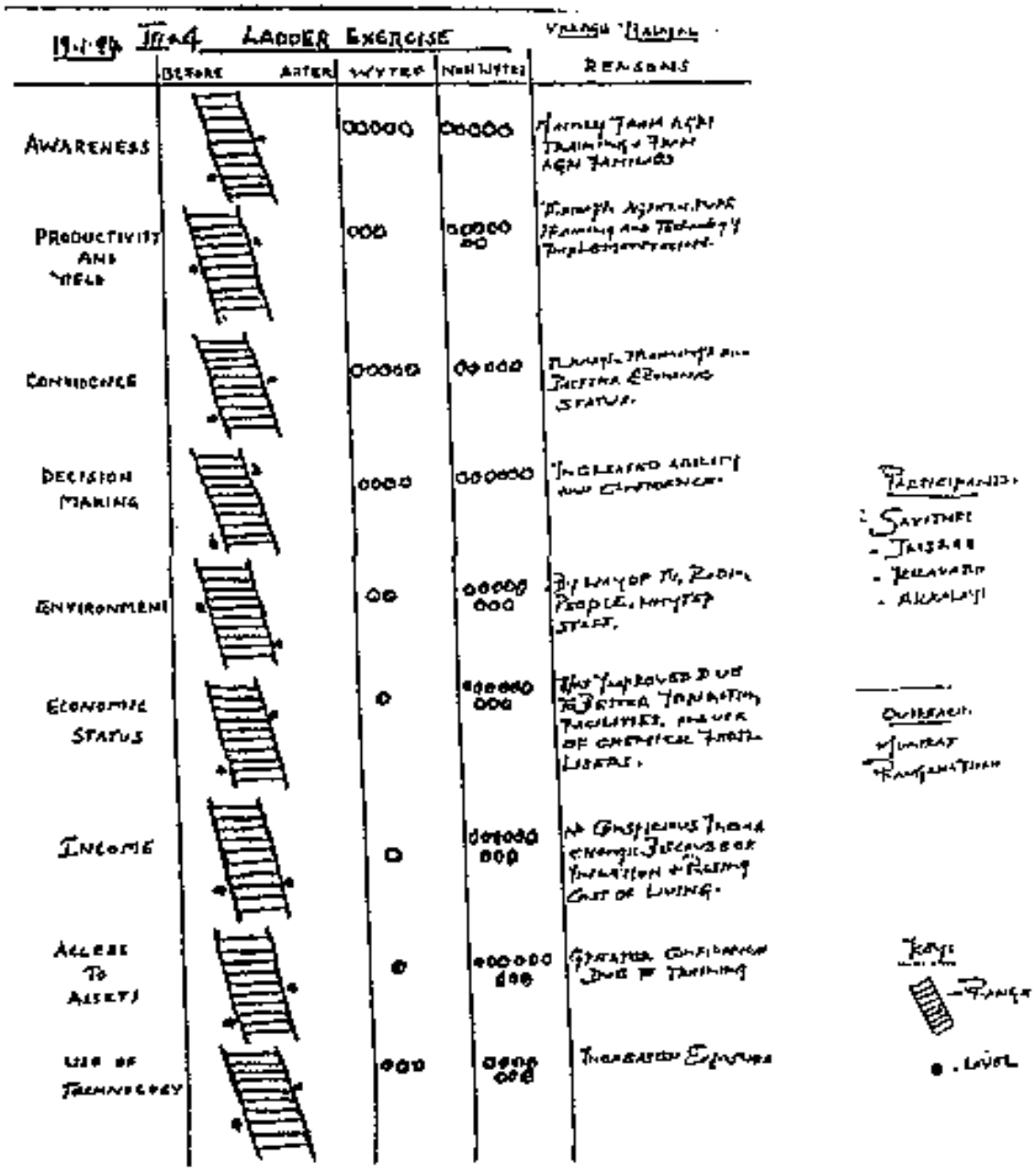
example, if a group of farmers is interested in identifying 'efficiency of meetings' as an indicator of the success of the group, then group members can ask themselves that question every 6 to 12 meetings, for example, using the following points system (based on Uphoff 1991):

- *3 points* Our meetings are always efficient: we use our time well, make clear decisions, and our decisions are implemented.
- *2 points* Our meetings are usually efficient: we use our time fairly well, make decisions that are usually clear, and our decisions are often implemented.
- *1 point* Our meetings are sometimes efficient: we sometimes manage to avoid unnecessary discussion, and can make decisions but they are not always clear to everyone, and our decisions are sometimes implemented
- *0 points* Our meetings are never efficient: we always talk without making any decisions and therefore are not implementing changes.

Changes in the average opinion or points per question forms the basis of discussing why such changes have occurred. If points are used, first clarify what the maximum number of points will be. The more there are, the more complex it can get and also the more meaningless the discussion as people may not be able to indicate exact numeric differences, for example deciding between 28 or 29 points if they have a range of 0 to 50. On the other hand, if people are scoring on a scale of 1 to 3, then it will be much easier to reach a general consensus and therefore the answer will only serve as an extremely general indication.

Final numbers or positions on the ladder are not the main outcome of this method. The most important part is the discussion that occurs as group members reach agreement, and of course the analysis of why changes in the numbers/positions might be occurring.

Figure 18. Women's assessment of project impact using nine indicators, India

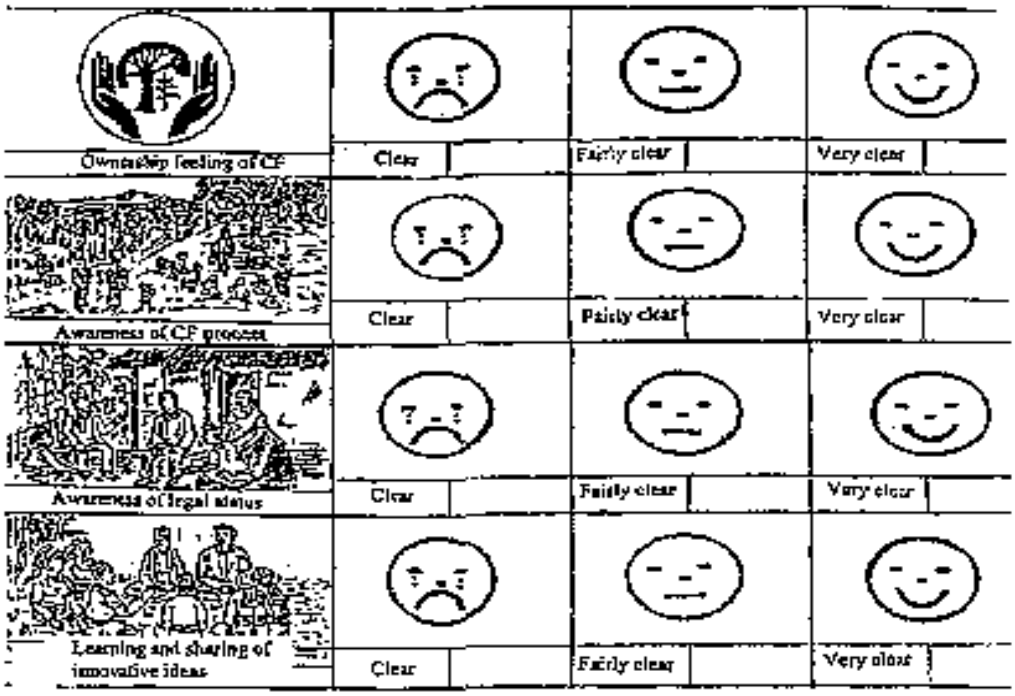


Source: Mascarenhas 1994

Figure 19. Self-rating of community water user's group, Indonesia

Source: Narayan 1993

Figure 20. Information flow and awareness about community forestry process, Nepal



Source: Kumar Rai 1998

12. Ranking and pocket charts

This method is similar to matrix scoring (Method 10) and relative scales or ladders and (Method 11). But, unlike matrix scoring which compares how a range of different options rate in terms of many criteria or the ladders which assess one option at a time, ranking involves making a single overall ranking of a list of options. Whereas matrix scoring is ideal to select the best amongst various options, a ranking exercise from a monitoring perspective helps assess changes in people's general opinions about options.

A simple ranking is like a matrix which only has one column. A pocket chart is more complex as it is used to make a series of overall rankings. The pocket chart is also more accurate as it allows the assessment of the percentage of people with certain opinions. While filling in a pocket chart may well provoke less discussion than matrix scoring, as it is usually done on an individual basis, analysing the results afterwards with the group of participants will encourage collective reflection and will help give meaning to the data.

Unit of analysis and possible topics

- individual farmer/household: preferences for different types of crops or different varieties of a crop (see Figure 21); key problems or production bottlenecks; sources of income or credit; sources of agricultural information
- interest group (see Figure 22 and Figure 23): same as above, plus preference of group members for different types of agricultural practices
- community: distribution of decisions made amongst different groups within the community; incidence of habits/behaviour amongst community members, such as specific land preparation or pest control practices; development priorities (see Figure 24)
- organisation: priorities for research and extension; key management problems

Task and medium

- Good for collecting and analysing data, and sharing findings.
- Best used with words or diagrams, with quantities in writing and additional notes on any discussion and analysis.

How

Make a complete list of all the options about the topic being monitored, for example all the maize varieties, sources of credit, erosion control measures, etc. When conducted with a group, there are two ways to do the ranking. It is possible for each participant to make her/his own individual ranked list and then to calculate an average rank for each option to arrive at a collective ranked list. Alternatively, the group can reach consensus on the relative ranks through group discussion and make one collective ranking. The second option will clearly provoke more discussion than the first!

A new ranking is made at each monitoring event and compared with previous rankings. This is the basis for discussing the changes and their possible causes, and what future action or adjustment of the activity is required.

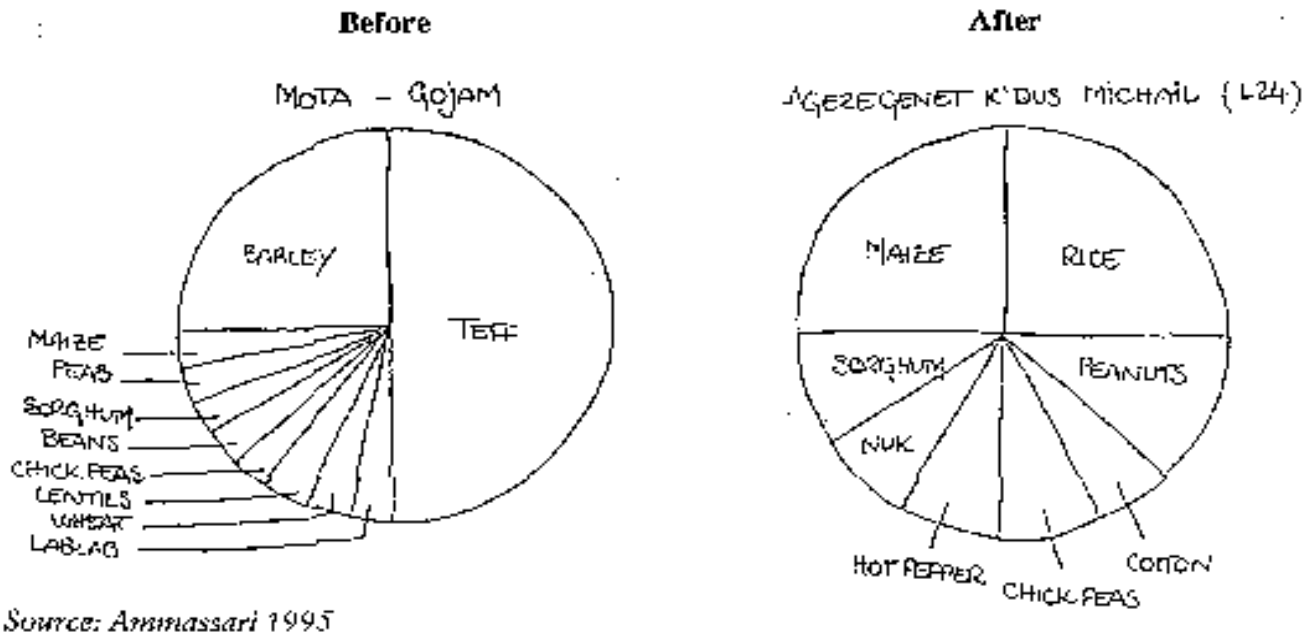
A more visual, but also more general, approach than a simple 1-to-10 type of ranked list is to ask people to give a relative weight or 'value' to each option with a certain quantity of stones, a heap of sand, or a segment of a pie diagram. This approach clearly generates only a very general idea of preferences and priorities, but in some cases that is sufficiently accurate. If pie diagrams are used to gather the actual data, then they usually will only represent only very approximate perceptions of people's rankings. However, a pie diagram can also be used to record precise findings as segments of

a pie diagram can represent exact percentages based on data that has been gathered through other means.

To make a pocket chart, first identify the different options that you want to assess (eg potential decision-makers – see Figure 22 – or different agricultural practices/habits). Write or symbolise each option at the top of a column. If you want to monitor the rate of occurrence of certain habits or practices, place three or more rows below the columns: 'always', 'sometimes', 'never'. In this case, ask each person to place a vote per practice/habit. If you want to monitor the participation of different groups in decision-making, then these groups are symbolised at the top. Then decide which aspects of decision-making you want to monitor. These aspects become the other side of the matrix, the column.

The voting can be done privately by asking everyone to turn their backs (or turning the pocket chart around) and having people come up one by one. Count the votes and discuss the outcome together. If people want to have a gender-differentiated analysis, use different codes for the women and the men. Alternatively the group can discuss each question until they reach consensus. Repeat the exercise however often people feel changes might occur and need to be reassessed. Use the comparison of the results from previous events to discuss why changes might have occurred.

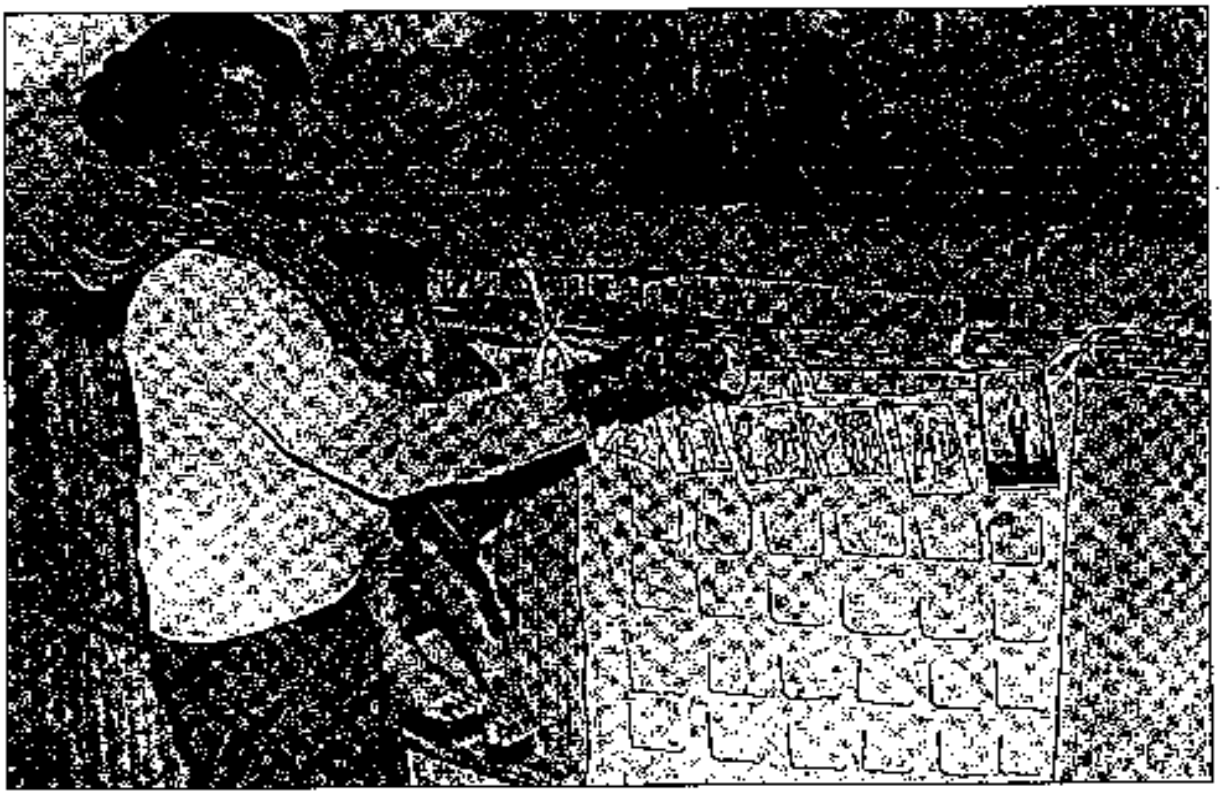
Figure 21. Pie diagrams showing changed rankings of crops planted, Ethiopia



Source: Ammassari 1995

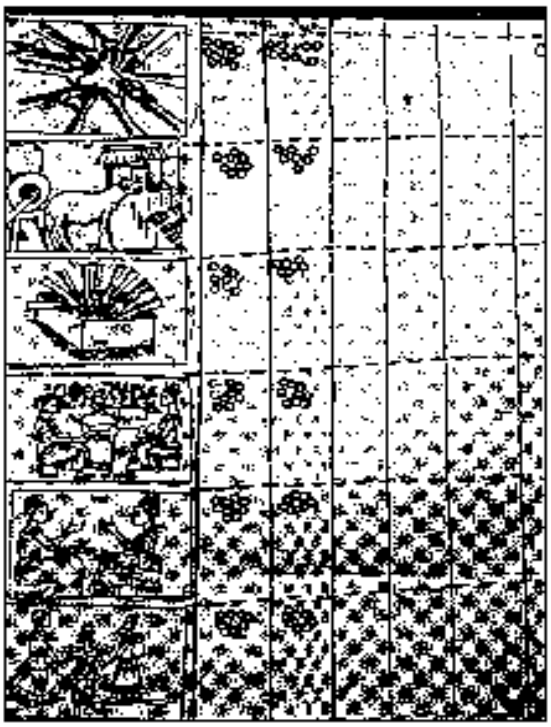
Figure 22. Pocket chart to assess participation in decision-making within water user's group, Indonesia

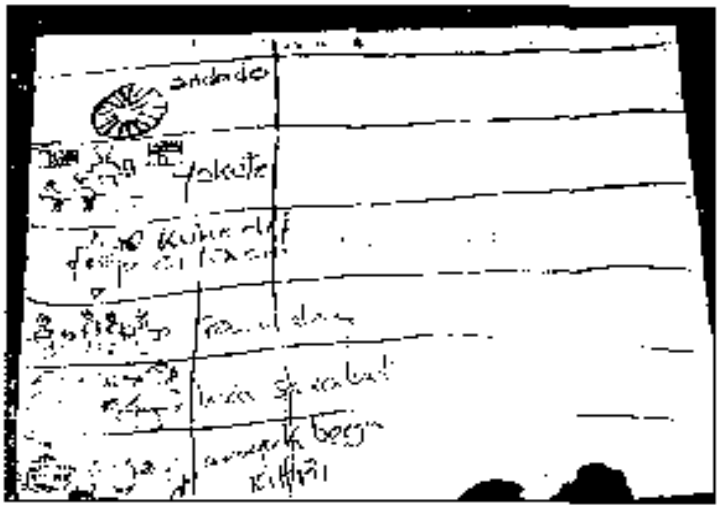
Who Decides What?	Ordinary Woman	Ordinary Man	Female Leader	Male Leader	Water Group	Field Worker
1. Decisions within groups	7%	5%	19%	12%	28%	29%
2. Group Leaders	3%	11%	30%	20%	10%	26%
3. Group Activities	9%	13%	16%	23%	27%	12%
4. Size of Monthly Contributions	8%	13%	32%	10%	17%	20%
5. Need for Sanctions	5%	6%	22%	39%	13%	15%
6. Location of Pumps, Taps, Tanks, etc.	1%	13%	16%	16%	14%	40%
7. Repairs	4%	5%	9%	18%	21%	43%
OVERALL SCORES	6%	9%	21%	21%	19%	24%



Source: Narayan 1993

Figure 23. Women monitoring the functioning of their group activities, Senegal





These women have identified six indicators of group functioning: cohesion, diversity of activities, participation, regularity of meetings, equal voice of members, and if they are addressing real needs. Monthly discussions of each indicator for each of their group activities gives the members a basis for adjusting plans and improving their efforts.
Source: Gueye 1997 pers com

Figure 24. Shifting development priorities, Kenya

Shifting Priorities: Comparison of Needs in 1992 and 1996 Nagumu and Kamathatha Zones in Gilgil

Original Ranked Priorities: 1992	Reranked Priorities for Kamathatha: 1996	Reranked Priorities for Nagumu: 1996
1. Water	1. Food Shortage	1. Food Shortage
2. Health	2. Employment	2. Lack of Income
3. Wildlife	3. Hospital	3. Health
4. Technical Services	4. Lack of Income	4. Migrating Livestock
5. Education	5. Police Post	5. Roads
6. Transport	6. Cattle Dip	6. Lack of Trees
7. Lack of Income	7. Artificial Insemination	7. Wildlife
8. Food Shortage	8. Market	8. Veterinary Services
	9. Playground	
	10. Poor Transport Network	
	11. Water	
	12. Schools	
	13. Lack of Woodfuel	
	14. Wildlife Menace	

Reranking priorities at regular intervals provides indicators of changing priorities within a community. In Gilgil, new pipelines reduced the need for water; however, priority for jobs, income, and food have moved to higher levels.

Source: Ford et al 1996

13. Calendars

Calendars record data for distinct time periods and therefore show changes over time. This can be weekly, monthly, or per season. They can be used to assess changes for one or for several years. Seasonal calendars and historical trend lines (graphs or bar charts) are perhaps the two best known versions. Seasonal calendars, as the name says, are ideal when the need for monthly or seasonal monitoring per year has been identified. Seasonal calendars that include a range of indicators are very useful for revealing how different patterns of change are linked and discussing causality of certain changes. Historical trend lines show changes from one year to the next, and are therefore better at keeping track of longer term changes. Trend diagrams are often used to summarise data that is gathered and analysed using other methods.

Unit of analysis and possible topics

- individual farmer/farm property: rainfall, production/productivity, costs of inputs; amount of labour invested in different parts of the agricultural enterprise (Figure 27); key problems
- interest group: market price for collectively marketed goods (for sale or buying); key problems
- community (Figure 25 and Figure 26): health status, illness, attendance at literacy classes, resource management use and activities
- organisation: wage labour price, regional migration levels, completion of tasks

Task and medium

- This method is particularly good for recording and analysing data, but is also suited for gathering data and sharing findings. Data may need to be gathered through other means, depending on the indicator. For example, if monthly rainfall is to be measured, then a rain gauge will be needed, or if harvest levels is important then weighing scales or volume assessments are needed.
- The method as suggested here is diagram-based, or can be in writing if those involved wish, particularly to record data of individual farmers.

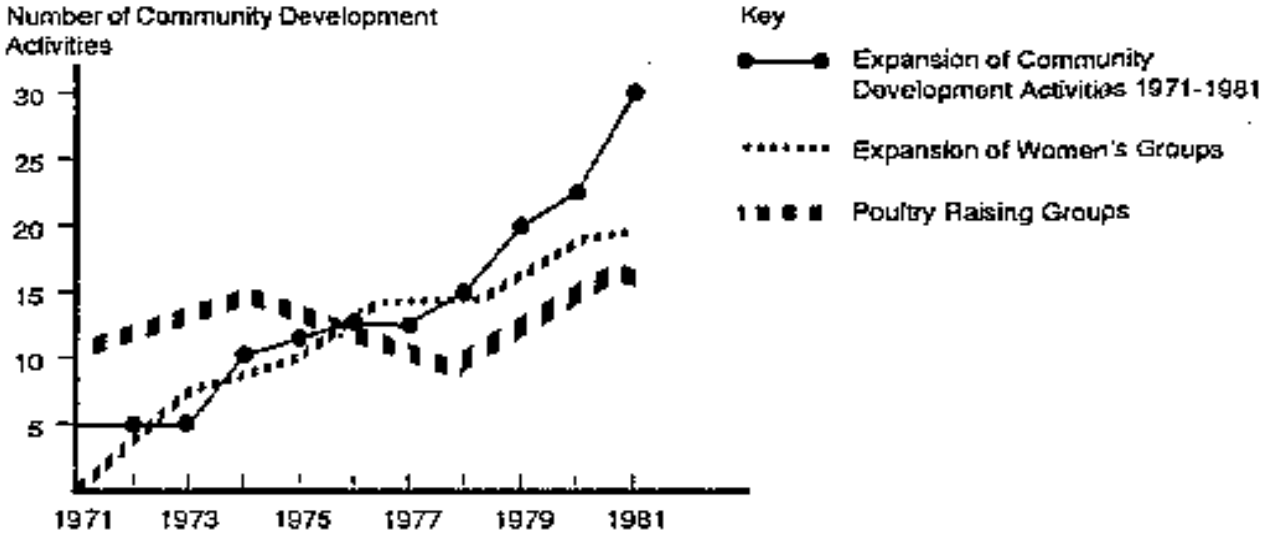
How

First, it is important to clarify with those involved whether calendars will monitor changes between weeks, months, seasons, or years. This will depend on the indicators that have been selected. Then a calendar is constructed either to depict one or several years, or the minimum number of months or seasons for which monitoring is intended to occur. The seasonal calendar can be represented either horizontally or circular, though the latter can get a bit messy if many indicators are being monitored. Circular calendars are not well suited for multi-year trend analysis.

The calendar itself can be used to gather the data in some cases. For example, at weekly or monthly staff meetings, when the tasks completed in the past month are discussed these can be recorded immediately onto the calendar. Alternatively, if data is gathered through other means, then for each month (or season) for which data is gathered, the correct amount can be filled in on the calendar, thus making the calendar a type of form (see Method 2). This will quickly show seasonal variations from month to month. Discussions will be needed to understand what the changes are and why they are occurring.

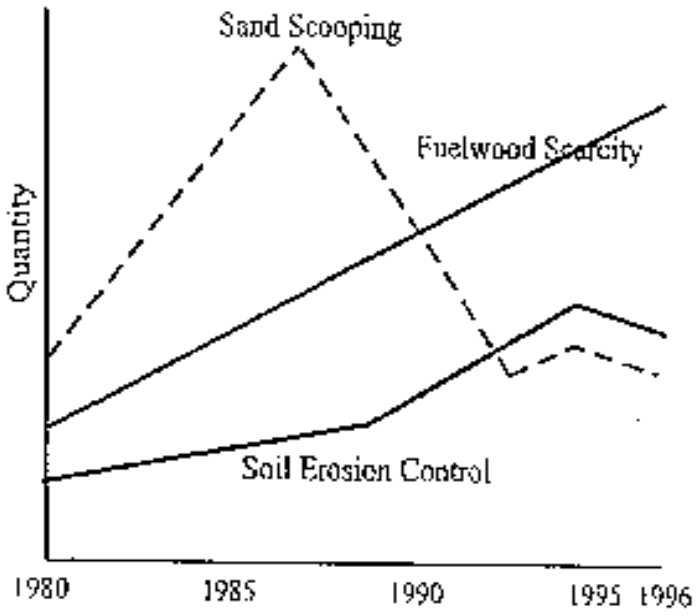
By monitoring various types of changes simultaneously in one seasonal calendar or trend chart, certain patterns may become apparent such as how heavy work periods may occur during periods of indebtedness, illness, and lower attendance at group meetings. Data can also be differentiated according to age and gender. However, the relevance of such variations will depend entirely on what it is that you want to monitor.

Figure 25. Trends of three community development indicators



Source: Mikkelsen 1995

Figure 26. Trends in three natural resource-related community level indicators, Kenya



Explanation:

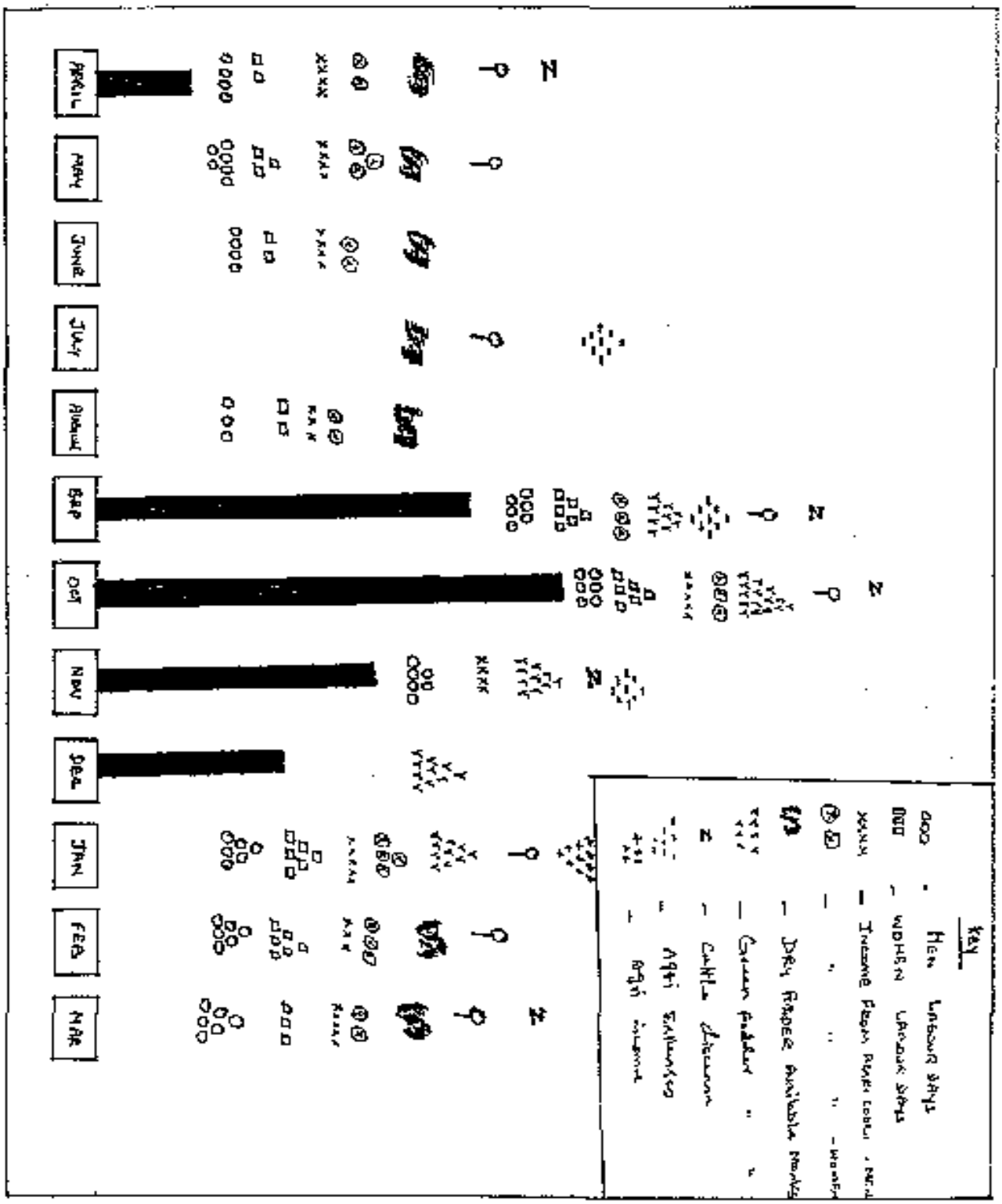
Soil Erosion Control
Good progress in late 1980s and early 1990s because tools provided by project activity and community groups well organized. As drought deepended in mid-1990s, attention to terraces weakened and women's groups diverted to providing livelihoods in difficult times.

Sand Scooping
Trucks from Nairobi increased in early 1980s as urban building boom took off. By late 1980s, community groups getting organized to deal with sand scoopers. Groups also enlisted help from District Commissioner and County Councillors. Problem mostly under control at present.

Fuelwood Scarcity
Steady increase as population rises and common land becomes less available.

Source: Ford et al 1996

Figure 27. Calendar of buffalo husbandry, India



Source: Devavaram 1994

14. Daily routines

Daily routines are similar to seasonal calendars but are based on analysing and monitoring changes in daily patterns rather than monthly or seasonal patterns. They are useful for assessing how key bottlenecks in daily tasks are overcome or if new problems are emerging, and for quantitative assessments of labour, inputs, etc of daily tasks.

Units of analysis and possible topics

- individual farmer: key problems related to daily tasks, time spent on daily tasks (see Figure 28), changing intensity of labour per task
- organisation: key problems related to daily tasks, time spent on daily tasks

Tasks and medium

- Good for gathering, recording, and analysing data , and sharing findings.
- Medium can be either through diagrams or written, or a mixture.

How

Discussions start by asking participants to identify each of the tasks they do from the moment they wake up to when they fall asleep. They can either show these tasks for each hour of the day or can identify how much time they spend per task. At each monitoring event, a new daily routine is constructed or written, or changes are identified and symbolised on the existing diagram. By comparing the current situation with previous diagrams, changes can be identified and their potential causes.

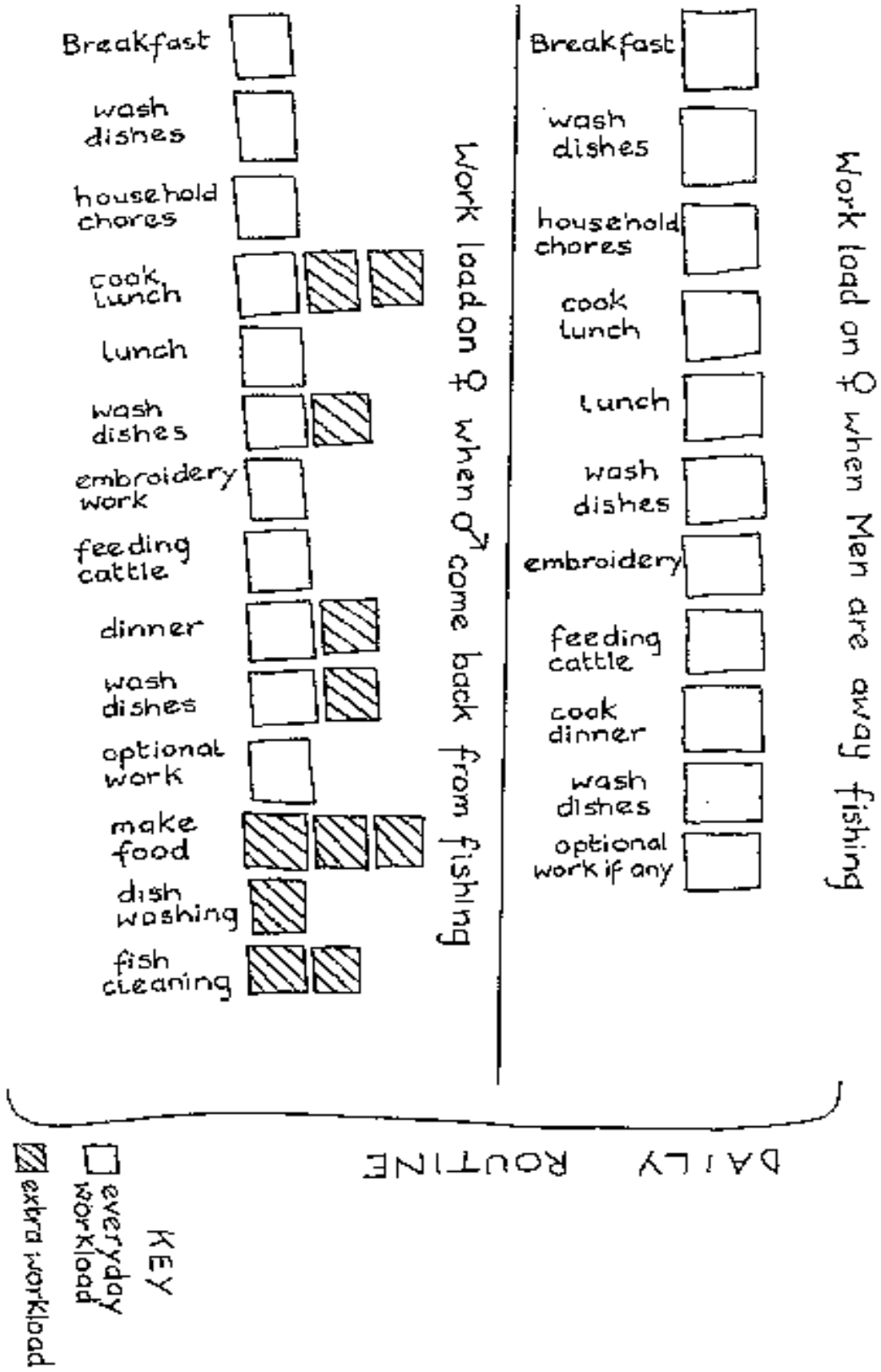
The people who do this exercise in a group setting usually realise quite quickly how different each of their routines are. Therefore, as it may become difficult to reach consensus on a 'typical' and 'average' daily routine, it might be best for each person to do one individually and then analyse the different routines together. As this method is likely to be time-consuming and reveal much variation between participants, it might be useful for the group to select a limited number of people with whom this method is used, or for a number of people to volunteer. This will be a decision that those in the participatory monitoring process will have to make but care must be taken to limit biases in the sample.

Figure 29 shows how the daily lives of women in a fishing community in Pakistan changes when their husbands return from a fishing trip. The striped boxes show how the existing workload increases and more tasks are added. While this example is not the result of two separate monitoring events but a single discussion, it gives an idea how *a series of discussions about daily routines can be* used sequentially to monitor changes.

Figure 28. Daily tasks and relative time spent on each, India

Source: Narayan 1993

Figure 29. Changes in women's daily routines when husband are in or out fishing (Pakistan)



Source: Guijt 1995

15. Institutional diagrams

Institutional diagrams are also known as 'Venn' or 'chapati' diagrams. This method can be used to monitor individual farmer or group perspectives on the changing institutional context and relationships between organisations. To be effective, it is important to be precise about the topic and about what types of organisations are being discussed that are related to the chosen topic.

Unit of analysis and possible topics

- individual farmer or household: the number, type and quality of relations between different organisations and agencies that are important for the farmer/household to pursue their agricultural enterprises or one enterprise in particular, such as bean production, sources of seed/credit/agricultural information or training/income (see Figure 31)
- interest group or community (see Figure 30): the number, type and quality of relations between different organisations and agencies that are important for the group to pursue its experimentation or collective marketing activity
- organisation: the number, type, relative importance and quality of relations with funding agencies; the number, type, relative importance, and quality of relations with research bodies; the quality of relationships with different farmer experimentation groups, including frequency of visits to the field; the relative importance and quality of relationships with other organisations working with smallholder production

Task and medium

- Good for gathering, recording, and analysing the data and sharing the findings.
- Mainly used in diagram form but especially during sharing some of the analysis may need to be written.

How

It is important to be clear about what is being monitored as it can be confusing if the discussion deals with all the relationships that are essential for all aspects of the farm enterprise, the interest group or the organisation. So instead of discussing 'all organisations important for all aspects of community life', use this method to monitor more specific topics like 'individuals and organisations external to the community that are important for the management of our communal forest'.

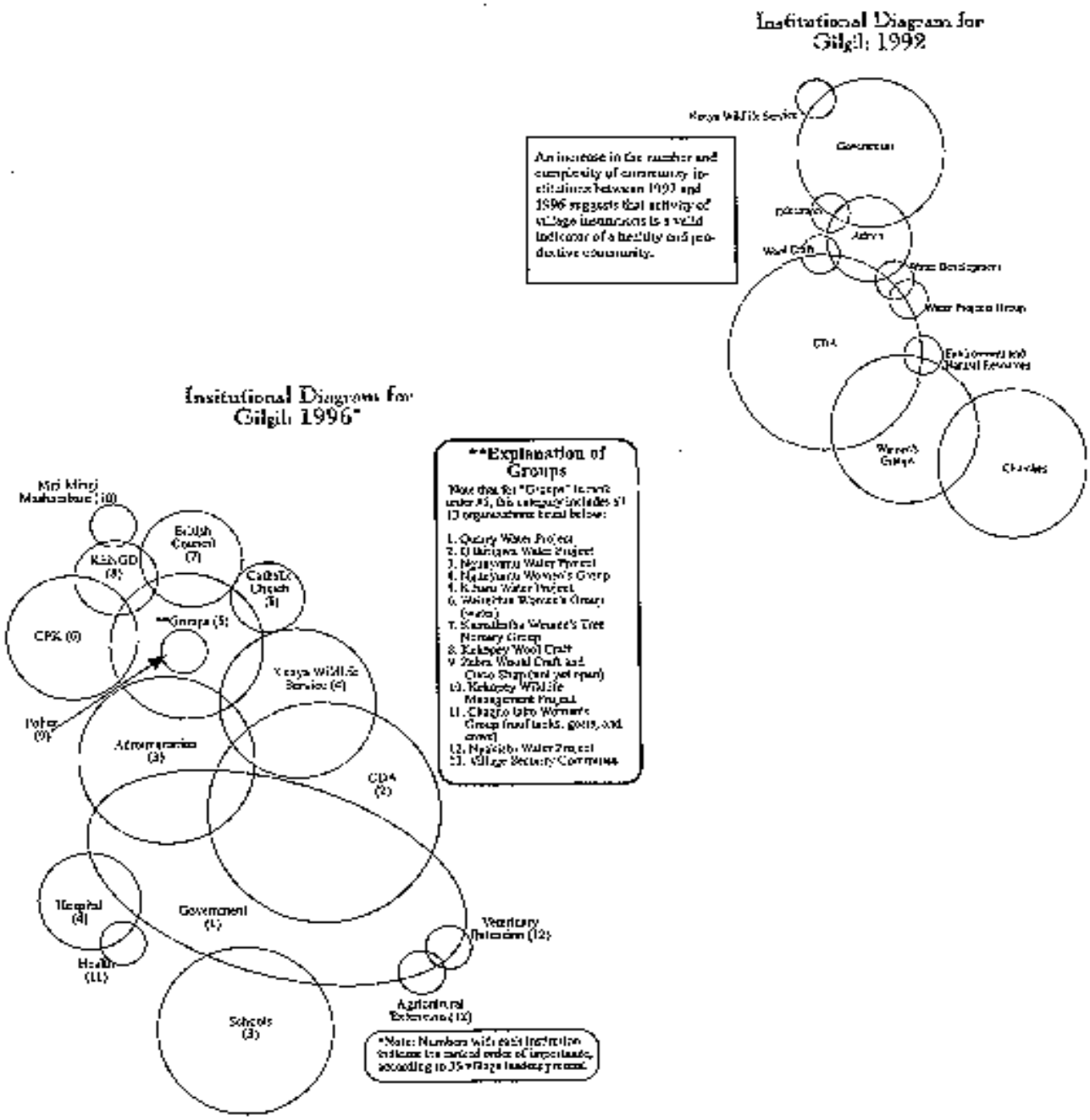
After clarifying the focus of the monitoring, place the key unit that is being monitored, for example the community or farm, and symbolise it with a circle. (Any shape will do but a circle is the most common). Have a general discussion during which all the different groups and people and organisations that relate to the topic are identified. Then represent each of those individuals or groups with a separate circle, the size of which indicates their relative importance for the topic being discussed. So, for example, if communal forest management is being discussed, then the local forest extension officer might be represented with a big circle if he/she is important while a nearby sawmill is less important as most wood is used locally. Place these circles in and around the central circle. The closer the circles are placed to each other, the more contact they are considered to have (make sure that this is not confused with their geographical distance from the forest).

Monitoring can happen in two ways. First, it is possible to make a new diagram at each monitoring event that can then be compared with previous diagrams to analyse changes and their causes. Alternatively, it is possible to use the first diagram and discuss how the current situation is different and why this is the case. These changes can be symbolised with arrows pointing up to show increase, or down to show a decrease, or whatever the group feels is appropriate. Whatever approach is used,

discussions should focus on the quality, frequency, appearance or disappearance of linkages between the groups.

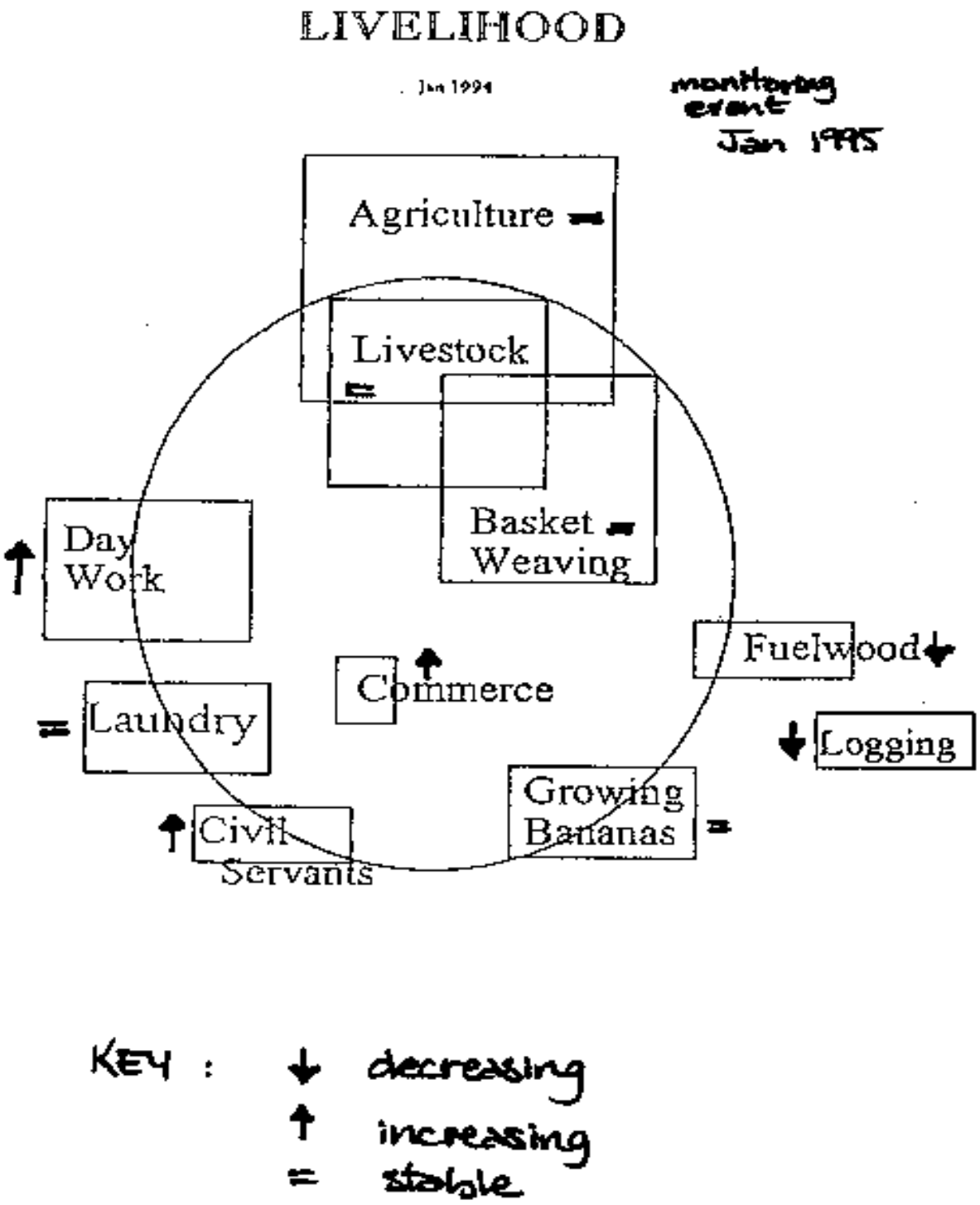
The idea of an institutional diagram can also be applied to other topics, such as livelihoods. The example in Figure 31 shows the importance of different livelihoods or sources of income for a household or community. Here too, the size of the circle represents the relative importance. It has been adapted to show it can be used to track changes in sources of income as a result of project activities.

Figure 30. Institutional changes over 4 years, Kenya



Source: Ford et al 1996

Figure 31. Assessing changes in sources of income (hypothetical example)



Source: inspired by Ford et al 1996

16. Network diagrams

A network diagram helps to understand the degree to which individual farmers or groups have contact with others outside their neighbourhood, community or organisation. This is important for those agricultural programmes that aim to enhance farmers' links to information, strategic alliances, etc. Networks diagrams are similar to Institutional Diagrams (Method 15) but rather than analysing the relative importance of contacts, they focus more on the nature and quality of relationships, the diversity of linkages, the reasons for contact and frequency of contact. They can be based on a map if linkages related to a specific geographic area are discussed (see Figure 33). From a monitoring perspective, institutional diagrams can help assess the changing nature of relationships, the frequency of contacts, the relative priority of some contacts over others, the extent to which communication bottlenecks are resolved, etc.

Units of analysis and possible topics

- individual farmer/property/household: changes in types and frequency of contact with those outside the community for information about agricultural innovations (see Figure 34)
- interest group: changes in types and frequency of contact with those important for marketing group members' produce
- community: the quality of relationships with neighbouring villages with whom a large resource area is being jointly managed (see Figure 32); gender-differentiated external linkages (see Figure 33)
- organisation: changes in types and frequency of contact with other research organisation; the building of strategic alliances for agricultural policy change

Tasks and medium

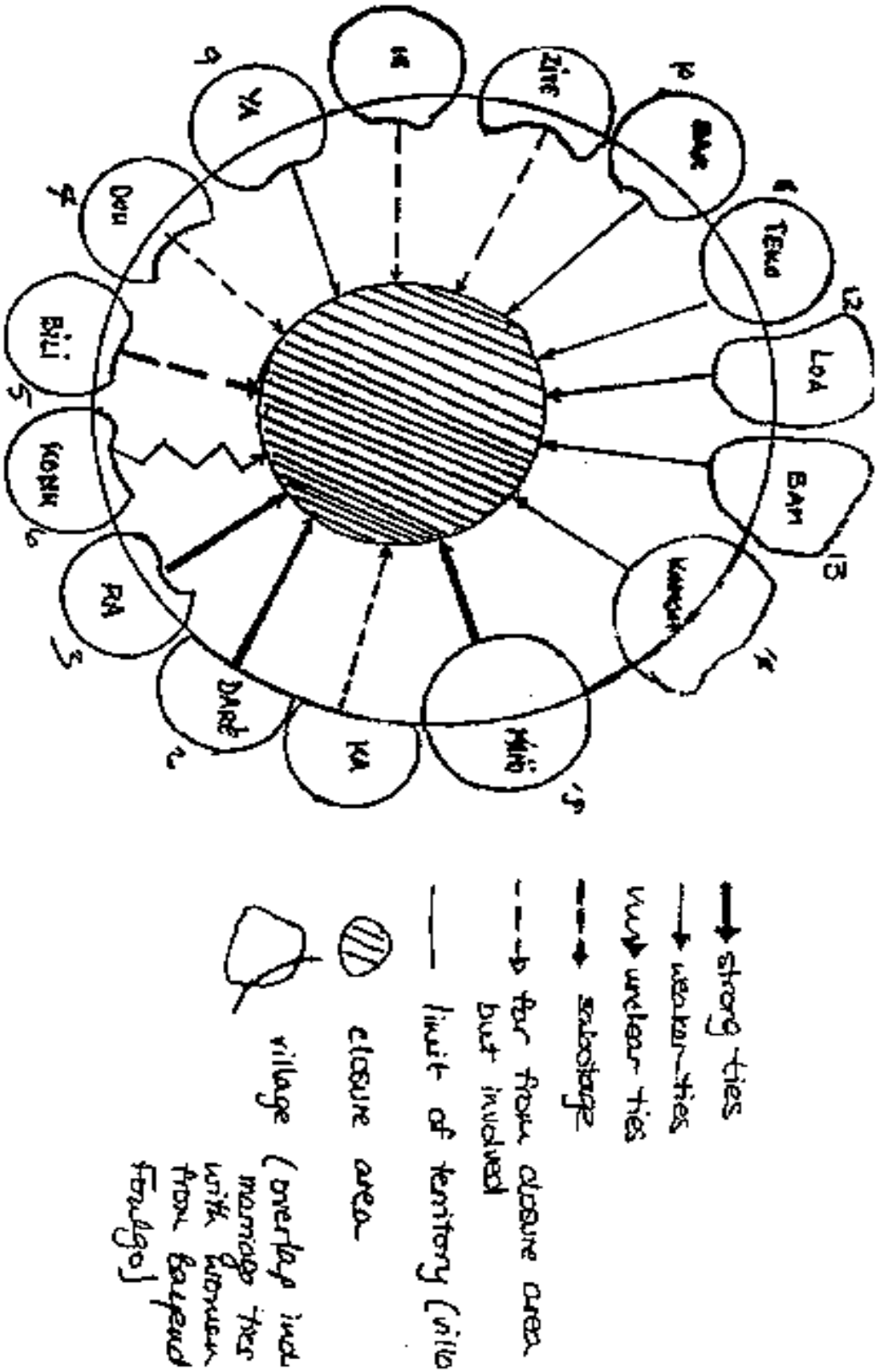
- Good for gathering, recording and analysing date, and sharing findings.
- This is a diagram, which can be accompanied by with written comments or quantities if necessary.

How

As with Venn diagrams, the network diagrams start by first representing the unit being monitored on the ground/paper. Then each organisation or individual with whom there is contact of the kind being monitored is represented in any form (often circles). Unlike with Venn diagrams where the size of the circles is important, it is not relevant with network diagrams. As the focus of this method is on monitoring the types of linkages, time must be spent to find appropriate codes or colours for each type of link. These codes can refer to the quality of relationships (see Figure 31), the type of contact (see Figure 32), the frequency of contact, or any combination of these three.

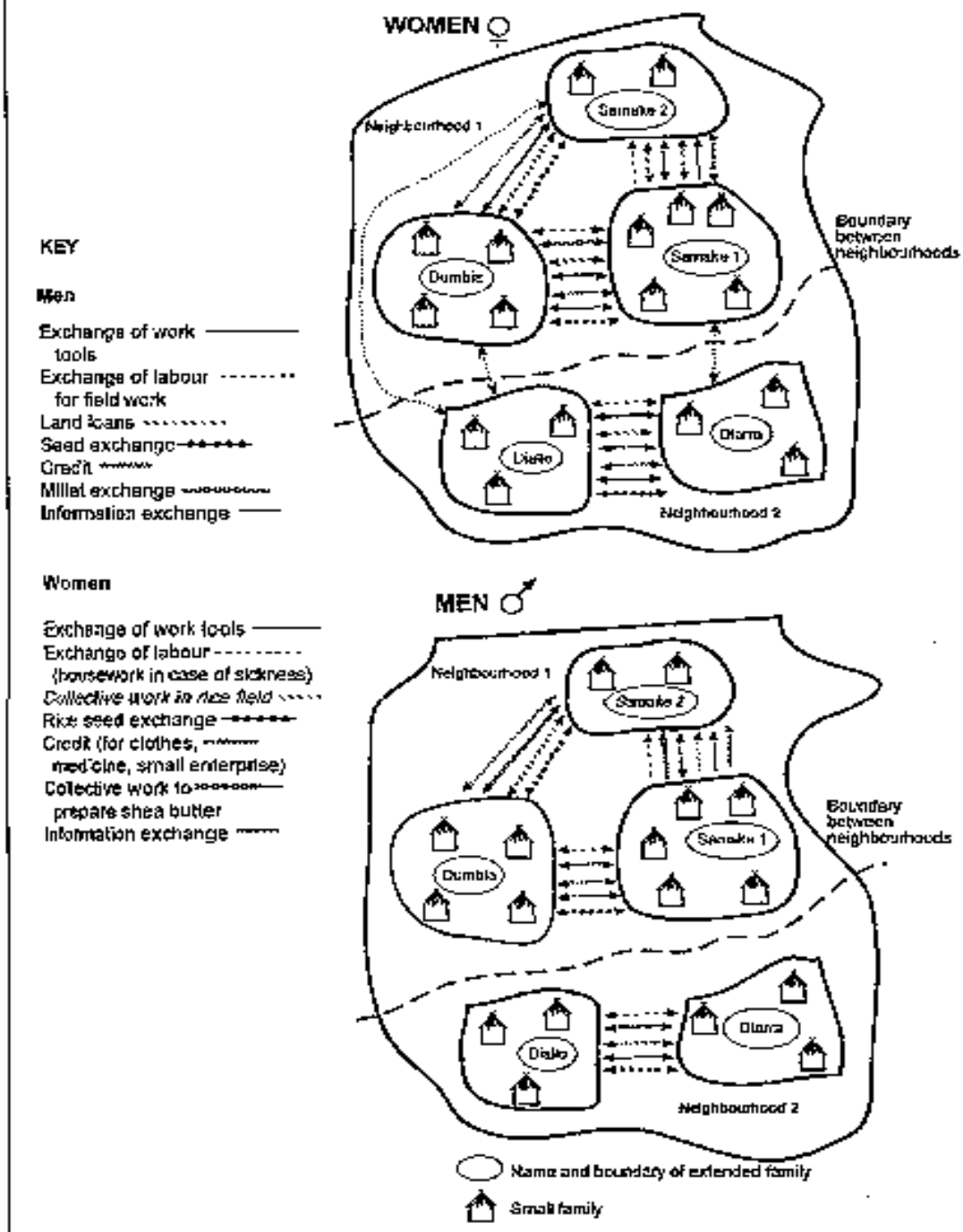
The monitoring occurs when these diagrams are updated or a new one is made and compared with the previous one. Assessing whether the changes in the type and/or quality of relationships is desirable or not can help to readjust development activities.

Figure 32. The relationships between villages jointly managing a resource area, Burkina Faso



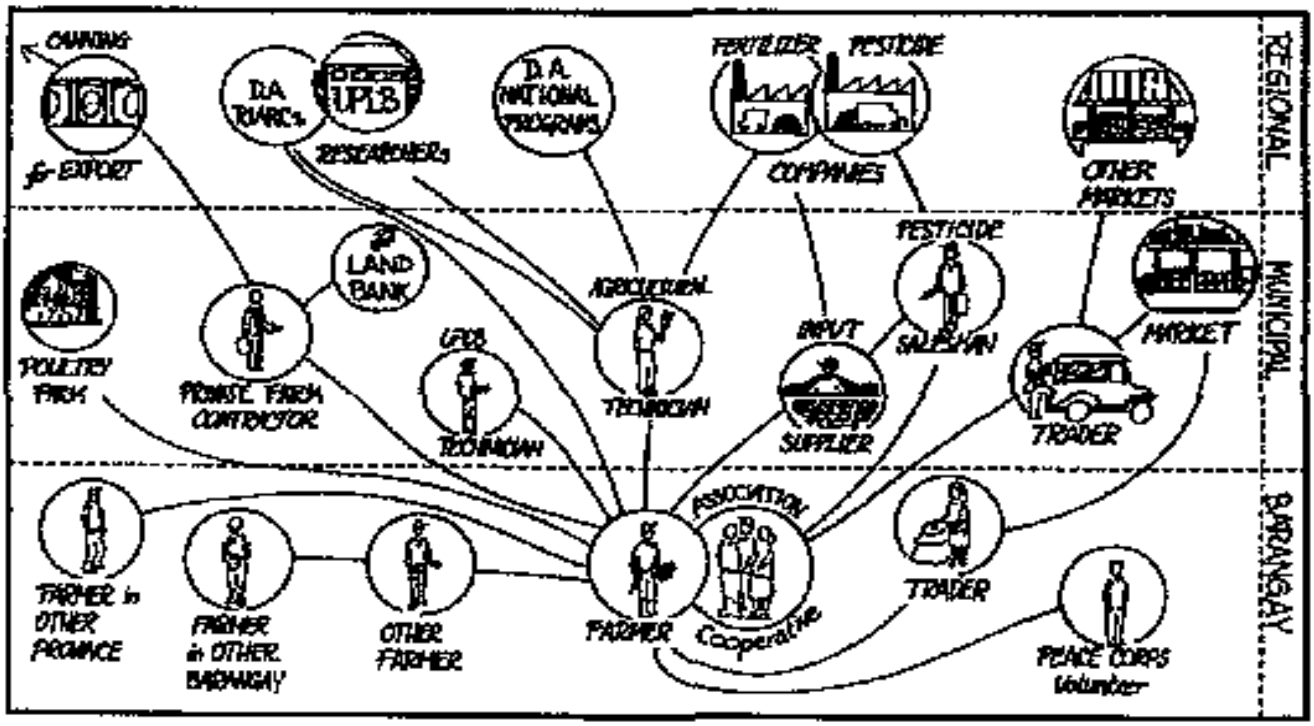
Source: Gueye and Guijt 1993

Figure 33. Gender-differentiated network diagrams, Mali



Source: Weller-Molongua and Knapp, in Slocum et al 1995

Figure 34. Important organisations and individuals at different levels



Source: Ramirez 1997

17. Dreams realised

Monitoring using 'dreams realised' involves a focused discussion around people's or organisational dreams for the future. These can be dreams that are worded in general terms for long time frames or those that are specific and detailed with clear time frames. These dreams can be viewed as development visions. The dreams, once articulated, become the indicators that are being monitored as they are realised, change, or become ever more elusive.

- Unit of analysis and possible topics
  - any unit: individual farmer (see Figure 35), household, interest group, community (see Figure 36), organisation
  - The topic will depend on what 'dreams' have been articulated.

Task and medium

- The dreams and the extent to which they are realised can be written down or symbolised.

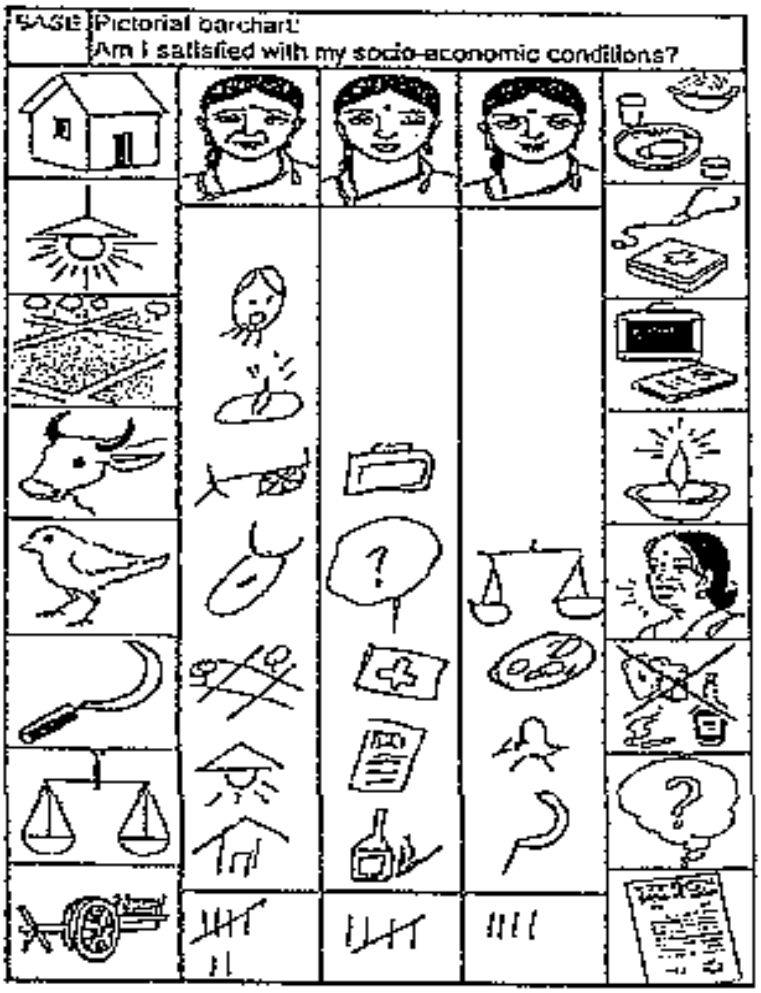
How

The time period over which dreams are to be discussed will need to be clarified beforehand but a period of 2 to 5 years is long enough for dreams to be more than simply dealing with the immediacy of survival and yet short enough to remain realistic. In a first discussion, the people involved discuss or symbolise their dreams for the next 2–5 years. The discussion is repeated every 6 to 12 months, or however often those involved think changes are likely to have occurred. The monitoring occurs by discussing whether the people or organisations have progressed or regressed on the path towards realising their dreams. Discussions can also include a comparison of current dreams with those articulated during a prior monitoring event. It is essential to also discuss why any changes occurred and to what extent they were caused by project activities or by other external factors.

The example shown in Figure 36 is not specifically about 'dreams realised' but gives an idea of how it is possible to use this method in the context of a specific intervention, in this case, improved village water pumps. The diagram shows a series of examples of the condition of the water source, ranging from perfect (the 'dream') to pretty horrid. Monitoring the extent to which more people start to feel the local water pump resembles their ideal state, through a point scoring system (see Relative Ladders and Scales, Method 11), can provoke a discussion about what else is needed to further improve the situation.

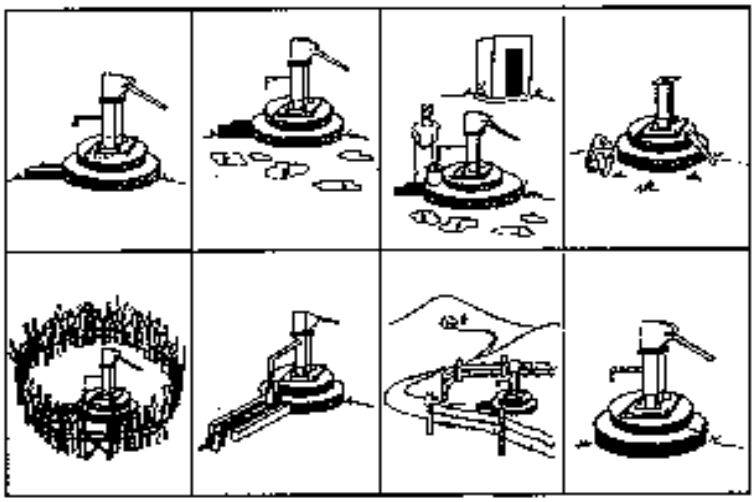
An agricultural example could be based on farmers or their organisations drawing or articulating on video or on paper, their ideal enterprise, and to identify what specific dreams they feel are possible to realise in the year to come. As they start implementing activities towards their ideal farming enterprise, they can tick or indicate through colour coding or some other appropriate way, what dreams have been realised. The diagram functions as a future, rather than a past, baseline against which to compare progress in implementing plans.

Figure 35. A woman's progress towards realising her ideal future, India



Source: Naponen 1997

Figure 36. Progress towards realising and maintaining a good spring



Source: Narayan 1993

18. Critical event analysis

This method is based on the Christian Commission for Development Bangladesh approach developed with Rick Davies (1998). Monitoring can be based not only on indicators that attempt to find trends related the same phenomenon but instead can focus on identifying extreme cases or 'critical events' – either positive and negative. Critical event analysis asks those involved to identify a critical event related to a general development objective. If the critical events are broadly in line with overall development objectives, then, in many cases, that is good enough information for project/programme management. The discussion can include a question about how the event relates to the project and programme so that cause-effect links can be clarified.

Unit of analysis and possible topics

- individual farmer/property: income security, environmental improvement on farm, result of personal agricultural experimentation
- interest group: well-being of group members; collaborative experimentation process; participation in group process; sustainability of the group
- organisation: contribution to changing municipal policy towards more sustainable agriculture; communication methodology with farmers; creating a new 'farmers union vision for rural regeneration; developing strategic alliances for sustainable agriculture

Task and medium

- Good for identifying, recording, and analysing data, and sharing findings.
- Writing is probably most efficient if sharing is to occur but diagrams, photographs, or videos representing the critical event can also be used

How

The first step involves identifying what general development objectives, or domains, will be monitored (see examples of topics above). The frequency for discussion also needs to be decided and will depend on the likely rate of change in meeting the objectives (some changes will take longer to be observable while others may occur on a weekly basis). A simple question is then developed, such as *'Since our last meeting, what has been the single most critical event related to our experimentation process* (or whatever the selected development objective is)? or *'During the last month, in our opinion, what do we think was the most significant change that took place in the lives of the people participating in the project?'*.

If discussions take place with a group (as will usually be the case), the need to reach consensus on the single change or event will provoke a rich and detailed review of the experiences of group members over the past period, and much debate about why one event or change is more significant than another.

In the Bangladesh approach the answer is documented in two parts: (1) a description of what happened in enough sufficient detail to allow another person to verify it if necessary (what happened, with whom, where, who was there, when did it take place, etc); and (2) an explanation of why that particular change or event has been selected out of all the others that will have been suggested.

The findings relate to positive or negative changes or events that occur as a result of project activities. Where negative changes are identified, actions can be decided on to prevent or redress the problem. If a positive change is selected, then actions can be taken to strengthen or spread these. Qualitative experience is emphasised but quantitative data can be included.

The choice of domains is a crucial element of this approach that requires consensus and clarity. It is a good idea to do a trial run of the domains before finalising them. In Bangladesh, the three specific domains about which critical change events are being monitored:

- changes in people's lives;
- changes in people's participation;
- changes in the sustainability of peoples' institutions and their activities.

In Brazil, AS-PTA is experimenting with the critical event method for the following four domains of its work in sustainable agriculture:

- changes in its participatory communication methodology with farmers;
- changes that contribute towards creating a new model and societal role for the rural worker's unions;
- changes in developing strategic alliances in support of sustainable rural livelihoods;
- changes in its contribution towards changing municipal policy to be more supportive of sustainable agriculture.

19. Case studies

A case study involves a focused, in-depth discussion with a selected sample of people or households about any topic that is selected for monitoring. It is a method that can provide insights about how people deal with change and why change occurs in specific ways, by following a sequence of personal events over time and trying to identify key phenomena or characteristics. This method can also provide much important background and human context for any specific and quantitative data that is generated by other monitoring methods.

● Unit of analysis and possible topics

- individual farmer/household: the problems faced and strategies used to overcome them
- interest group: any variety of indicators

● Task and medium

- Written observations and answers.

● How

The principle of a case study is to document the life story of or sequence of events related to a person, household or organisation, in order to understand the details of change, their positive experiences, their dreams and obstacles. The documentation can happen by an external person or, for example, by members of an experimentation group, for themselves. In more participatory processes, it will be carried out by people on themselves or each other, and perhaps with a control group for comparison (eg farmers who are not members of an experimentation group).

Repeating the discussions every six months (or whatever the chosen frequency may be) allows for the documentation of important moments, successful and unsuccessful survival strategies, new problems and opportunities. It provides an up-to-date picture of changing conditions.

It is important to think carefully which families, people or organisations to select for the case studies to limit any distortions caused by biases in the sample. Social mapping might help to find an appropriate selection of case study candidates. Generally however, in the case of participatory monitoring, those who are potential case study candidates are those designing the monitoring system so any biases can be discussed openly before coming to a good final selection of case study participants.

20. Participatory theatre

Drama, though increasingly commonly used in participatory appraisals and planning (cf PLA Notes 1997), is an unconventional form of monitoring. As it is based on groups of people enacting scenes from their lives that are then discussed, it is probably most suited for monitoring group interactions and perceptions of key problems. It can also be used to monitor changes in natural resource use, for example by asking those involved to include their use of resources, the quality and ease of availability, etc in the scene they are to enact. Drama can be a good way to start identifying what changes might be most important to monitor specifically using other methods.

Unit of analysis

- interest group: interaction of group members; relationships with other groups or organisations that are important for agricultural production or group's experimentation process
- community members: interactions between sub-groups in the community related to agricultural decision-making, agricultural tasks, natural resource use and relative value of different resources
- organisation: interactions amongst staff members; relationships with other entities

Task and medium

- Good for gathering and analysing data, and sharing findings.
- Dramatic, perhaps with written, photographed or video-taped documentation of conclusions drawn.

How

In participatory drama, the participants themselves construct their own performances, thus allowing them much opportunity to communicate their opinions and thoughts on the topic being discussed. Though there are many types of participatory drama (cf IIED 1997), perhaps the most interesting type for monitoring is the use of short skits that are created about the topic being monitored, for example gender relations in forest management. Taking this example, the actors enact their ideas of how women and men use and manage forest resources and make decisions about such joint use. As Cornwall (1997) writes: "*Virtually any ...diagramming method can be used as a starting point for group analysis of issues, which are then turned into story-lines that reflect real-life experiences and made into skits or role-plays ... these can be videoed and played back, or played to different groups to stimulate discussion and analysis*".

Theatre can be used in combination with other methods that provide information for the scenes, as this example illustrates:

"*One issue we were trying to understand in SNAP [Soil Nutrients for Agricultural Productivity project, Jamaica] was how the quality of gender relationships within the small farm family affects agriculture-related decision-making. To check [previous contradictory findings], the project undertook a drama-based investigation with a community cultural group. The drama showed three sisters, all farmers, in a different relationship: an abandoned mother, one with an abusive husband, and the third with a supportive husband. A comedy approach meant that potentially difficult gender-related issues could be raised without insulting anyone directly.*

The play was a huge success in the three communities where it was shown. People were so excited about what it had to say that any critical discussion afterwards was impossible. ... each performance of the play was videotaped. We returned to the communities a week later and watched the video again. We stopped it, rewound it, and discussed those moments of the play that sparked the

most interest. Much of the initial excitement had abated and we were able to analyse the contents of the play together.

A second discussion only with women allowed us to focus on issues specifically of concern to them. ... For one, the women were able to formulate alternative solutions to those chosen by the women in the drama. The discussions highlighted that there is much less joint decision-making than had been reported in the video interviews. Most of the women identified closely with the first two sisters, citing the third one as their ideal. Drama had exposed the deeper reality that women experienced. The process also offered women and men the chance to look at the quality of their own relationships without singling anyone out. Since then, women and men have referred often to the play, and some of the issues have been dealt with at other moments in more appropriate ways." (Protz 1998:170-171).

Annex 2

Encouraging farmers' technology development groups to monitor their work

AS-PTA and the Rural Workers Unions of Solânea and Remígio are trying to improve the monitoring of their activities in small-scale production. Current activities in Solânea and Remígio include: seed banks; banana weevil control; contour line planting; pigeon pea intercropping; and re-establishing lost cash crops such as potatoes and fennel. Many of these activities are being carried out with groups of farmers who have the same interests, for example raising income, improving soil fertility, and so on. This Annex suggests steps to start more systematic monitoring with groups of farmers doing the same activity. Such joint experimentation is essentially what is commonly known as PTD, Participatory Technology Development (cf Veldhuizen et al 1997).

Self-monitoring of groups has many advantages. It strengthens the group because the group reflection process can motivate the members to continue experimenting and innovating with agricultural technologies. Furthermore, having data about on-farm changes that are a result of agricultural innovations helps group members:

- to identify any negative impacts of the innovations and correct them;
- to decide whether it is worthwhile to continue with the innovation;
- to have better control over agricultural production, making adjustments to input levels as and when necessary;
- to help with planning further changes to the agricultural production system;
- to raise the interest of non-adopting farmers and sceptical extension staff;
- to convince other organisations that the innovations are effective.

The steps described below are simply a series of questions that can enable a group of farmers to develop its own approach to monitor their efforts. Each step includes a suggested question. While each step is important and they are arranged in chronological order, do use words and questions which are relevant for the group with which you are working.

It is not necessary and highly unlikely that all the steps, or questions, can be dealt with in one meeting. Starting a discussion about the merits or not of keeping track of the experimentation process can be tacked onto the end of a normal exchange meeting. At a subsequent meeting, the second question can be discussed, that of indicators, and so forth.

The steps

1. Identify whether any group member is monitoring anything systematically, or whether any one is registering relevant data about the collective activity. For example, many seed banks already have a list of members and data about amount of kilograms of borrowed seed returned.

- *Who in this meeting registers some information about his/her farm or about your common activity?*

2. Using any examples that might arise, discuss the value of monitoring in general, and registering of

data. Even if nobody registers any data, discuss this question after making sure that everyone recognises they do monitor in other ways, eg. observation.

- *What are the advantages of monitoring and the possible uses of the registered information?*
- *What are the disadvantages of monitoring?*

3. Having established the importance of monitoring, identify the objectives of the group, ie the objectives of the farmers in carrying out such activity.

- *Why do you want to do this work with pigeon pea (contour line, Leucaena, seed bank, etc.)?*
- *In a year's time, what do you expect from the results of these activities in small-scale farming and where do you want to go?*

4. Identify the indicators which show progress in the achievement of objectives. If there are too many indicators, ask the group to choose those which are considered more valuable and relevant.

- *How are you going to know whether the group's activities are working well?*

5. Identify the methods of monitoring (observe, count, measure, weigh, touch, etc.) and of registering the data (write in a notebook, take a picture, draw a diagram or table, etc.).

- *In which way are you going to obtain and record the information or indicator?*
- *What do you need to obtain and record the information?*

6. Decide who is going to do the measuring and when. Consider the information storage implications (ie where and how will it be stored?)

- *Who needs or wants to register this information?*
- *How many times does the information need to be registered?*

7. Decide when and how the group would like to analyse the data.

- *How you want to bring all the information together and analyse what it means?*

Keeping a brief description of the monitoring system can be useful for the group to evaluate later on if the type of monitoring it did was worthwhile or not.

Discussion Papers of the Sustainable Agriculture and Rural Livelihoods Programme

International Institute for Environment and Development

The Sustainable Agriculture and Rural Livelihoods (SARL) Programme of the International Institute for Environment and Development, London, supports and promotes rural development based on sustainable agricultural and land management practices, strong rural organisations and dynamic social enterprises. It seeks to analyse and promote the policies and practices needed to foster forms of rural economic growth that are socially inclusive and environmentally sensitive.

The SARL Programme takes a livelihood systems approach, as agriculture is not the only, or even the main, source of income and employment for many rural people. While agriculture remains fundamental to the livelihood security of many, it is off-farm activities, such as agro-processing, marketing and the provision of goods and services to agriculture, that give people entitlements to food and access to other resources.

In its research, training, advisory and information and networking activities, the SARL programme works closely with partner institutions around the world. The Discussion Papers present work-in-progress and preliminary findings from the Programme and its collaborators for researchers, practitioners, planners, policy makers and educators. The Discussion Papers offer food for thought about the livelihoods of rural people who are affected by ecological, economic and social and political change, and about the factors that affect the emergence and spread of sustainable agriculture and rural revitalization.

Testing mapping with researchers and farmers (above) to assess extent of spontaneous dissemination of innovations (below). (photos: I. Guijt)

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