







Changing views on change: participatory approaches to monitoring the environment

Joanne Abbot and Irene Guijt

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## Executive summary

This Discussion Paper reviews participatory approaches to monitoring environmental change. It draws on published literature, interviews with practitioners, and the practical experiences of a research project on participatory monitoring of sustainable agriculture in Brazil. This project seeks to develop a viable and relevant monitoring process with farmers, farmer unions, and NGOs to help assess the social and environmental impacts of their efforts in developing more sustainable forms of agriculture.

The term 'participatory monitoring' is used to describe a wide range of practices. In the literature, it often refers to processes that involve field staff in designing or adapting a monitoring process, but limiting the role of local women and men to data gatherers or providers of information. Here we use it to describe monitoring approaches that develop partnerships of multiple stakeholders for efficient, effective, and socially inclusive monitoring. We focus on the use of monitoring approaches in the context of tracking environmental change in general, and of projects focusing on environmental regeneration.

The drive for accountability and the need for more information to improve planning processes have given great impetus to participatory monitoring. Much is promised of it: from increasing accountability to enhancing participation and advocacy efforts, improving local and external awareness of key issues, increasing local level capacity and sustaining partnerships between different stakeholders. While these benefits have been discussed theoretically, there are relatively few practical experiences that can be drawn upon to support or refute the claims.

This paper discusses various project-led approaches to participatory monitoring of the environment, and other approaches to noting, recording and monitoring change which are initiated within and by community members. Whatever the approach, it is essential that the monitoring objectives are clear, that the expectations and information needs of all stakeholders are understood, and that the end users and uses of the information are identified. The review highlights that the monitoring process must provide real benefits for all stakeholders, particularly for local people. Without their enthusiasm, their long term participation, which is central to the monitoring process, may not be assured or maintained.

Many of the experiences reviewed here describe and highlight the importance of indicator definition, without emphasising the other stages of the monitoring process, particularly how the information will be used and by whom. Yet the methods and indicators that may be appropriate for meeting the needs of one stakeholder group are rarely those that are most suitable for another group. This highlights the need for negotiation between stakeholders to reach consensus on the objectives, methods, indicators and end-users of the monitoring process. But few of the experiences reviewed discuss these negotiation processes or describe how gender, age, ethnicity, class, and tenure, as determinants of resource use, create social differentiation of priorities, methods and indicators.

Compromise is inevitable in any participatory monitoring process which attempts to reconcile diverse stakeholders and their different expectations. However, this does not always mean accepting a problematic trade-off. We discuss trade-offs that are commonly claimed to exist, particularly that between scientific rigour and maintaining local participation. Instead of an either/or outcome, participatory monitoring presents a challenge for innovation that includes both sides of the debate.

Ultimately, the balance between the multiple demands of any monitoring process will depend on the objectives. More conventional, scientific approaches may be used where consistency and 'proof' of impact or change is required, while more flexible and 'user friendly' methods may be adopted where the learning of the stakeholders is prioritised. Alternatively, new standards to incorporate both approaches can be developed.

This review describes in greater detail three categories of participatory monitoring: (1) methods based on the visualisation techniques of Participatory Rural Appraisal; (2) those that use oral testimony to uncover patterns of environmental and social change; and (3) those that adapt methods of ecological assessment to make them more accessible to local people. While not mutually exclusive, these approaches have different origins and have evolved for different reasons. Within

this broad classification, 10 experiences of monitoring are described and compared. All the approaches appear to be highly participatory in data collection, but few involve all the stakeholders in designing the monitoring process, and in the analysis and dissemination of findings. This may be because approaches that involve stakeholders in the entire monitoring process take longer to establish and implement than those that involve stakeholders only in data collection. However, the approaches that are more participatory appear to produce information that is more relevant and useful to the stakeholders than those in which local people act only as data gatherers.

Several areas for future research and improved practice in participatory monitoring of environmental change include:

- a more explicit debate on the trade-offs inherent in participatory monitoring;
- greater discussion and documentation of the negotiations that occur within and between groups of stakeholders during the monitoring process;
- an exploration of the monitoring priorities of different sectors of the community;
- the development of mechanisms for promoting feedback between the monitoring and development processes, so that monitoring does not become an end in itself but a means to promote more participatory development;
- an improved understanding of the real costs, financial and otherwise, for all stakeholders, but particularly for local communities; and
- the development of approaches that maintain the long term interest of all stakeholders.

1

#### Introduction

Ecologists and many other natural scientists have long aimed to provide information about environmental processes and trends, partly to enable more appropriate interventions but also to forewarn of impending and current environmental change. The need for more accountability in natural resource management projects and for more information to enable better planning of conservation and regeneration efforts have stimulated great interest in environmental monitoring. This is particularly relevant at the end of the twentieth century as environmental degradation threatens the existence and quality of life for many species - not just humans. More information and more data are often called for to provide the answers to environmental challenges. Yet the information that ecologists 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. At the same time, the world is experiencing great interest in, and demand for, increased community involvement in local development. It is not surprising, therefore, that local people, NGOs, funding agencies, and scientists are expressing keen interest in participatory monitoring of environmental change.

This paper discusses recent experiences with 'participatory monitoring', focusing on its application in tracking environmental changes and the impact of natural resource management interventions. Before discussing this further, it is critical to distinguish between these two types of environmental monitoring: 'performance monitoring' that is used for assessing effectiveness of natural resource management interventions, and 'ecological monitoring' which assesses changes in biophysical phenomena outside the context of projects or programmes (Mahanty et al.

1997). Both types of monitoring are discussed in this paper but the emphasis is on performance monitoring of natural resource management interventions. Both types of monitoring involve multiple stakeholders in various stages of the process and can lead to recommendations for action. Irrespective of the focus, basic questions must be answered, such as why the monitoring is being undertaken, which indicators are to be assessed, and how will information be shared.

In this paper, we explore the entire monitoring process, but our central theme is: What is the role of different stakeholders in each of these stages? Diverse interpretations of these roles, together with multiple objectives, have led to many shades and forms of participatory monitoring, some of which are discussed below. In theory, it involves greater numbers and more diverse groups of participants in the measurement, documentation, collection, analysis and dissemination of monitoring information to help those involved in decision-making.

### 1.1 | About this paper

This paper starts by describing conventional approaches to monitoring and data-related dilemmas. We then discuss the rationale for participatory monitoring and outline key stages in developing one such approach. We examine the benefits of participatory monitoring, how it deals with 'participation', and how indicators are perceived and generated. We also discuss the seeming conflict between the need for scientific rigour and for enhanced participation and local learning. The final section of the paper describes three categories of approaches to participarory environmental monitoring that seem to have been successful at providing a basis for community involvement: (1) methodologies developed from the use of participatory rural appraisal (PRA); (2) those based on oral testimony; (3) and those that adapt scientific approaches of ecological assessment. The paper concludes by comparing the different methodologies and identifying current gaps in our understanding of participatory environmental monitoring. The annex describes 10 experiences of participatory monitoring of the environment in more detail.

Because participatory monitoring is a new, but rapidly expanding, field of interest, this review draws on a range of sources, including an extensive review of the published and 'grey' literature and interviews with practitioners around the world. Another key source of insights comes from the experiences of one of the authors (IG) in establishing a participatory monitoring approach for assessing the impact of sustainable agriculture activities in Brazil. The three year research project started in January 1996, and is a partnership between two local NGOs, three rural workers' unions, one university, and IIED. The reflections here describe the steps undertaken and some of the initial insights about the process.

# 2

# Monitoring of the environment

## 2.1 What is monitoring?

1

2

Spellerberg (1991) defines monitoring as the systematic measurement of variables and processes over time. While this summarises well the basic elements of monitoring, there are many other definitions (Box 1). Hellawell (1991) describes monitoring as a process of providing information – not results, and as a means to an end – rather than an end in itself. Great diversity in 'ends', or objectives, are reflected in an equal diversity in approaches to monitoring. Nevertheless, most monitoring activities are based on the recognition of the potential for change. Change can be discerned in two broad ways:

Performance monitoring which assesses the effectiveness of natural resource management interventions, policies, legislation, etc. It identifies the extent to which activities are proceeding as planned and/or examines the degree of success in achieving stated objectives. It often has a regulatory function.

Ecological monitoring which is based on the collection, analysis and interpretation of data designed to assess biophysical phenomena (e.g. salinity), outside project or programme cycles. It aims to understand, determine and predict environmental trends, such as for 'early warning' that allows for appropriate corrective/ameliorative action.

Irrespective of the type of monitoring, most approaches have several basic elements which are discussed in more detail in Section 3.2: defined objectives (or monitoring questions e.g. 'Is global warming affecting maize harvests?'). As monitoring requires the regular assessment of a particular characteristic in order to detect change, it has to be clear what aspect of change is being assessed.

- indicators (or 'benchmarks'): a characteristic that helps provide concise answers to the monitoring question, e.g. mean monthly temperature could be an indicator of global warming and maize harvested per hectare could be an indicator of yield;
- methods (often a combination) that enable the measuring/observing of the chosen indicators. Methods must be found to measure or assess, register, analyse, and disseminate the findings.
- a determined frequency of measurement, often enough to identify meaningful trends and infrequent enough to avoid an excessive work burden;
- ongoing critical reflection on the monitoring methodology to ensure the appropriateness of objectives, indicators, methods and frequency of measurement/observation;
- analysis of the monitoring data to explore trends and decide next steps (planning, evaluation, adjusting implementation, etc.);
- feedback of the information gained from monitoring into environmental planning, project evaluation, and/or policy decisions.

#### Box 1. Definitions of monitoring

...maintain regular surveillance...

Pocket Oxford Dictionary

a systematic process, which occurs within the context of a program or project implementation, and which has as its aim the provision of information on progress...:

- to assist decision-making, especially in the short term, for increased project effectiveness;
- to ensure accountability to all levels within the project hierarchy from local community to donor

   especially in financial matters;
- to enable judgements to be made on personal and institutional performances.

Impact Evaluation Workshop Report, in Pietro 1983

the systematic and continuous collecting and analysing of information about the progress of a piece of work over time, to identify strengths and weaknesses and for providing the people responsible for the work with sufficient information to make the right decisions at the tight time to improve its quality

Gosling and Edwards 1995

systematic recording and periodic analysis of information

Davis Case 1990

the detection of change, whether that detection is based on concern for understanding natural processes or 10 evaluate the impacts of human activity

Dutton 1993

## 2.2 | Monitoring *versus* evaluation

As the emphasis of this paper is on monitoring in the context of natural resource management interventions, some clarification is needed about the difference between monitoring and evaluation. The close link between these two terms is demonstrated by the much used abbreviation 'PM&E' (participatory monitoring and evaluation), PM&E is

most relevant for 'performance monitoring', but can also be used in contexts of 'ecological monitoring'. In either case, it is important to clarify some key differences between monitoring and evaluation.

One difference is the frequency with which observations are made and the data are collected, which has many methodological implications. Monitoring is a periodic, rather than a one-off, reassessment of indicators that are chosen to determine the effects of certain interventions or policies, or change in general. Thus, performance monitoring is a relatively frequent occurrence, as often as daily, while evaluations generally are more sporadic, sometimes annually or bi-annually, but more often every two or three years.

Another difference between monitoring and evaluation is that monitoring is almost always guided by pre-determined indicators, while evaluations are usually based on more general questions or the assessment of data, such as:

- what activities took place;
- what the trends are in any changes that may have occurred;
- whether the activities achieved the intended objectives;
- how future efforts can be improved.

Evaluation is ultimately about judging a situation and the merit or worth of an intervention. In the context of natural resource management, this means making an overall assessment of whether the development project or programme has made a significant difference to the natural resource issue it was trying to address. By contrast, monitoring , is about collecting information regularly that might feed into an evaluation, but is not necessarily focused on reaching a conclusion about the overall effectiveness and direction of a programme. Monitoring focuses on assessing trends, examining differences between one moment and the next and drawing some interim conclusions. For example, the value of ecological monitoring may lie just in detecting change (e.g. rainfall patterns) and using this to plan activities, rather than judging the pattern in, or direction of, that change. In theory, monitoring data provide the basis for, or at least contribute to, evaluation exercises. However, the reality is that many evaluations do not build on monitoring data as they simply are not available.

One area where confusion remains about the difference between monitoring and evaluation is how to deal with the analysis of data. For some, the act of interpreting monitoring data makes it an 'evaluation' activity, while others view analysis as part and parcel of any monitoring process. For example, McArthur (1997) suggests that "it is important to distinguish between monitoring as a process of regularized observation and data collection and evaluation as a way of systematically organizing and interpreting data for management and planning". We believe that it is not essential to adhere to one or the other definition, as long as the people involved are clear about how they choose to define the limits of the monitoring process.

Notwithstanding their differences, core elements of monitoring and evaluation are similar. By definition, monitoring and evaluation processes compare 'before and after' or 'with and without project' situations. Therefore, to be able to make a meaningful comparison over time, both require some information, or a baseline, which describes the situation before any project or programme starts. Also both monitoring and evaluation have objectives and, therefore, an identified enduser of the information. This may seem an obvious point but as noted by Roberts (1991), much field recording "tells us only that lots of people are keeping lots of records: often for no good reason, using dubious methods, and producing vast quantities of un-analysed, and often unanalysable, data". Thus, both monitoring and evaluation approaches require the identification of relevant information, how data should be collected, analysed and interpreted, and who should be involved in each phase. These decisions depend on the objective of the exercise, the scale and structure of the activity to be monitored/evaluated, and the resources available.

## 2.3 | Why monitor?

In essence, monitoring exists to support decision-making and planning by providing information on trends and changes, on what works or how activities might be adjusted. Effective monitoring hinges on the provision of timely and relevant information to resource users, decision makers and policy makers. The demand for concise and easily assimilated and interpreted information has led to a recent explosion in the development of indicators as a way of measuring progress. This "rush to quantify" has occurred under the adage that "if you want it to count, count it" (MacGillivray and Zadek 1995).

While indicators provide a shorthand way of assessing progress, it should be remembered that in conventional monitoring systems the people who use and interpret monitoring data (e.g. policy makers) are rarely the same people who have collected the information. Because the end-users are often remote from the situation that is being monitored, they may be unable to contextualise the summarised information that indicators deliver. Considerable caution is therefore needed in interpreting data, as problems may arise from the simplification that occurs when complex environmental processes are distilled into a small number of indicators (even if the indicators were commonly agreed beforehand). Thus, monitoring enthusiasts should not assume that monitoring data will necessarily resolve the problems that are caused by insufficient or poor information about particular environmental challenges. Answers to the question 'why monitor?' will depend on how knowledgeable end-users of data are about the context in which information was collected and the conclusions they dare make about the data.

In addition to providing an improved understanding of the local environment and assessing the impact of interventions, accountability has been a common reason for monitoring programmes and projects. In this context, the monitoring process has usually been defined by the implementing or funding agencies — not by the people who live with the changes. Also very common has been the monitoring of biophysical parameters, such as the weather or pollution levels. While some ecological monitoring is simple and cheap (e.g. rain gauges to measure rainfall), much biophysical monitoring requires costly and complicated equipment (e.g. chemical tests of water quality) and is difficult for non-scientists to undertake and understand. In both cases, it is clear that local people, as resource users, have little input into designing or implementing the monitoring process.

More recently, the value of the monitoring process for improved learning about changes occurring locally has challenged conventional approaches to monitoring. This is leading to more community-based approaches to monitoring. These aim to enhance the local capacity for recording and analysing change, and to improve community-based initiatives through a structured process that emphasises shared learning, and locally defined indicators and methods. The following section explores the rationale for the move towards participatory monitoring.

## 2.4 The subjectivity of monitoring

Monitoring is commonly perceived as an objective process for obtaining unambiguous information to detect clear-cut change. However, Roberts (1991) notes some limitations of data collection and monitoring (see Box 2). He suggests that monitoring is not at all a 'scientific' process', as the objectives themselves, the methodology, the indicators, and the interpretation of data are all influenced by individual or collective world views.

Roberts' analysis is not unique. Other examples are provided by Leach and Mearns (1996) who explore the 'received wisdom' or popular myths about environmental change that are held to be 'correct' by social consensus. Their analysis highlights the political nature of scientific investigation. This has important implications for designing and developing methodologies that are appropriate for detecting environmental change. Can monitoring provide us with the data we need to detect environmental change? Which variables can we monitor? Whose reality do they represent? Who benefits from monitoring? Can we use monitoring data to scale up from our monitoring sites and infer change at a landscape/national level to inform decision making processes? And will all this information be useful and actually improve a development intervention or research programme, and therefore increase the quality of human life?

 Rodenburg {1995:79] also distinguishes between monitoring and science but on the basis that: (1) science looks at how a process (such as an ecosystem) works: while monitoring looks into the state of the ocosystem and changes. in that state; (2) science is "original research with a conclusion" while monitoring is ongoing; and (3). science is "published leisucely in peecreviewed journals" while the results of monitoring "are dispatched and used immediately". He does say, bowever, that monitoring is scientific. 0.00

#### Box 2. The truth, the whole truth and the limitations of data

Why are data so often of minimal value? Monitoring everything is impossible. It is impossible in theory because we do not know enough about natural systems to know all the aspects we could record – and new techniques and approaches are being developed all the time. It is impossible in practice because there will never be enough resources – time, money, equipment, expertise, to record everything. Therefore, data selection is necessarily selective. This means that an assemblage of data is not objective fact: rather it is a particular view of objective fact. As viewpoints change with time, due to progress in knowledge and theory, past data is of dubious value in answering future questions.

Monitoring provides a *particular view* of reality. Some hold that reality itself is a matter of perspective, while others see it is a direct representation of reality. These are not just philosophical irrelevancies but directly influence how the findings of monitoring are used:

Monitoring data as reality

Some people argue that monitoring data are a direct representation of reality. This perspective holds that the monitoring data reflect objective science and can therefore be used as evidence that supports or dismisses a cause.

Monitoring as politically expedient.

In contrast, other people may see reality as a matter of perspective, objectivity as impossible, and therefore monitoring data as manifestations of political ideology and propaganda. Based on this view, monitoring data can be moulded to support the cause being pursued (or data selected on the basis that it supports the cause).

Source: adapted from Roberts 1991.

There are no answers to all the methodological challenges posed by a politically expedient interpretation of 'science'. Despite increased information about the natural environment, many people realise, paradoxically, that little of this helps to understand how social and environmental processes influence each other. However, what is clear is that broad, research events repeated every few years will provide little information about local conditions and the process of change over time. Yet extrapolating from any detailed understanding of local change is tenuous, precisely because of the complexity of environmental processes and the dynamism and change inherent in the systems being monitored. The challenge of understanding, documenting and demonstrating impacts or change is described succinctly in the editorial in the ILEIA Newsletter (1996) on 'Tracking change':

"'Understanding' refers to perceiving a complex and changing environment, but different stakeholders perceive reality according to their own world views. Perception of environmental degradation may vary even between individuals within a given stakeholder group as a result of socio-economic, religious, gender or age group differences. ... Perception is also greatly influenced by the media used to capture and communicate it."

This makes it all the more crucial to know why information is being sought, to do so with a clear focus on the end-users of information,

and to understand where and how subjectivity is influencing the monitoring process. It is such needs, and the pragmatic reality of limited resources and capacities, that have fed a keen interest in, and growing experimentation with, alternative, and more participatory monitoring approaches.

#### 2.5 The role of scientific monitoring

Before discussing in more detail the focus of this paper – participatory monitoring, it is important to devote some attention to the role of scientific environmental monitoring in general. A critique of conventional monitoring approaches falls outside the scope of this paper but is certainly an important factor in the growth of more participatory forms of monitoring. However, irrespective of the subjectivity and limitations of conventional scientific monitoring, it plays a fundamental role in enabling society to understand and explain the physical and natural environment and to test hypotheses. Such information needs call for detailed, scientific monitoring that aims to ascertain unequivocal cause-effect linkages within ecosystems, and between biophysical phenomenona and human activity. This information cannot be obtained only through registering observable results and people's perceptions, but needs detailed measuring of chemical and physical components.

Take the example of soil fertility. While farmers can and do monitor observable natural indicators of high or low soil fertility, such as the status of crops or the presence of certain plant species in different soil types, they are not all able to analyse the micro-level changes that might occur as a result of applying different ratios of organic fertilisers. Likewise, they do not have the broader perspective of regional soil fertility changes that result from more macro-level soil loss processes. In these cases, laboratory or field testing under controlled conditions and the use of Geographic Information Systems can complement farmers' information. Besides this biophysical information, complementary social and economic information is needed for which other conventional methodologies are better suited.

Participatory monitoring can help meet certain information needs but it clearly cannot meet them all. Experiences are growing with different combinations of methodologies (cf. PLA Notes 28, Marsland 1998). To date, these seem to cover four types of methodological combinations (adapted from HED 1997):

- Improving conventional monitoring: participatory monitoring can be used to describe the context, which is needed to help identify relevant monitoring questions and to design more appropriate monitoring systems, surveys, etc.;
- Verifying findings from conventional approaches: participatory moni-

toring can help to verify or ground truth the results from conventional monitoring approaches, and to provide important background information that can help interpret such results;

Replacing (questionnaire) surveys and systematising participatory monitoring: conventional monitoring approaches can help outline the framework within which participatory methods can be used to find the information needed;

Complementary monitoring: depending on the type of information sought and the purpose of monitoring, participatory methods can be used alongside more discipline-specific approaches.<sup>2</sup>

However, despite such methodological advances, we are far from reconciling the two generic approaches: participatory and non-participatory monitoring. The rest of this paper is devoted to participatory monitoring, as it is from this area that many thought-provoking questions are arising and where many unresolved dilemmas lie.

Other recent work (Marsland 1998) describes three types of methodological combinations for sample surveys and experiments; (1) hybrids - in which more formal methods and attitudes are 'swapped' for less formal (ieparticipatory) ones, and vice versa; (2) mixed suite - in which participatory and nonparticipatory methods are used concurrently; and (3) sequencing – in which one type of method precedes or follows the other.

# 3

## Participatory monitoring

### 3.1 | Moving towards participatory monitoring

3 Sometimes, erroneously, confused with the monitoring of participation. Increasingly, approaches to monitoring are emerging that involve multiple stakeholders, integrate their perspectives, and challenge the orthodoxies of environmental monitoring. These new approaches, collectively known as participatory approaches to monitoring or 'participatory monitoring', have multiple origins and objectives. While arising in part from the debate on the subjective and value-laden nature of data, these approaches also reflect a more ptagmatic rationale: the limited availability of human and financial resources. For example, experience within the Southern African Development Community (SADC) suggests that routine environmental monitoring, based on technical data collected by government ministries and other agencies, is often "poor" or "inadequate" (Dalal Clayton and Hearne 1996). Major concerns with these less participatory approaches include:

- the limited scope of monitoring;
- the limited scale of monitoring;
- incompatible data collected from different sites that cannot easily be compared;
- inadequate testing facilities;
- inability to assess regional conditions and trends.

A common response to such problems is to attempt to standardise monitoring methodologies. However, given the ongoing limited financial resources and institutional capacities, Dalal Clayton and Hearne (1996) suggest that "it is unrealistic to expect that such 'formal' monitoring will be sufficient to generate enough data to evaluate trends ade-

quately". Recognising that the majority of poor people live in rural communities and depend on natural resources for their livelihoods, their report continued; "The challenge is to develop the means to monitor environmental quality and land management practices that impact on poor people in rural areas". By engaging local actors in monitoring, some of the existing problems with less participatory approaches can be overcome (although some others arise, as is discussed below).

The SADC experience is by no means a unique perspective, as this example from Australia highlights:

"We had 30 years of monthly water quality records from the government, but we weren't getting the information we needed for catchment management until we got the farmers involved."

(Morgan in Alexandra et al. 1996)

Participatory monitoring recognises the central role that local people can play in planning and managing their use of the environment. It reflects a logical evolution of the participatory approaches to resource appraisal that have developed over the last two decades (see Chambers and Guijt 1995). Participatory monitoring shifts the emphasis away from externally-defined and driven programmes and stresses the importance of a locally-relevant process for gathering, analysing and using the information. It means involving (groups of) people in stages of monitoring in which they have not previously been involved. Inevitably, this will require some form of capacity-building: either of external people to understand local systems of environmental monitoring, or of local people to understand external systems, or both as they develop a mutually acceptable process. Thus, monitoring moves away from being an activity undertaken for, and by, outsiders, to one that builds on local community activity and increases its capacity to record and analyse local conditions. The information generated should contribute to improving learning and action, in addition to the regulatory, watch-dog function of many conventional monitoring programmes.

Key questions are emerging from the embryonic experiences with participatory monitoring worldwide, such as what are the claimed benefits and what is the extent of local participation. Before discussing these, we give an example of one monitoring process. It explains key moments in the development of a monitoring process, and highlights how this process could be constructed in more or in less participatory ways.

#### Key steps in indicator-based participatory monitoring

As part of the Brazilian research project on monitoring sustainable agriculture, Guijt (1998) developed a framework for establishing a participatory monitoring process. The monitoring approach was adapted to the Brazilian context during three large workshops and numerous meetings of each stakeholder group over a period of about 12 months. The 'monitoring calendar' is now being implemented, and indicators, methods and timing are being reviewed to improve the approach,

4 While indicators might seem a prerequisite for any monitoring approach, one example with a different perspective is described in Section 3.5. Therefore, this example is by no means. the only way to set up a participatory monitoring process.

Planning an indicator-based approach<sup>4</sup> to participatory monitoring involves a number of basic steps. These are outlined below, but are described more fully in Guijt (1998). The steps do not, however, necessarily follow each other in 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. The final choice of indicators will also depend on what is possible to achieve with the available methods. Preferred indicators may be those for which a reliable or feasible method of measurement cannot be found. For example, whilst a 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 adapted to overcome the constraints of money and time.

#### Key steps

3

1 Make the decision to start a participatory monitoring process.

This is not a decision to be taken lightly. 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.

2 Identify possible participants.

> Who has a perspective or knowledge that is essential? Whose capacity for monitoring should be strengthened if sustained monitoring is desirable? Invite all the stakeholders to become partners in the monitoring process, making it clear that all steps will be negotiated with everyone. Identify the objectives of the monitoring from the perspective of each of the participating groups.

> Clarifying people's objectives for monitoring – i.e. why they are interested in monitoring - will help specify to what extent each group is willing and able to participate in different tasks. The objectives of the monitoring should be distinct from the objectives of any intervention that might be undertaken. For example, if the development interven-

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tion 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'.

4 Clarify (or identify) the objectives of the work being monitored.

This step is only important when monitoring measures the extent to which objectives of activities are being met (so not for assessing general changes in environmental phenomena). Normally, such 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 sufficiently to allow for joint monitoring. These must first be understood and clarified.

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. One common way to help clarify whether an indicator will work well is to see it if is 'SMART': Specific, Measurable, Attainable, Relevant, Timely (see also Section 3.5).

6 Selection of methods.

The choice of method will depend on the 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 data, consider which methods of collecting, registering, analysing and sharing the information are best for each indicator.

7 Decide frequency and timing of monitoring.

Certain indicators are best measured at key moments in the year, and with a frequency that enables the collection of useful information. One obvious example is yields, which are best assessed at harvest time and can be measured immediately or shortly after harvest by asking farmers. To avoid confusion, it is essential to clarify the monitoring schedule and those responsible for each monitoring stage, possibly in the form of an annual monitoring calendar.

8 Prepare and fine tune the methods.

Test the methods, and any tools 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 be involved in different stages of the monitoring to enable them to be confident with carrying out their tasks to the standards required.

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. It is impossible to obtain an objective picture upon which to base an understanding of cause and effects without comparable data or information. How-

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ever, 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.

10 Dealing with the data.

After data is collected, it needs to be collated, analysed, and shared with the relevant people or groups. It is important to consider which methods will be used to analyse the data and who will carry out the analysis (see step 8). As far as possible, those who participated in the data collection 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 situation.

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 activities of land users, community-based organisations or non-governmental organisations, donors, researchers, and/or policy makers where appropriate, to improve the achievement of objectives or limit unanticipated negative impacts.

As mentioned above, this formalised description of the key steps in monitoring hides what is, in fact, an iterative and negotiated process to which all the monitoring partners can contribute. In Brazil, farmers were involved from Step 1 onwards, with the NGOs discussing with the farmers and unions whether a participatory monitoring process would have a value for their work. However, the practice of participatory monitoring of environmental change is very diverse. In many cases, local people are only involved in Step 9, the actual data collection.

The implementation of this process in Brazil, and our review of other experiences, suggests that there are four central questions and dilemmas that need to be understood when embarking with a participatory monitoring process:

- What are the perceived benefits for different stakeholders of participating in monitoring?
- Assuming that everyone will benefit in some way, what is the degree of participation of each stakeholder group in different stages of the monitoring work?
- Given different objectives and world views, how does one agree on indicators?

 Given the methodological compromises that any partnership demands, how can one deal with the trade-offs, particularly those between 'scientific rigour' and 'participation'?

Each of these challenges is discussed in the four sections below.

#### 3.3 The benefits of participatory monitoring

Section 2.3 explained three general purposes of monitoring: (1) to support decision-making and planning; (2) accountability; and (3) to enhance local capacity for recording and analysing change, and improve community-based initiatives. Turning now to the specific case of participatory monitoring, a fundamental question is why anyone should bother assessing change in that particular manner. For whom will the information, and the process of collecting it, bring benefits?

#### Box 3. Multi-level learning for more informed management

Different agencies have different perspectives on and requirements from monitoring. Frequently, monitoring has been donor-led, enabling external agencies to evaluate the impacts of their interventions. However, increasingly, monitoring is seen as an advocacy tool, enabling implementing agencies to justify their approach to a wider audience. This often requires a broader approach to monitoring that includes a wider or different suite of monitoring variables than those required for donor agencies. Furthermore, a participatory monitoring process can be used to encourage a 'healthy competition' between different communities who are involved in a project. Participatory monitoring develops the monitoring skills of villagers and contributes to institutional capacity development at all levels, from the local to the implementing agencies.

Marshall Murphree pers. comm. 1997

Very often people's monitoring indicators turn out to be rather different from those that are decided by outsider 'professionals'. Allowing the community to generate its own monitoring indicators makes it easy to keep track of the process and use the findings for day-to-day decision making.

Kaul Shah 1995

Participation is a familiar development theme but local involvement has tended to focus primarily on implementation aspects. Although this may produce short term results, it does not lead to a sustainable process where people upgrade and develop their capacity to think about their own priorities for development, take decisions affecting them and develop a long term perspective for change. Unless village communities participate actively in the appraisal, planning and evaluation processes, then development will not be sustainable. Also, rural people have a vast pool of indigenous knowledge and expertise which is generally neglected in planning and evaluation. Conversely, participatory monitoring is an important tool for outsiders to learn from rural people.

Shah 1993

The lack of data is clearly a problem for long term project planning and accountability to donors. Despite the intensity of NGO efforts in sustainable agriculture in Brazil, they have little systematic, documented evidence of the impact of their efforts. Unfortunately lack of proof is often interpreted by critics of sustainable agriculture or funding agencies as lack of success or an absence of evaluation. By developing a participatory monitoring system, objectives and indicators that are meaningful to farmers and NGOs can be found that allow the collection and processing of information with higher relevance and less effort.

Guift and Sidersky 1996

Most project-initiated monitoring processes make the rather tenuous assumption that the monitoring process has value for local people. But this may not always be the case. Box 3 describes a range of perceived benefits of four project-led approaches to participatory monitoring. These include: accountability to donors, enhancing participation, increasing local level capacity, and improving the sustainability of project activities. Each partner in a collaborative monitoring process is likely to emphasise some objectives more than others, thus influencing how much time they are willing to invest in it and what they will get out of being involved. This has implications for the design and implementation of the approach.

Our review of experiences, from countries as diverse as Brazil, Mali and Australia, highlights the wide range of motivations of different stakeholders for becoming involved in a participatory monitoring process - but learning, rather than accountability, is a critical ingredient. For example, the work in Brazil was undertaken after several NGOs, who work with farmers and rural workers unions to make agriculture more sustainable for smallholders, became increasingly concerned that they had no proof with which to lobby for changes in agricultural policies and practices at the macro level. Two NGOs, one in the state of Minas Gerais and the other in the north-eastern state of Paraíba, discussed this with HED and they decided to learn together how to set up a participatory monitoring approach. As the unions were already engaged with the NGOs in developing, testing, and disseminating alternative agricultural practices, they were an obvious partner in the monitoring process. The NGOs had developed close working relationships with a number of particularly keen and innovative farmers, who were invited to join in the process. In Minas Gerais, the Department of Soil Science (University of Viçosa) had been involved in developing better soil conservation and regeneration practices so they too were invited into the process. Box 4 highlights the different motivations of the partners involved in the Brazilian process for wanting to develop a participatory approach to monitoring.

Satisfying one's curiosity about environmental change and the value of regeneration work is another perceived benefit of participatory monitoring. In Australia, Alexandra et al. (1996) estimate that between 150,000 and 200,000 people, "fuelled by enthusiasm and curiosity", are part of community environmental monitoring (CEM) groups. They suggest that the dramatic and recent increase in CEM is a response to increased public awareness of environmental issues which has prompted large-scale public participation in environmental decision making. Typically people join CEM groups because they want to know:

- What's going on in the local area?
- What's effecting this, or causing that?

- Is the local creek or river healthy?
- Are the landcare, catchment or conservation strategies working?
- Is such and such a plant/animal/organism increasing or in decline?

#### Box 4. Why different people and institutions are interested in monitoring change

At the first meeting to start developing participatory monitoring of sustainable agriculture in northeast Brazil, the partners involved discussed what their interest was in monitoring.

#### Formers

- to activate the interest of other farmers not involved in the sustainable agriculture.
- to ensure proper management of their own farming enterprise
- to be able to show the impact of their efforts to neighbours and others.

#### Rutal Worker's Union

- to avoid having to resort to opinions (e.g. 'I think our work is doing well') and to evaluate with more certainty
- to convince other farmers with more and better proof that sustainable agriculture practices can also benefit them
- to convince other organisations that sustainable agriculture activities are worthwhile innovations and are worth supporting
- to be able to evaluate better other aspects of the union's work.
- to help with planning, knowing what works and what doesn't.

#### AS-PTA (local NGO)

- to report to funding agencies the extent to which efforts are meeting the intended objectives.
- to help in planning and prioritising of activities.
- to have proof for advocacy purposes at the regional, state, and perhaps even national level
- to enhance the capacity of farmers and unions for autonomous planning and implementation of sustainable agriculture activities
- to strengthen the cohesion and interaction of newly forming farmer experimentation groups.

Source: HED/AS-PTA/STR-Reinigio/STR-Solanea 1996a

As with the Brazilian experience, CEM groups and their members in Australia have diverse motivations for becoming involved in monitoring:

"CEM groups differ in what they hope to achieve, Just as science can be pure or applied, and religion can be active or contemplative, some CEM groups simply want the intrinsic pleasure of understanding and appreciating the world around them. They have little interest in applying their understanding to management problems. Others are concerned with economic survival and farm productivity. Others are seeking insight into change processes in order to improve environmental decision making. But most are united by a common desire to see actual improvements in environmental conditions." (Alexandra et al. 1996)

A similar pattern in the range of expectations and uses of the monitoring process emerges from a soil fertility project in southern Mali (see also Annex 1, Case Study 3). Table 1 shows the diverse ways in which the monitoring findings have been used by different stakeholders. It highlights how monitoring findings can feed into a range of different activities, depending on the interests and priorities of the stakeholder group.

User Group	Purpose to which the results have been put
Researchers	<ul> <li>To evaluate the overall methodology used</li> <li>To evaluate the different tools and the effect they have on soil fertility</li> <li>To evaluate the effect of the new technologies on ecological, social and economic stability in southern Mali</li> </ul>
Farmers	<ul> <li>To facilitate comparison between their own and their neighbours' performance</li> <li>To make comparison between their own practices and extension recommendations</li> <li>To facilitate year-on-year comparison of their own fertility management practices</li> </ul>
Extension services	<ul> <li>To draw comparisons between their own recommendations and the current practices of farmers placed in different categories or living in different areas</li> <li>To revise recommendations where necessary</li> </ul>
Policy makers and donors	<ul> <li>To evaluate the effects of their own policies or the programmes they are supporting.</li> </ul>

#### The efficiency argument

A popular reason for, and expected benefit of, participatory monitoring is that monitoring efficiency can be improved by harnessing multiple perspectives. However, this benefit cannot be assumed as it requires considerable investment and commitment, in terms of time and resources, to bring different world views and languages together. As an example of this, Box 5 outlines flation (Larry) Merculieff's experiences with Alaskan Natives and the Alaska Department of Fish and Game which he recounted at the Sixth International Conference on Hunting and Gathering Societies. He discusses the importance of considering the breadth and depth of local information in informing research on natural resources. An Aleut himself, Merculieff argues that the native Aleut sees the environment as in constant flux, a process that scientists find hard to monitor, model and manage. Yet, he stresses that by integrating perspectives, a better maderstanding of 'connectedness', and therefore what to monitor, could be achieved.

#### Box 5. Dialogue for the sake of survival

As an Aleut, one of the three distinct aboriginal races in Alaska, I am keenly aware of the depth of knowledge and experience about the environment inherent in my own cultural system. I realised there was a definite pattern in the breakdown of communication between aboriginal peoples and well-meaning individuals in Westernised institutions. I can best communicate this by recounting a meeting in a remote Alaskan village between scientists, resource managers, and tribal chiefs from villages highly dependent on hunting and trapping.

The theme of the meeting was subsistence. One of the state representatives presented the fieldwork that was planned to determine the health of the local moose population. The individual described the intended methodology, and indicated that this study was important because the moose population appeared to be at a critical threshold of sustainability.

The traditional governing group leader responded by saying that they had noticed a distinct drop in marshland water levels. This had adversely affected the marshland food sources for the moose. He asked if anyone from the state had counted the number of beaver in these areas or the number of dams these beavers had built, as at least 20 small tributaries to the Yukon river were dammed. He commented that the Alaska Department of Fish and Game might propose to cut the villagers' hunting of the moose as their answer to the problem without understanding beaver populations and their impact on the environment. The leader said, 'It seems to me that you should listen to us and find ways to work together'.

Both sides left the meeting feeling that they had never connected. The scientist's job was to coffeet limited data on moose only. The native groups provided information that went beyond the scope of the field assignment. They were never heard as the focus on scientific field data minimised the importance of what seemed to be anecdotal information.

These two world views could be described as 'linear' and 'cyclical'. The scientist is immersed in the linear construct, as are most Westernised people. In science, linear progression is reflected in the continued refinement of scientific methodology from its origins of simple logic, common sense and visual observation. Contrast this way of life with those who live their lives by the seasons and in responses to their environment. Theirs is a world in which the interdependence of humans, animals, plants, water and earth – the total picture – is always immediate, always present. And the total picture – every day, every season, every year – is seen as a circle. Everything is connected: the marshlands to the beaver, the beaver dams to the altered conditions, the new conditions to the moose herd, the moose herd to the marshlands.

The chief had described a specific sequence of events that his people had observed that demonstrated their world view of connectedness. What is overlooked by dismissing such information is that the native comes from a community of people who have had sustained contact with their immediate environment for thousands of years, and who, through a cultural information system, have passed on their visual observations, knowledge and experience to each successive generation. In this context, native information is anything but ancedotal.

Source: Merculieff 1994

In another, more positive experience, scientists collaborated with the Anangu, aboriginal traditional custodians of the land in Uluru (commonly known as Ayers Rock) National Park in central Australia (Reid et al. 1992). While this is not a monitoring process in the sense of periodic assessments, it highlights the benefits of a joint faunal survey. The

ecological survey was the start of a process of "maximising the chances of maintaining all vertebrate species in the Park" and involved a review of traditional knowledge, alongside a more standard ecological survey. One way in which the collaboration proved helpful for the scientists was the advice the Anangu wildlife experts provided about where to find rare, threatened or cryptic species. In the case of the striated grasswren (Amytomis striatus), Reid et al. describe:

"... an Anangu wildlife expert showed an ornithologist how to identify the grasswren's tracks in the sand and how to track the birds back to their nests in the spinifex clumps. These newly acquired skills helped the researcher to locate populations elsewhere in the Park and to find two active nests in a fraction of the time it would otherwise have taken"

Reid et al. go on to say:

"Perhaps the most important conclusion for wildlife management was to recommend the establishment of integrated monitoring programs... It is clear that considerable efficiency can be achieved if Anangu participate in all future monitoring and research because of their outstanding wildlife skills".

In 1994/95, a repeat survey was conducted as a form of (fairly unstructured) ecological monitoring (Reid, pers comm. 1997). In this survey, Anangu involvement was in some ways less integrated than in the previous survey, but also improved due to a more flexible approach and more social interaction. Unfortunately, resources have not been dedicated to analysing and writing up the materials provided by the Anangu, and little of the new and interesting information may see the light of day. Reid explains:

"It is incredibly time consuming and therefore costly [requiring] linguists, vetting of sacred knowledge, corroborating or reconciling conflicting information and interpretations, payment of Anangu and other consultants, etc.."

Thus the pursuit of efficiency has perhaps a flip side, that of the costs incurred in bringing the different perspectives together. The lesson is clear. Despite many potential benefits, being serious about an integrated participatory monitoring approach that bridges widely differing world views, as between the Anangu and the westernised scientists, requires commitment, careful design and substantial funding. It will not happen through good intentions alone. Furthermore, the onus is on those who advocate for more participatory approaches to environmental monitoring to demonstrate that it works.

#### Assessing claimed benefits

Usually monitoring is assumed to achieve some or all of the multiple objectives that are demanded of it, yet few projects assess whether this, is in fact, the case. For example, Campilan (1996) notes that while a

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growing number of agricultural projects are adopting participatory monitoring as it is assumed to be 'better', there is a need to determine whether participation contributes significantly to achieving more effective monitoring and evaluation. He warns that as participatory monitoring becomes a new "buzz word" in development, it should not become "romanticised as the panacea for all the ills in project monitoring and evaluation".

Given that people invest much time, money, and effort in participatory monitoring (and its advocates demand more resources to be allocated to it), it is important to know if it is worthwhile. Monitoring the positive and negative impacts of participatory monitoring processes, as compared to conventional methodologies, would require a long term study, particularly as so few practical experiences of participatory monitoring exist. However, one rare insight into the benefits comes from Australia which has a long history in community environmental monitoring (CEM). Although Australia is a relatively tich country, their insights, based on CEM experiences that have been established for up to fifteen years, may assist the development of participatory monitoring approaches elsewhere.

In their survey of over 200 CEM experiences in Australia, Alexandra *et al.* (1996) asked several questions in national surveys and several workshops, including:

Does CEM improve environmental management?

Can CEM data be integrated to provide a systems view?

How can CEM be improved?

1

2

The responses indicate that CEM groups assess their own achievements very positively:

Although learning how to identify causal factors of natural phenomenona may be somewhat ambitious for most, at the very least direct involvement in monitoring led participants to develop a sense of responsibility for the continuing health of the environmental issue/organism on which they were focusing: "As monitors begin to understand natural processes and rhythms, they gain the capacity to distinguish natural changes from those induced by management. When this point is reached, they come to identify causal factors. They see what needs to be done, identify who or what is responsible, and seek positive responses and adaptive changes from the responsible agencies".

"Data exchange is essential. Most environmental issues require the undest data available ... best results in environmental monitoring will come from the combined resources of government, researchers and community interests that have a stake in the issue involved". This has been realised on a large scale in South East Queensland, Australia by integrating data from a wide variety of sources and through community and agency collaboration. Using simple Geographic Information Systems, it has been possible to integrate the community generated

information with material from existing databases, and to provide all councils within the region with customised data, in map form, to assist in planning.

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"[W]ithout some assistance from the wider community, the interests and resources of community environmental groups may be insufficient to sustain the consistent, long term monitoring required to determine significant environmental trends". The survey highlighted a number of requirements for realising the potential of CEM more fully. These included:

- establishing better links between monitors and environmental managers;
- encouraging initiatives to integrate data at the regional level;
- providing national leadership in data sharing;
- building community capacity to interpret data;
- building increased involvement in CEM.

## 3.4 Degrees of participation in monitoring

This section explores the roles of different stakeholders in the monitoring process. Recognising that most participatory monitoring relies on partnerships of different stakeholders (see below), we describe how a common approach can be developed.

#### Local monitoring

"We all monitor the environment. We look, feel, smell and listen. These are basic survival skills which we use when driving, shopping, farming or whatever. Knowledge is increased by recording observations and noticing patterns, and by organising, analysing and collating information derived from dispersed and diverse observations. It happens in families, tribes and international scientific endeavours; it happens in small specialist disciplines and in large organised networks. Repeated observation of environmental conditions over time can help us understand the causes of environmental changes and provide early warning of environmental problems. Monitoring is basic to human understanding and necessary if we are to improve our environmental management". (Alexandra et al. 1996)

Alexandra et al. (1996) note the informal ways in which people use "environmental indicators as a form of ecological shorthand – a rapid way to assess environmental conditions". There are many examples of local indicators of change that enable people to capitalise on natural processes. For example, in Mare village, Papua New Guinea, village men highlighted that wild pigs are hunted when certain berries ripen. Amongst the Ngarinmand and Ngaliwuvu people in the Northern Territory, Australia, the (unpleasant!) bites of March flies are a signal that it is time to go and look for crocodile eggs (Rose 1988). Rose goes

5 From recent fieldwork in Papua New Guinca to assess the local value of biodiversity, forthcoming in an HED Hidden Harvest publication. on to explain this and other similar use of environmental indicators:

"This system of information is based on messages sent out by different agents within the system, 'telling' about the system, ... There is an immediately discernible pragmatism here: if buman beings are to forage with greatest success and minimal outlay of energy, they must know what is happening at any given time. Beyond simple pragmatics, however, there are further questions... In order to act responsibly, humans and others must be constantly alert to the state of the systems of which they are a part." (Rose 1988:382-383)

Although few people now live as foragers, monitoring also underpins the livelihoods of those people, such as fishers, farmers and herders, who depend directly on the natural resource base. As expressed in the editorial to the ILEIA Newsletter (1996), "In order to survive farmers must be - and often are - experienced 'trackers of change' who are open to learn, adapt and innovate". Hambly (1996). documents how farmers in the communal lands of Zimbabwe identify over-grazing by examining forage and sharing reports of change in vegetation in order to devise indicators or drought warnings. For example, to predict the end of the dry season, the bark of indigenous trees is cut to observe the quantity and appearance of its milky sap. If the sap is quick moving and plentiful, this indicates the rains are coming. If not, farmers take heed and economise their food stocks and delay their planting. Other examples of environmental triggers, or indicators, that are used by farmers in Australia are shown in Box 6. Despite such in-depth local knowledge about the environment, many externally-driven monitoring approaches exclude or ignore the informal, conscious and unconscious ways in which communities, as resource users, monitor their environments,

# Box 6. Land literacy applied: the 'when this, then that' pattern of informal monitoring as applied by farmers

When you observe this:

algal bloom

change in grass species

ants, termites, worms

silt fans on lower slopes

change in milk yields

lack of fertiliser response

soil against fences

Then you know that there is:

high nutrient levels/run off

under or overstocking

living soils

intense rain after poor cultivation

inadequate shade or dict

soil acidity/structure decline

wind and water erosion.

Source: adapted from Jack 1989 in Alexandra et al. 1996

## Building partnerships for participatory monitoring

In these types of local monitoring processes, community groups or individual farmers are the only participants in monitoring processes that have direct benefits for them, in ways that suit their needs and operating constraints. But how representative is this type of monitoring compared to others that operate under the banner of participation? Within the broad term 'participatory monitoring of the environment', there are varying degrees of participation by the different partners. As most communities are linked in some way to external agencies (whether government departments, NGOs or the private sector), community monitoring frequently occurs as a partnership between different groups within the community, and not (only) as groups of foragers or farmers in isolation (see Box 7). Thus, the majority of the literature reviewed describes project-led approaches to monitoring activities within the project cycle. And it is for this type of monitoring that participatory methodologies are most often developed.

Recognising the multiple stakeholders in a participatory monitoring process, Rennie and Singh (1996) note that while community-based indicators should be selected for collection by the community, they should also be upwardly compatible with higher level monitoring and evaluation concerns. These authors suggest that "we have to find common ground between the statistician and the community, and a possible trade off between professional standards and practicality or realism from the community point of view" (see also Section 3.5). Community-based monitoring will only work if it contributes to local understanding and empowerment, and not simply to the satisfaction of the researcher. The development of the monitoring process must ensure that all stakeholders are motivated and there is feedback into a local information system so that the process of indicator measurement is not purely extractive.

#### Box 7. Vital partnerships

In 1992, the then Prime Minister of Australia, Paul Keating, announced funding of Aus\$ 2.9 million over 3.5 years for the establishment of the national Waterwatch programme. By encouraging community participation in monitoring water quality, the programme aimed to raise community awareness of the natural environment, instil the wise use of natural resources ethic in communities, and encourage appropriate activities in response.

In the initial stages, priority was given to funding infrastructural support in the form of state and catchment or regional facilitators. These people play an essential role in providing community groups with information, training and assistance in carrying out water quality monitoring activities. Without such support, community-based programmes, such as Waterwatch, will not succeed.

Source: Mobbs 1996

#### In search of common dialogue

In developing partnerships for monitoring, it is essential to build on local terms for 'monitoring' or noting and recording change, or to find terms that are clear for everyone involved. Local perceptions of the term 'monitoring' are likely to be highly variable and location specific, and getting the wording right is crucial for everyone to understand and contribute. In recent work in Brazil, the word 'monitoring' was rejected in one field site, in favour of the term acompanhar (i.e. 'accompanying change'). There, the term 'monitoring' has no local significance and is viewed as an academic, and almost a foreign, word. However, in another field site in Brazil, the term 'accompanying change' was found to cause great confusion as it was already used to describe existing extension activities. After explanations and clarifications, the word 'monitoring' is now common parlance, used by the farmers as easily as the academics in the collaborative work (HED/CTA/STR-Araponga 1997).

## Who participates in participatory monitoring?

Ricafort (1996) notes that most monitoring activities, even many that are called 'participatory', start with indicators, formats or reporting systems derived by outsiders. These external management systems are imposed on the community to encourage comparisons of change either over time or between communities, or to meet accountability requirements from higher up in the organisational hierarchy. Ricafort suggests that this means that we immediately "trade off some 'participation' so that we can implement our neat frameworks". He suggests an alternative approach which "start(s) with the complexity and dynamics of the community and lets those impose themselves on our own systems and ways of doing things. The challenge is how to capture the dynamics of the community as it monitors, reacts and copes with changes within it".

This may be the ideal monitoring approach for those whose focus is on community empowerment. But in many situations, participation has a more technical interpretation, with people involved to ensure better and more efficient projects. In this type of setting, the relatively quick pace of development interventions may preclude synchronicity between community and project monitoring approaches. Furthermore, it cannot be assumed that local people would be interested in full-scale involvement at all stages for all topics. What may be more important, and more achievable, therefore, is understanding what intensity and type of local participation in different stages of the monitoring process is desired and can be attained.

Much of what passes as participatory monitoring often has a project or programme focus, with a narrowly defined role for the local community. In many documented examples, it is striking to see the emphasis placed on how to encourage participation of field staff, and not community members, in designing the monitoring programme. In

these cases, staff are considered the new 'participants', rather than local people.

Little systematic thought may be given to the role of local women, men and children, other than as collectors of information. Yet a monitoring process is much more than data collection. As outlined in the key steps (see Section 3.2), community members can, in theory, be involved in different ways in all aspects of the design and implementation. As shown in Box 8, a comprehensive process requires that:

- issues and goals are clear to all involved, so that everyone knows what to monitor and why this is the case;
- monitoring methods or instruments are available or can be designed to assess and interpret outcomes;
- data is collected, compiled, analysed and used by those who are affected by the policies/interventions being implemented, or by the changes to the state of the natural environment (depending on the type of monitoring).

#### Box 8. Participation in stages

In monitoring work in Minas Gerais (Brazil), four stakeholder groups are collaborating to assess change induced by their collective activities in sustainable agriculture:

- farmers (women and men).
- representatives of the Rural Worker's Union (who are often also farmers)
- staff of a local NGO, CTA-ZM
- academics from the Department of Soils of a nearby university.

Over the past year they have all been involved, usually in mixed groups but sometimes to their own groups, in each stage of developing a monitoring methodology:

- 1 prioritising which of their 28 field activities would be evaluated.
- 2 identifying short-mid- and long-term objectives of each prioritised activity (in their own groups).
- 3 merging objectives as perceived by the 4 groups to create a common understanding of the activity
- 4 prioritising which objectives of each activity would be monitored
- 5 identifying the indicators for each prioritised objective.
- 6 selecting feasible and reliable methods of collecting and registering information that could be managed by farmers and union representatives
- 7 identifying when, how often, and where measurements would take place
- 8 identifying who would be involved in data collection, collation, and analysis
- 9 clarifying with whom the final information would be shared and for what purpose.

The extent of participation of each group has been discussed collectively at each stage. This has helped, for example, union representatives asking the NGO to help at particular moments, and farmers opting out of specific meetings due to urgent work in their fields.

One obvious implication of this is that much time is needed to develop a monitoring methodology, as meetings must fit in with many agendas. In addition, compromises have to be made in terms of the choice of indicators and methods. Flowever, the participatory process also means that methods are feasible, indicators are understood, end-use of the information is clear, and everyone is keen and able to implement the monitoring. It has, after all, taken on meaning for each partner.

Source: HED/CTA/STR-Arabonga 1997

The slow and collective approach outlined in Box 8 will not be feasible, for practical reasons alone, in many settings. Some projects might be able, and interested, only in ensuring that the monitoring approach is understood by the different groups. If consensus cannot be the outcome, at least an appreciation of the parts of the monitoring process that are important to each social group should be attempted.

To achieve a monitoring process that aims to be participatory, it is essential to invest some time in understanding the different views and intentions about monitoring of each group. Depending on the purpose of the monitoring, different groups of people will be involved to a greater or lesser extent. For example, is it necessary and appropriate for farmers to measure indicators that are of interest and relevant only to NGOs? As discussed in the previous section, participation in various stages must be negotiated, and cannot be assumed to be of equal interest to everyone (see Box 9).

#### Box 9. Who should participate and when?

To help assess who should, ideally, participate in which stage of the monitoring work, the following structure is now being tested in Paraiba (Brazil) by AS-PTA. For each of the indicators, participation of the different possible stakeholder groups (farmers in general, members of farmer experimentation groups, union representatives, NGO staff, others) is to be assessed using the following questions to fill in the table:

- What is the relevance of participating for each group, or is it the process of collating/calculating the data that is important, or only the final information?
- Who is going to use the final information? (Those who are to use it should understand on what it
  is based, how it was calculated, etc.)
- How difficult are the calculations? (The more difficult, the more caution should be used in encouraging broad participation unless it is clear whom it will benefit and how.)

Discussing these questions helps the union representatives and NGO staff sort out roles and responsibilities, and identify who will be invited to participate when.

Steps	Who should participate?	When will this happens
1 Methodology design		
2 Data collection		
3 Collation/calculation		
4 Analysis of findings		
5 Devolution of information		
	Source: HED/AS-PT	A/STR-Remigio/STR-Solanea 1997

# 3.5 Developing indicators: consensus and compromise

# Negotiating the needs of different stakeholders

Given that participatory monitoring depends on partnerships between stakeholders, this section explores how different stakeholder priorities and expectations can be integrated in the search for common indicators. Guijt and Sidersky (1996) suggest that "If monitoring is to be part of a sustained learning process, it has to have local relevance and be feasible in the long run". This takes time and involves compromise. For the work with the Brazilian NGO, AS-PTA, this has meant moving away from an approach to monitoring that provides "proof for hard headed scientists" towards identifying indicators that better reflected farmers' perspectives on the changes they experience. But prior to developing indicators, it is critical to clarify the objectives for the activities being monitored (see Box 10). This important step is often missing from other descriptions of monitoring approaches, with most projects assuming that everyone understands the project objectives.

#### Box 10. Agreeing on objectives and indicators

A key lesson from participatory monitoring of sustainable agriculture in the Brazil research is 'spend sufficient time on the objectives'. If these are not clear, it is impossible to identify indicators to monitor them. During a workshop, the objectives of the NGO were clarified using an 'objectives tree', to distinguish between, and prioritise, short-, middle- and long-term objectives.

Developing appropriate indicators requires understanding the end use of the data. In one case, soil regeneration activities, the discussion focused on the direct measurement of biophysical properties. For example, one of the main objectives of contour planting was 'soil and water conservation'. Indicators, such as soil retention, moisture retention, and organic matter content, were initially identified. However, the measurement of these indicators is impractical given the limited resources of the NGO. Furthermore, such precise data were deemed unnecessary when the audience and the purpose of the information was discussed. The information was to be used in farmer-to-farmer extension and donor reporting, neither of which required detailed statistical data. Instead, it was more important to understand farmers' perspectives on perceived changes as a result of planting along contour lines. Thus, agreement was reached on another indicator: the frequency with which positive and negative changes were noted by farmers planting along contour lines.

Source: Guijt and Sidersky 1996

Selecting indicators is one of the most difficult steps in setting up a participatory monitoring methodology. It is this stage that highlights, more than any other, the different information needs and expectations of monitoring of different stakeholders. It also reveals that what one group considers 'trustworthy' information, does not necessarily hold for another. Although the process described by Campilan (1996) in

Box 11 does not include local people, he describes how the information needs of multiple stakeholders must be integrated into any participatory monitoring approach for it to be implemented and maintained. Campilan (1996) writes:

"One of the most important lessons learned by researchers is that participatory monitoring and evaluation can work most effectively when dealing with data which are of mutual importance and usefulness to researchers and farmers."

This might seem an obvious point. But few of the experiences of participatory monitoring that were reviewed seemed to invest sufficient time and effort in ensuring that these mutual benefits existed before embarking on indicator selection. This is supported by Ricafort (1996). who suggests that if we acknowledge multiple stakeholders and multiple views of reality, then the process of indicator selection must be reexamined. Pre-defined and "objective" indicators must be replaced by "negotiated" indicators that are "channels for bridging realities and meanings". The negotiation should be an on-going process and should result in indicators with an element of flexibility if they are to be releyant and meaningful.6 Ricafort asserts that the main gap in participatory monitoring lies not in the actual use or development of methodologies, but rather in the "facilitating of negotiations across organisations, social sectors, and within organisations". This requires that each stakeholder (or group of stakeholders) is able to be flexible and adapt their "monitoring norms". Viewed in this way, participatory monitoring appears to be as much about understanding social interactions and processes, and using these to reconcile the needs and agendas of different stakeholders, as it is about developing new methods.

6 The need for flexibility in choosing indicators, particularly during the initial phase of designing the monitoring process, is proving to be important in the Brazilian work. As those involved in the partnership attempt to apply the chosen indicators, it becomes clear to them why they might not be relevant or specific enough. This leads them to fine-time the indicator(s).

## Box 11. Participatory monitoring for whom?

An urban project in the Philippines brought together three different institutions: a research centre, public elementary schools and a local health agency, to pursue a common goal of promoting home and school gardens for enhancing food security. While the three institutions worked together in project implementation, the research centre took the lead in developing a monitoring and evaluation programme. Thus, the data requirements for monitoring largely corresponded with the information needs of the research centre. The staff of the health and education agencies could not see the relevance of certain indicators, such as crop yields, varietal mixtures and other technical parameters, to their work. Consequently, monitoring forms developed by the researchers were not filled in by the health and education workers and the monitoring programme failed.

From this initial experience, the researchers realised that to implement a monitoring programme and enhance participation, the information needs of all the project stakeholders had to be incorporated. A follow-up workshop brought the three stakeholders together to reconcile their respective information needs. The data requirements were adapted to ensure that they all found the monitoring outputs useful for their work.

Source: Campilan 1996

# Social differentiation of indicators

Negotiating indicators is also critical because of social differentiation. However, few of the papers reviewed address this issue. Yet extensive conventional and participatory research experience would suggest that it is important. Highly differentiated patterns of use of the natural environment are documented according to factors such as the culture, wealth status, age, gender and length of residency, of the individual (cf. Abbot 1996, Sarin 1998, Rocheleau et al. 1998, Kaul Shah 1998, Vlaar and Ahlers 1998). It may therefore be expected that the different priorities of individuals would translate into their different needs of a monitoring programme and different indicators. One rare example of the social differentiation of indicators supports this hypothesis. Roche (1993) describes differences between households in defining and measuring 'success' (see Box 12). This case study from Mali highlights that different indicators were defined according to age, occupation, gender and wealth status of participants.

### Box 12. Female-male grass indicators in Mali

As an NGO working in Mali, ACORD was interested in promoting the regeneration of a riverine fodder crop (Panicum bourgou) along the Niger river. It had been assumed by most people (particularly the technical services working in the area and external aid agencies) that the primary reason that groups were interested in this activity was to ensure adequate fodder for their animals during the dry season. This was true for many individuals – men suggested that their indicator for measuring the success of the project would be their ability to offer ACORD staff a calabash of milk when they visited their site in March.

But discussions with women established that the success of this activity could also be judged by asking the children, in the coming year, if they had drunk more *kundou* than usual (a sweet drink also made from the grass). Further discussion revealed this criterion for success was a single indicator that allowed rapid appraisal of several aspects of the project: if the *kundou* had been made available to children it would indicate that there had been enough to satisfy the needs of animals.

This revealed the different priorities between men and women, and between women who owned livestock and those who did not. A further lesson of the project was that different intra-household relations exist, particularly between pastoral groups. These differences often depend on levels of sedentarisation of the group and the social origins of the bousehold (i.e. noble, vassal or marabout). The replicability of the analyses of within-household relations and evaluation criteria needs to take account of such factors. One of the main differences was between female and male-headed households.

Source: Roche 1993

# When is an indicator a 'good' indicator?

An indicator is an aid for communicating complex processes, events or trends to a wide audience. The term is drawn from the Latin verb, *Indicare*, meaning to point out or proclaim (MacGillivray and Zadek

1995). There are many different definitions of 'indicators' (see Box 13). But to develop locally meaningful indicators, an essential first step is finding a term for the word 'indicator' that people recognise. In a research project in Uganda, the word 'signpost' was chosen (see Rennie and Singh 1996). Everybody recognised what it was and what it was not: a signpost points to something else, but is not in itself the thing to which it points. Yet when this was tried in another (unrelated) monitoring project in Brazil, it drew blank states. The farmers were not familiar with this metaphorical use of the word 'signpost'.

#### Box 13. Indicator definitions

Indicators are pieces of information that provide insight into matters of larger significance and make perceptible trends that are not immediately detectable.

Hammond et al. 1995, in Somé and McSweeney 1995

Indicators help you understand where you are, which way you are going, and how far you are from where you want to be.

Hart 1995, in Some and McSweeney 1996

Indicator is a measurement that reflects the status of a system, for example an oil pressure gauge on an engine or the number of owls in a forest.

Alexandra et al. 1996

Indicators are bits of information that highlight what is happening in a large system. They are small windows that provide a glimpse of the 'big picture'.

Sustainable Scattle 1995

Indicators generally simplify in order to make complex phenomena quantifiable in such a manner that communication is either enabled or promoted.

poverty and hunger.

Adriaanse 1993, in MacGillivray and Zadek 1995

Identification of indicators that will work in practice is not as easy as it is sometimes suggested in the literature. Indicators have to be suggested, adapted, negotiated, and approved. One common tool to help in this process is using the acronym 'SMART': Specific, Measurable, Attainable, Relevant, Time-framed to ensure the chosen indicator is likely to function well.

Another set of criteria that can be used to assess an indicator is:

valid, measurable, verifiable, cost effective, timely, simple,<sup>7</sup> relevant, sensitive and punctual (adapted from Rennie and Singh 1996). This may seem a demanding set of characteristics for any indicator but ensuring these are met will prevent much meaningless monitoring of imprecise or unnecessarily complicated information. Rennie and Singh give an example from Uganda of a community-derived indicator for hunger that meets many of these characteristics: eating beer bananas (see Box 14). As beer bananas are normally reserved for brewing, eat-

ing them as a staple food is a sign that a family has been reduced to

7 This criterion should be clarified according to whether the indicator is simple to use, measure or interpret.

# Box 14. Evaluating indicators: eating beer bananas as a staple food

- Valid? Does it measure what we think it is measuring and not something else? When discussing
  indicators of hunger at community level in Uganda, 'increased domestic quarrelling' and 'eating
  meals at other peoples' homes' was first offered by local representatives. After discussion, it was
  realised that these would not be good indicators of hunger, as many other factors could also lead
  to the same result. Finally, it was agreed that 'eating beer bananas' was a valid indicator, since
  nothing except hunger would lead to it.
- Measurable? Yes, we can count the number of households affected.
- Verifiable? Yes. Anyhody can check. It is not difficult to know who is reduced to eating beer bananas: the fact is hard to hide. This contrasts with a household expenditure survey, where you have to hope people are telling you the truth about how much they spent, but you have no way of checking.
- Cost effective? Yes, you just count. It doesn't take long and doesn't require any special equipment
  or training. Even school children could help.
- Timely? Only somewhat. It depends on what you want to know. It is a trailing indicator i.e. it
  shows that people are already in a state of hunger and will not provide an 'early warning' of incipient hunger. On the other hand, you could get a picture of the situation quickly: just walk into a
  village and ask for the indicator, and people will get it within a day.
- Simple? Yes, it is simple to use, measure and interpret.
- Relevant? Everyone agrees it is. It is something they would be willing to monitor on their own, as
  it is relevant to their own problems. This is an essential point if the community is to help in monitoring the indicator it must be something that they see as important as well as not burdensome.
- Sensitive? Only somewhat, an individual is either eating beer bananas or s/be is not.8 There are no other answers. Thus, the indicator will only tell you how many households are affected, but not how seriously. You would have to look at nutritional status of the children to determine acute or chronic malnutrition. This would require expect help, although rapid survey methods exist. The indicator would not be very useful if things get much worse, when everybody finds themselves in the same situation, or if things get so bad that even beer bananas are finished. We would need other indicators for severe, prolonged hunger like eating roots, or other emergency foods.
- Punctual? It can be measured at regular intervals, e.g. weekly or monthly

Source: adapted from Rennie and Shigh 1996

8 Indicators that evoke a response of 'yes' or 'no' may, at first sight, seem unsatisfactory. However, they have the advantage that they can be applied easily. Furthermore, where background infomation is provided with the response, this can be used to glean inore precise information that may be required (Gohl and Germann 1996).

The 'beer bananas' example highlights that it is not just the technical quality of indicators that is important – they must also be easy to understand and capture the imagination. MacGillivray and Zadek (1995) suggest that while indicators must measure something, their crucial role is in communication. They suggest that "good indicators will communicate information that is not only accurate, but also resonant for the intended audience. A 'good' indicator is one that achieves a judicious balance between accuracy and resonance". They also note that the balance is difficult to achieve: indicators that are technically accurate ('cold' indicators) are often complex to interpret and therefore fail to reach a wider audience. By contrast, 'hot' indicators – those

that 'strike a chord' with their intended audience – are often rejected as lacking scientific rigour by technicians.

Box 15 gives an example of a 'warm' indicator that, like beer bananas, balances the needs for resonance and accuracy. It was developed as part of the attempts by the residents of Seattle, USA to develop 'Indicators of Sustainable Community' (Sustainable Seattle 1995). They chose the 'number of wild salmon returning to spawn' as an indicator of overall watershed health. The salmon example highlights that "Inlot just any piece of data tells you what you need to know about sustainability". Thus, the Seattle residents developed five criteria that good indicators should meet:

- Promote sustainability. The indicators should reflect something basic and fundamental to the long term cultural, economic, environmental or social health of a community over generations;
- Accepted by the community. Indicators should be understood locally to be a valid sign of sustainability (or symptom of distress);
- Attractive to the local media so that the press publicises them and uses them to monitor and analyse community trends;
- Statistically measurable so that indicators can be compared to other cities, counties or communities;
- Logically or scientifically defensible so that general conclusions can be drawn (Sustainable Scattle 1995).

## Box 15. Seattle salmon: a warm indication of sustainable development?

Active citizens of Scattle, USA, have selected a suite of indicators as key measures of the city's progress towards sustainable development. The indicators address a range of topics including: environment, population and resources, economy, youth and education, and health and community. One of the indicators is the number of salmon returning to spawn. They note that the decline in salmon numbers marks a 'significant trend away from sustainability' and reflects the need to rethink concepts of development and other living practices that affect watershed health. Seattle's citizens have chosen this indicator as it is symbolic of their relationship to nature that is sustained alongside economic development. At the same time, the indicator is accurate, since it provides information on the water quality of local rivers, and on the scale and nature of human activities, such as pollution, construction and logging.

Two lessons about indicators emerge from this example. First, an indicator can be 'warm' whilst not being comprehensive. The salmon count, after all, makes little assessment about many aspects of sustainable development, such as income inequality or the state of non-aquatic habitats.

Second, an indicator can resonate for one reason and be accurate for quite another. The resonance of Scattle's salmon may be attributable to the amenity value of baving salmon to look at, or to eat. People may not consciously be making the connection between salmon runs and water quality or the state of the timber industry. "Warmth' does necessarily imply that the audience knows about, or has interest in, the nature of the indicator's accuracy, even if it is measuring something they themselves think important.

Source: adapted from MacGillivray and Zadek 1995, Sustainable Seattle 1995

The salmon example is just one of over 40 indicators developed by the citizens of Seattle. Not all of them meet all their five criteria for 'good indicators'. The Indicators of Sustainable Community report includes descriptions of indicators where uncertainty exists in their use, analysis and interpretation. They feel it is important to acknowledge 'flawed' indicators as it highlights the importance of the topic and the difficulties involved in measuring progress.

## Grassroots indicators

Indicators derived by individuals, households and communities are sometimes known as 'grassroots indicators' (Hambly 1996) or 'barefoot indicators' (MacGillivray and Zadek 1995) and have been advocated as a way of involving people who are most affected by the quality of the environment in assessing change (see also Section 3.4). One approach to participatory monitoring is to use such 'grassroots indicators' as a starting point for scaling up.

However, scaling up the data provided by grassroots indicators may not be an easy task as they are often derived from specific cultural, ecological and spiritual contexts. Furthermore, there may not be sufficient political will to drive such a difficult process. MacGillivray and Zadek (1995) suggest that the emerging body of community level indicators "are in almost all cases marginalised by key international and national institutions because they are considered technologically inadequate or cannot be 'scaled up' to fit the focus or way of working of decision makers". They go on to assert: "This is not merely a question of which indicators are best for describing a particular process or set of events. It is more a matter of who is empowered or disempowered in the process of selection, development and application"?

Decision makers at every level and scale, from an individual within the household to national and international policy makers, will find very different kinds of indicators relevant to their decisions. Thus, indicators must be developed that integrate these different perspectives. In relation to soil-related monitoring, GTZ (1997) recommend the inclusion of three types of indicators in any single monitoring process:

Indigenous or experiential indicators (grassroots indicators) that are used by farmers and reflect experienced changes in environmental or socio-economic conditions. These are site-specific and incorporate the needs and expectations of the individual or community.

Scientific or technical indicators are global, disciplinary and quantitative and promote comparability across time and between locations. These indicators are based on reference points.

Proxy and surrogate indicators can help relate scientific methods to farmers' experiences. Proxy indicators can help represent change and thus assist in impact prediction. For example, percentage of soil cover lost during critical rainfall events can serve as a proxy indicator for

9 Gubbles, in Rugh 1995, also reflects on the political nature of a participatory multistakeholder evaluation process "as it risks leaving at least some of the major groups unhappy with the autcome (i.e. lack of sufficient 'impact data") ... the process of reconciling interests in muhi-stakeholder priented evaluation is a political process".

erosion loss. Surrogate indicators represent processes that either have an indirect or no apparent relationship to the processes under assessment. Changes in crop species (e.g. from maize to cassava) or the extratime spent weeding may be a surrogate indicator for declining soil fertility.

The collaborative development of indicators only makes sense if methods can be identified that are intelligible to, and useful for, all stakeholders. Table 2 suggests that this process will be a difficult one. It uses GTZ's (1997) assessment of the application of soil erosion assessments to different stakeholder groups. The table highlights that the methods that are most appropriate for one stakeholder group are rarely as meaningful to other groups.

Table 2. Appropriateness of soil erosion assessment methods to different stakeholder groups<sup>10</sup>

Assessment Method	<b>Farmer</b>	Researcher	Yolicy Maker	Funding Agency
Visual (rills, turbidity of run-off water, gullies, soil colour)	Excellent	Good	Poor	Poor
Stick in the ground	Good	Fair	·	<del></del> -
Total suspended solid	Fair	Excellent	<u></u>	<del>_</del> _
Run-off plots	Fair	Fair to good	. <del>-</del>	<u>_</u>
Soil horizon	Poor	·- <u>-</u>	· <del>-</del>	
Vegetation/pedestal formation	Good		*	<u> </u>
Simulation/ modelling	Poor	Excellent	Good to excellent	Good to excellent
Remote sensing	Poor	Good to excellent	<u>-</u> -	
Sediment deposition	Fair			

10. In terms of the ability of the stakeholder to conduct each assessment, or, the usefulness of the method to the stakeholder conducting the assessment.

# Doing away with indicators?

If indicators are problematic, are there ways around them which still allow for successful monitoring? One fascinating approach from Bangladesh addresses this challenge and does away with indicators (Davies 1998a, 1998b). While this example docs not relate to environmental monitoring, it provides an innovative perspective. Davies compares this evolutionary approach to monitoring with more orthodox approaches which he describes as being "heavily influenced by a planning ethos that places substantial emphasis on rationality, (rediction and control" (see Table 3).

The Christian Commission for Development in Bangladesh (CCDB) has experimented with a participatory approach to monitoring that involved the "deliberate abandonment of the use of 'indicators', a central concept in orthodox approaches to monitoring" (Davies 1996). CCDB had rested two other monitoring systems previously but neither had been implemented. The new monitoring approach met its needs to assess the impact of its activities but provided a novel way of analysing, prioritising and summarising qualitative data. The approach has sought to be flexible and inclusive of the diverse perspectives between stakeholders that could have prevented agreement on indicators. The approach for CCDB's main project 'Peoples' Participatory Development Programme' centred on monthly inquiry of three types of change for each shomiti or credit group:

changes in people's lives;

changes in people's participation;

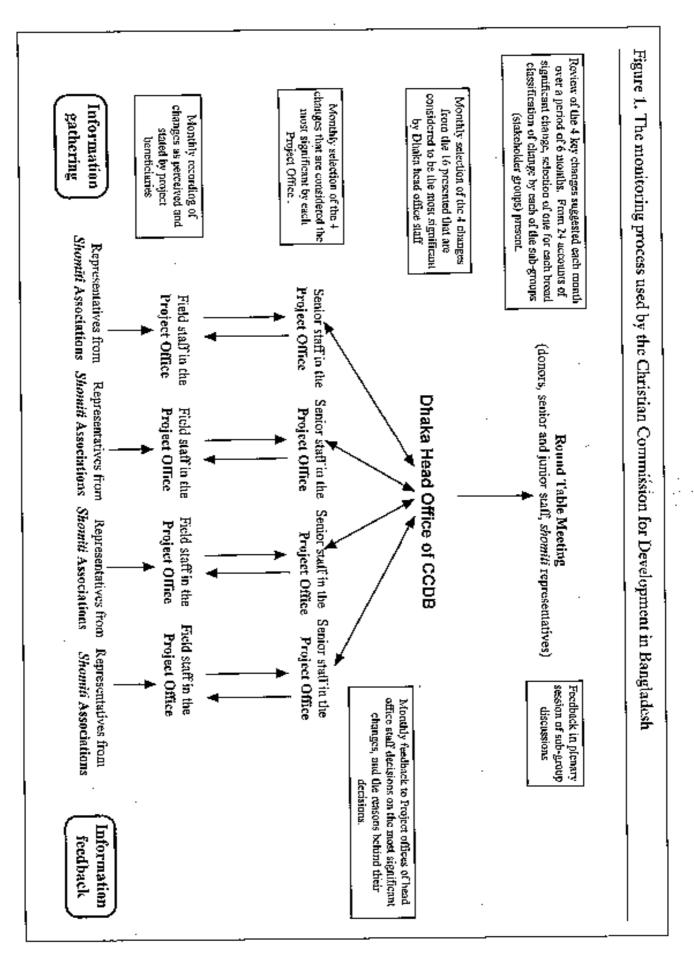
changes in the sustainability of people's institutions and their activities.

Additionally, the group can report any 'other type of change' enabling field staff to report on other factors that are deemed important. For each type of change, a simple question was constructed as follows: During the last month, in your opinion, what do you think was the most significant change that took place in the lives of the people participating in the project?'. The group is asked to provide a two part answer: descriptive — describing what happened in sufficient detail such that an independent person could verify that the event took place, and explanatory — explaining why they thought the change was the most significant out of all the changes that took place that month.

Figure 1 shows how the monitoring information flows. Each Project Office designed its own way of discovering the 'significant change events' for each credit group. The only criteria imposed by CCDB were that the process should be transparent and understandable to those reading the selected accounts. No restrictions were placed on who should be consulted to explore significant change events.

Deciding on the most significant events is meant to be a subjective expression of the values and concerns of the respondents. The explanatory response to the questions provides a forum whereby these values can be brought into a wider debate and examined, compared and selected. The monitoring process was designed to highlight the significant change events that occur as a result of project activities. Thus, the approach does not provide mundane information on the day-to-day

Planning-based methods	Evolutionary approach
1. How does the monitoring approach deal with Important to develop a common understanding of indicators between different stakeholders, subjective perceptions on indicators need to be controlled or ignored. Confusion over the existence or meaning of indicators is seen as a threat.	Acknowledges different sets of values and interpretations within an NGO, and between NGO and donors. NGO staff use 3 broad categories of change chosen by head office staff. Their immediate bosses select a sub-set of changes that are consistent with their world views. These are offered to head office staff for their selection.
2. What kinds of information are included? Primarily quantitative information which most be homogenised to be summarised, with considerable loss of richness of the information and its context,	Qualitative experience is emphasised but quantitative information can be included. 'Detailed anecdotes' explain events in their local context, with an outsiders' interpretation of their causes or history. Comparisons between locations of specific changes can be sought.
3. When are indicators selected? Usually, indicators are established at the beginning of a project (although may be reviewed throughout) and data are gathered duting the life of the project.	Instead of indicators, indicative events are selected from recent experience. The process of selection and criteria for selection of the event are renewed with each new reporting period.
4. Who designs the monitoring system? Usually designed by people distant from events being monitored. Indicators are often identified by senior staff but sometimes by project beneficiaries. Key challenge is reconciling indicators from different stakeholder groups.	Change events are identified by beneficiaries, and field staff present their interpretation of these events to staff higher in the hierarchy. Diversity becomes an opportunity for discussion and explicit prioritisation.
5. Who analyses the information? Usually, analysis is centralised and undertaken by senior staff rather than field staff. More recent approaches may incorporate a wider group of stakeholders in the analysis.	Information is distributed throughout the organisation and analysed locally. Staff collect information about change events and evaluate it, according to their own (local) perspectives.
7. How flexible is the approach? Usually static. Methodological adaptation and local interpretation of data during monitoring process is rare.	Potentially dynamic and adaptive – but depends on organisation's learning culture. Recorded change events reflect a changing world and a changing set of perceptions about what is important.



running of the project, but provides on-line information on extremes, be they positive or negative (but see below). This kind of information can be used directly by project staff: where negative changes were reported, the project would try to avoid this in future. Where positive changes were reported, these would try to be reinforced or replicated by the project. Although not indicators in a conventional sense, the indicative change events serve to define organisational 'milestones'. They thus provide a flexible approach to monitoring impact.

The system means that a wide range of respondents' experiences are subject to "an iterated process of analysis (choice-explanation-choice...) that eventually selected a small number of stories of high value" (Davies 1996). The structure was designed to "take the form of a slow but extensive dialogue up and down the CCDB hierarchy each month". The regular feedback between the Head Office and Project Offices (see Figure 1) enabled the decision-making criteria to be shared between the two levels. The purpose of this is for project staff either to adapt their criteria to those of head office staff, or actively seek different examples and better explanations for the significance of the types of changes that they thought were most significant. The information generated is useful to a wide group of stakeholders, with extensive use made of stories in CCDB publications, videos and educational materials.

Davies reports that about 90-95% of all the changes documented were positive changes. This may reflect project staff concerns about recording negative changes. Evolution of the project could include asking a specific question about negative change. Alternatively, feedback from the Head Office, through identifying a negative change as one of its key changes, could emphasise the importance of recording both negative and positive changes alike.

# Community monitoring of food security

So how does this approach relate to the precision usually required of environmental data? A monitoring approach similar to Davies (1998a) evolved in a Food Security Project in Zimbabwe when more conventional approaches to monitoring failed. Since 1991, the Intermediate Technology Development Group (ITDG) has been working with farmers' clubs and garden groups in the communities in Chivi District in the dry communal areas of southern Zimbabwe. There are 34 farmers' clubs in Chivi District, and 40 garden groups, which are dominated by women. Each club or group has a membership of 30 to 40 people. The focus of the work is to develop technologies to increase the productivity and reliability of field and vegetable crops and to support the community level institutions to manage the process of technological innovation.

Initially, project monitoring was managed by ITDG staff, who kept

records of the project and collected most of the information. However, in 1995, local farmers and gardeners started to take a more active role when they realised how much information existed on their activities. This information was primarily available to ITDG staff because they were in contact with all the groups - there was little sharing of experiences between groups. Group members felt that visitors to their project often had more information on their progress and activities than they did. They were embarrassed by this, decided to take a more active role in the monitoring process and called a community meeting which was attended by all the representatives from the farmers' clubs and garden groups. The participants recognised the need to be able to monitor the impacts of their efforts more effectively and wished to ensure that the information that was collected was relevant to them. The development of the monitoring process from a formal indicator-based approach to one that relied on the noting of significant change events is described in Box 16 (see also Croxton and Murwira 1997).

This monitoring system has now been in existence for just over a year. ITDG staff and community members alike have found this system highly informative. One drawback is that the methodology does not provide quantitative data or detailed information on intra- and interhousehold differences (Murwira pers. comm. 1997). Nevertheless, the approach enables the community to assess their situation regularly and to explore alternative ways of macking progress. For ITDG staff to understand the changes in the groups and communicate these to stakeholders external to the monitoring process, they have to attend the community meetings. These are set at times convenient to the community, not ITDG, putting the community firmly in control of the process.

However, this indicator-free approach may not be appropriate in all situations. AS-PTA, a Brazilian NGO, discussed the potential of GCDB's approach but rejected it as a stand-alone approach. AS-PTA needs to convince policy makers and donors of their impact and felt they would not be convinced by the presentation of key experiences of 'significant change'. They are, however, going to test its suitability for one part of their work. While they have a strong indicator-based approach for assessing the generation and diffusion of sustainable agriculture activities, they are aiming to use the focus on significant changes to assess four other areas of work; contribution to changing municipal policy towards more sustainable agriculture; participatory communication methodology with farmers; creating a new vision for the rural workers' unions that centres around rural regeneration; and developing strategic alliances for sustainable agriculture.

#### Box 16. Fewer indicators, more information

To develop the monitoring of the food security project in Chivi District, Zimbabwe, a series of community meetings took place. These were attended by members of the six farmers' clubs and six garden groups selected by the community leadership to develop the monitoring process with staff from the Intermediate Technology Development Group (ITDG). Working together, the group developed a number of indicators for increased household food security. These included: reduced food handouts, construction of food (grain) storage facilities, a good mulch of crop residues immediately after harvest, an increase in the number of meals eaten per day, and a reduced number of children leaving school early. These 'indicators of success' were endorsed at a wider community meeting: the participants agreed that the indicators would assist them to monitor the effects of the various technological innovations they used in their fields and gardens. Some groups added extra indicators, according to their needs.

Initially it was decided that the people selected to record the changes would submit their records to the Ward Area Committee on a monthly basis. In turn, the Ward Committee would periodically facilitate community meetings to share this information, in a summarised form, among all community members. The system was tested for a few months. It soon became clear that the task was time consuming, difficult to do thoroughly because many recorders were semi-literate, and was not producing much useful information.

ITDG and the monitoring representatives met to re-examine the process. They decided to abandon monitoring against a large number of indicators. They felt that the easiest strategy was for each community to share one significant change with the other communities. Individual monitors would seek to identify, with other group members of that community, those few significant changes that were relevant to the efforts they were making to promote their food and livelihood security. Any type of change could be recorded – provided it had an impact on local livelihoods.

The participants feel that this approach to monitoring gives them more control of the process. ITDG attends the meetings at which the changes are shared, and uses the opportunity to collect information to share with policy makers and donors. Where conflicting impacts are presented, public discussion has encouraged consensus building and closer monitoring.

The community has a strong oral tradition and the verbal presentation of changes has been an effective way of tracking change (see Section 4.2). However, with time, the changes are beginning to be recorded on paper. This helps to ensure that the expectations of other stakeholders in the monitoring process are met.

Source: Croxton and Murwira 1997 and pers, comm. 1997

# 3.6 | Ensuring rigour and participation

Previous sections of this paper have highlighted different perspectives on the rationale and the benefits of participatory monitoring and the trade-offs involved in agreeing on indicators. Given the range of compromises that are needed in participatory monitoring, is there not also a constant tug-of-war between 'being participatory' and 'doing rigorous monitoring' (as conventionally perceived)? The answer to this is an unequivocal 'yes', but the dilemmas posed and resolution strategies have not been discussed much in the literature. Box 17 highlights some

11 The 'participatory' nature of this monitoring process may be questioned as the farmers' role is limited to one of providing information. They are not involved in any other stage of the long monitoring process.

of the challenges raised by ensuring scientific rigour and farmer participation<sup>[1]</sup> during implementation of a participatory project in the Philippines.

How can the often very different information needs and expectations of multiple stakeholders be integrated in participatory monitoring? Campilan (1996) describes participatory monitoring as:

"a double-edge sword. On the one hand, it seeks to be participatory by involving local people in its various stages and activities. On the other hand, participatory monitoring and evaluation is expected to yield timely and reliable data for making valid conclusions and informed decisions."

This prompts the question: what is lost and what is gained when monitoring moves away from a scientist-dominated approach towards one with more community involvement? Guijt and Sidersky (1996) describe one example of deciding to shift from soil loss measurements to a more open-ended appraisal of changes in soil conditions (see Box 10). Indicators and methods had to be reconsidered.

The question of ensuring both local participation and external validity largely depends on the level at which monitoring information is needed and by whom it is used. As one Australian research scientist put it pragmatically for his context, "Community monitoring does not... have to stand up in court... What the community needs are methods which give direction... at the small subcatchment or property level." (Rob Tanner in Alexandra et al. 1996). Yet when data needs extend to higher levels, beyond the catchment or village, the question of information that is considered valid at all these levels becomes more pressing.

## Box 17. Participation and research

UPWARD researchers undertaking field projects on true potato seed technology with farmers experienced the dilemmas of trying to obtain rigorous data in a participatory way. The project devised a participatory monitoring tool in the form of colour-coded and pre-formatted monitoring cards. Researchers asked the participating farmers to record production and economic-related data from farm trials on the cards. The project research assistant visited farmers regularly to collect the completed cards so that the data could be analysed and fed back to them.

The first few months of piloting the approach in the field revealed that farmers found the task too cumbersome with few benefits. They did not follow regular record keeping procedures to provide the project with data to fill information gaps acknowledged by the project. To correct the situation, the research assistant decided to fill out the cards during an interview with farmers during routine, regular visits. This arrangement has significantly improved the process of data collection, allowing more sophisticated analysis. However, it highlights the challenges in ensuring farmer participation and meeting the research data requirements of the project.

Source: Campilan 1996

Australia by Alexandra et al. (1996) revealed that most groups were keen to work toward standard national procedures for monitoring and data-handling. Many groups already follow best current scientific practice, train and supervise their members, and ask for external assessments of their data. However, these groups operate in a high technology society, have (relatively) easy access to information and resources, and are often linked into partnerships with natural scientists. In the many contexts where this is not the case, easy solutions for dealing with aggregation of data at higher levels may not be forthcoming.

In Brazil, the issue of rigour within a participatory process has come up repeatedly due to the many and diverse expectations of the partners (see Box 4). A scientist might say that scientific rigour has been compromised on several occasions, in exchange for more equal partnership and more locally meaningful results (see for example Box 18). However, this brings us to two central questions in the discussion of rigour versus participation. Who defines what 'rigour' is? And how do 'rigorous' approaches deal with changes over time that result from increased participation, such as fluctuating community interest in monitoring, of objectives, of indicators? Is there, in fact, a trade off between rigour on the one hand, and participation, on the other, or can they be combined?

The perceived 'trustworthiness' of information is intimately related to the source of the information. For example, in connection with the example discussed in Box 10, the farmers and NGO staff alike felt that other farmers would not be motivated to take up contour planting on the basis of evidence such as the 'increased percentage of soil moisture'. Yet if confronted by statements such as '18 of the 24 farmers noted a significant increase in soil moisture in critical periods' this would be more than enough to galvanise them into action. Hearing testimony from respected peers, be they farmers or scientists, is perhaps the most important factor in accepting data as 'trustworthy'. In a participatory process, this calls for more negotiation about what each stakeholder group considers 'rigour' to be (cf. Estrella and Gaventa, 1997). It also requires greater acceptance of different information sources and the use of alternative methods for assessing reliability, other than through conventional scientific measurement.

A second quandary with respect to rigour in participatory processes is the clash between time series data and ever-changing contexts. When environmental monitoring focuses on the impact of interventions, rigour is achieved by assessing the same indicator at several moments over a reasonable time period to identify trends. In theory, the interventions being monitored will have clearly defined objectives which are used as a basis for defining the indicator(s). If this happens in a new

project context, then it is possible that objectives are still not crystallised to the extent required for unambiguous monitoring. This means that as the intervention unfolds, new insights are gained that help fine-tune and redirect the objectives (see Box 19). The initial indicators might also require adjusting and when indicators are not stable, it becomes impossible to develop a time series of data.

#### Box 18. Querying quadrats and comparing cows

In a recent workshop in Brazil, the farmers, NGO staff, union representatives, and university academics were deciding which method could assess 'the percentage of vegetation cover' (one of the chosen indicators for monitoring agroforestry trials). In addition to the use of a wooden frame (with 4 quadrats about 1m² in total, to be placed on the ground in several sites within the agroforestry plot and estimate visually the surface area covered by vegetation), the academics suggested a form to fill in the 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, it was rejected as too alien to the farmers' way of registering, as they have great reluctance to use pen and paper. Finally, they all 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. Each farmer uses a new stick for each measuring event. When the farmers meet for the agroforestry project, they bring their rulers, register the measurements on paper, and discuss the findings and their significance for their plots.

The accuracy of a scratch mark on a wooden stick compared with written percentages on a piece of paper might well be debated by scientists. However, if the paper-based method had been imposed, the reliability of the information would probably have been low because of the reluctance of the farmers to use this approach. In this case, participation probably ensured more 'rigorous' data collection.

In the same workshop, discussion moved on to the viability of comparative studies in participatory monitoring which everyone agreed would allow for more reliable analysis of impacts. The academics and some of the NGO staff wanted to compare the milk production of cows with and without a locally produced mineral salt in their feed. The difficulty was that all farmers who feed the salt to their cows are convinced of its merits. For a comparative study, farmers who were not involved nor interested in the mineral salt would have to be included. The farmers at the workshop, who would be doing the data collection, collation and analysis, were reluctant to include such farmers. They said it would be too difficult socially to discuss the non-use of salt with their neighbours. Without the comparison, the indicator 'milk production' was no longer felt to be useful and another indicator and method were selected. Once again, while not enhancing the rigour, participation ensured the implementation of a realistic monitoring approach and avoided the collection of fraught data.

Source: HED/CTA/STR-Araponga 1997

#### Box 19. Accepting uncertainty

In Paraíba, one of the partnership activities involves training farmers in contour planting as part of the overall aim to regenerate the soils. Therefore, one of the indicators they had chosen to monitor was 'the number of farmers planting along the contours or atravessado (a less exact version of contour planting)'. At the end of the first monitoring period, the data surprisingly revealed that almost all farmers were planting 'atravessado'. They knew that this could not be due to their own 12 month effort and suddenly doubted whether they were justified in focusing so much on training of contour planting. The need to count adoption rates no longer appeared as relevant as they initially thought.

The union and NGO sought additional information about whether this phenomenon was correct and, if so, what had caused it. It was, indeed, true that atravessado had recently seen enormous growth – and it was not due to their training work. A recent regional policy had facilitated the acquisition of draught animals which had led to quick and widespread changes in land preparation. As the animals were unable to deal with ploughing straight up and down the steep slopes, many farmers started ploughing more along the contour lines, i.e. atravessado. Clearly there is no point in counting adoption rates of contour planting and atravessado based on a wrong assumption about the reason for adoption. The NGO and union are now reassessing their entire approach to tackling soil regeneration, and therefore how they want to monitor it.

One way to avoid this problem is to assess indicators related to long-term objectives, as these are less likely to change. This type of objectives includes 'poverty alleviation', 'greater autonomy from banks', 'increased local experimentation', etc. Yet what if these objectives are not prioritised by the partners involved? Also, who is to say that community interest and funding will sustain monitoring over the time period required (Irons and Walker 1996)? And finally, the more long term the objective, the more difficult it is to establish clear cause-effect relationships due to the influence of other external factors. How can a participatory process deal with the ever-changing nature of objectives and the required time series to make a sound judgement based on rigorous data?

In practice, the balance between scientific rigour and community participation will depend greatly on the objectives of the monitoring process itself. If monitoring is less about providing proof to others, and more about improving learning and planning, then participation of stakeholders can be the first priority. If local proof of impact is needed, then use can be made of local indicators of change and local norms for 'trustworthiness'. Yet if proof is needed for scientific and/or policy audiences, then externally acceptable approaches might need to be used, to demonstrate changes in ways that are compatible with these groups. In some cases, this might mean that the external agency will have to conduct parallel monitoring exercises, in non-participatory ways, alongside exercises that have greater local significance. In others, it might mean redefining what is considered 'trustworthy'.

Gubbels (in Rugh 1995) suggests an incremental process, with initial

greater emphasis on the participatory aspect and gradually ensuring that results are considered valid externally, as those involved become more skilled in monitoring. While he suggests this in the context of project-led participatory evaluation, it also has relevance for monitoring:

"the first essential steps.. should be more oriented to building program staff support, analytical skills and appropriate attitudes. There should be less immediate concern about achieving the rigor... if one emphasizes the latter, program staff can easily revert to various resistance mechanisms and future evaluations will be compromised from the start."

Thus the dilemmas raised by ensuring both 'rigour' and participation can perhaps be seen as a temporary phenomenon, one meriting careful thought, and not as irreconcilable differences. Above all though, it means developing and agreeing on new standards of validity for participatory monitoring (Estrella and Gaventa 1997).

4

# Different approaches to participatory monitoring

Given the trade-offs and varying degrees of participation, on what basis can 'the most appropriate' participatory monitoring methodology be chosen? Murphy (1993) suggests that the key to success is to select a combination of methods appropriate to the task, within the given constraints of time and human and financial resources: the aim should be to provide information that is "good enough and soon enough". Good enough for the type of decisions which will be made on that basis and not more precise or detailed than necessary, and soon enough for the analysed results to be presented before decisions have to be made. Some endorse an 'optimal ignorance' approach (Chambers 1992, ILEIA Newsletter 1996) that requires the collecting of appropriate amounts of useful information for the task at hand. However, this begs the questions of who decides what is 'good enough' or 'optimal', and what are their norms? This has many implications for funding agencies who not only demand certain types of information but also are pushing for it to be collected through a 'participatory' monitoring process.

There are many types of approaches to participatory monitoring. A recent review of experiences in South Asia identified no less than 10 generic types (Armonia and Campilan 1997). For this paper we have selected three types that seem to be relatively successful at involving multiple stakeholders in monitoring environmental change. Many interesting examples are based on applying the methods associated with Participatory Rural Appraisal (PRA) to monitoring. Another approach, that based on oral testimonies, emerges from the anthropo-

logical literature and involves in-depth interviews with community members who have been resident for sufficient time to detect both environmental and social change. A third group of approaches is based on adapting ecological assessments to make them more accessible for use by local people. These three types of participatory monitoring of environmental change have different origins and have evolved for different reasons.

Over the last decade, the principles and visual tools of PRA have been used extensively to facilitate local analysis of local socio-political, ecological and economic conditions that affect patterns of resource use. While this may produce participation over the short term, it has, in many cases, not led to positive and sustained change "where people develop their capacity to think about their own priorities for development, take decisions affecting them and develop a long term perspective for change" (Shah et al. 1993). This requires greater emphasis on the role of local people in planning development activities rather than just being involved in assessing their situation. Therefore, PRA has been developed for use in monitoring to increase the decision-making capacity of local people and sustain local participation over longer periods.

In parallel with the debate on participation, there has been a growing awareness of people's technical knowledge about the environment in which they live. Often referred to as Indigenous Technical Knowledge, 12 this information can be used to make development activities more appropriate to the needs of people, and development agencies more accountable to the supposed beneficiaries of their activities. By listening to local people, relief and development work can be made more effective. Oral testimony has been used in monitoring to discover local perspectives on development interventions and document a project history or sequence of local events. This type of approach to monitoring values the information provided by those people whose livelihoods depend most on the local environment.

A third source of methodological innovation has emerged from the desire to increase the role of local people in ecological assessment. Conventional approaches with sophisticated sampling frames and statistical analyses have tended to limit the role of local residents to that of data gatherers. To make ecological methodologies more accessible to local people, much of the scientific terminology and procedures are replaced with local knowledge of plants, animals, and their habitats and behaviours, and simpler methods. While the statistical validity of the findings is reduced, advocates of this approach highlight the spin-off benefits for conservation by enabling people to monitor plant and animals and detect changes in their populations.

Discussing these three approaches separately, as we do here, does not mean that they are mutually exclusive. Increasingly, communities

12 Although widely used, this term is problematic because of the difficulties in defining who is 'indigenous' within a community.

and scientists are realising the need for methodological complementarity (see Abbot and Guijt 1997) and many of the case studies use a range of methodologies. Often, creative combinations of methods are used to try and fulfil the multiple objectives of a monitoring programme: ensuring the participation of local people and providing the right kinds of information for policy makers and decision makers.

Table 4 lists the 10 case studies that are included in this review. Cases have been included only if they have an explicit participatory orientation, a natural resources focus, have been used in the field (although some methods have only been piloted), and have been described in sufficient detail and clarity. For each case study, information on the methods used, the monitoring process and the indicators developed is provided in Annex 1 such that comparisons can be made.

Monitoring approach	Case studies
PRA-based	<ul> <li>Participatory monitoring of sustainable agriculture in Brazil</li> <li>Participatory monitoring of village level soil and water conservation programmes, India</li> <li>Towards more sustainable soil fertility management, southern Mali.</li> <li>Participatory insect analysis in South East Asia</li> <li>Farmer participatory procedures for managing and monitoring sustainable farming systems in the Philippines</li> </ul>
Oral testimony	<ul> <li>Oral evidence in historical environmental impact assessment: soil conservation in Lesotho in the 1930s and 1940s</li> <li>Talking back: the role of oral testimony in participatory development, the Sahel</li> </ul>
Ecological approaches	<ul> <li>Community inventory of natural resources in East Kalimantan</li> <li>Engaging local hunters in wildlife surveys, Zambia</li> <li>Participatory methods for quota setting in CAMPFIRE areas, Zimbabwe</li> </ul>

# 4.1 PRA-based participatory monitoring

Many participatory monitoring methodologies use PRA techniques to explore changes in the local environment. This review includes five such cases (see Case Studies 1-5, Annex 1). These have a primarily agricultural focus (other natural resource management examples being poorly documented) and are all project-led approaches to monitoring. Case Study 1 describes the Brazilian experiences that have already been discussed in some detail in this paper. Case Study 2 focuses on the Aga Khan Rural Support Programme's pioneering work with PRA,

and its use of maps to monitor soil and water conservation programmes in India. Also using maps, Case Study 3 describes experiences with farm households to monitor soil fertility management in Mali. Case Study 4 describes the 'Farmer Field Schools' that are used to increase farmers' capacity to monitor their crops throughout South East Asia. Using transect walks and drawing techniques, farmers learn to identify and monitor the insects that inhabit their crops. The final case in this section, Case Study 5, describes an approach developed in the Philippines to enable communities and farm households to manage and monitor their farming systems.

PRA has been used extensively to enable community members and outsiders to assess local conditions. The community can make an inventory (largely qualitative) of its resources and patterns of resource-use, together with problems and constraints. Techniques, such as mapping the location of natural resources and matrix ranking of preferred species, are often used. Transect walks with older informants and key informant interviews with the traditional leadership provide an historical and land-use (and control) perspective. Flow diagrams help present perceived changes resulting from new resource management practices or general environmental changes. Venn diagrams can highlight how institutional relationships, such as for resource management, are changing.

If conducted prior to undertaking any planned activities, this type of detailed analysis of the local situation provides a 'baseline' or data set of the starting situation. Essentially, monitoring builds on an initial participatory appraisal by repeating similar exercises sequentially through time. This process enables changes to be documented and analysed. An advantage of the visualisation techniques associated with PRA is that the diagrams and maps help farmers to grasp more systematically the changes in their environment (Shah et al. 1993). Kaul Shah (1995) notes that as the community carries out the appraisal itself, the language and media most familiar and appropriate to them are used. Thus, the results of the appraisal can be stored and retained by community and used by them when required. Accessibility of information for the end-users is an essential part of any participatory monitoring process.

As 'the community' is not an homogeneous unit, PRA-based monitoring should be undertaken with a range of different groups, according to wealth or cultural status, gender and/or age of the participants, to examine the diversity of perspectives on change. For example, women and men may well have different views on key indicators due to their different daily needs and ecological knowledge, and may have experienced different impacts caused by environmental changes (cf. Kaul Shah 1998). Yet few of the case studies address social differentiation explicitly. Many, in fact, aggregate different perspectives, losing

13 It is difficult to know from the literature if the process of negotiation itself or the documentation of the (often illuminating) negotiation process was excluded.

valuable insights in the process. The exception, Case Study 3 from Mali, found some minor differences in the indicators developed by men and women. The literature also reveals a lack of discussion on how consensus was or was not reached between or within different groups (on, for example, identifying the monitoring priorities or the development of indicators). <sup>13</sup> A future challenge for these approaches may be to explore in more depth the different perspectives and priorities of men and women, the worse off and better off, and the old and young. Without this differentiation and triangulation of perspectives, some of these approaches perhaps provide only a superficial understanding of local conditions.

# Dealing with diversity in diagramming

Key features of PRA, such as its flexibility, it ability to deal with diversity and its emphasis on innovation and learning from multiple stakeholders, are important in making monitoring more participatory and therefore locally relevant. But these qualities can also hamper the comparison of a time series of diagrams. For example, many of the case studies suggest that mapping is an important method for documenting the process of change. However, experiences in the Philippines (Prain and Piniero, in Campilan 1996) suggest that while useful, there may be problems associated with interpreting the maps that are produced (Box 20). The project found that the analysis of the maps was complicated by inconsistencies in map style and format between monitoring events. The Philippines experience also suggests that sufficient time is needed to facilitate a collective analysis of a time sequence of maps and to understand overall trends. This is required to help overcome some of the 'problems' in comparing individual maps or other diagrams.

In Brazil (HED/AS-PTA/STR-Remigio/STR-Solanea 1997), this problem will be overcome by using what is being called the 'base map', which shows basic infrastructure. An exact copy of the base map will be used each year. Any changes in the basic infrastructure will be marked on the map in addition to the information related to the indicator being monitored. By comparing the two maps, an analysis of the changes can occur in another context, the same map is used with colour coding of the indicators for each new year or moment of measurement (Meera Kaul Shah pers. comm. 1997).

The different ways in which practitioners have dealt with the diversity in diagramming highlights the need for greater documentation of experiences of using PRA for participatory monitoring of the environment. This should enable some of the challenges in its application to be shared and overcome, and promote innovation and evolution in using PRA in a monitoring context.

### Box 20. Reflections on the use of participatory mapping

Participatory mapping was used to assess the impact of home gardening on biodiversity. At the heginning of the project, cooperating home gardeners drew maps, indicating features such as plot size, location and crops grown. After two years of participatory trials of crop species, a second workshop was held to evaluate changes in home garden biodiversity. Again, maps were drawn by the participants and these were compared with the original maps. On the whole, mapping proved a useful tool and helped home gardeners analyse changes arising from their involvement with the project. However, there were two limitations to its use. First, it was not possible to compare accurately and analyse the two maps since they were drawn independently and therefore differed substantially in terms of scale, perspective, boundaries and symbols. Secondly, time was a constraint. The mapping workshop had limited opportunity for collective analysis of the outputs of the exercise.

Source: Campilan 1996

# 4.2 Oral testimony

Many development agencies produce monitoring and evaluation reports as written documents. The inclusion of oral testimony can introduce a wider dimension and shift the balance towards a more qualitative assessment. Oral testimonies are useful for assessing long-term changes in the environment, rather than monthly changes. A broad 'unofficial' history of project activities sought from project staff, the target population and other affected individuals can help to build a better picture of the project process and its impacts. Case studies 6 and 7 are project-led examples of how oral testimony can be used to understand individual ways of noting and recording change. Case Study 6 from Lesotho, shows how historical narratives on soil conservation practices can be uncovered through interviews with elderly residents. Case Study 7 provides more general information about environmental changes as noted by pastoralists, farmers and refugees, who depend on the environment to sustain their livelihoods.

In their book 'Listening for a Change', Slim and Thompson (1993) outline the many forms through which people express their experiences and transmit interpretations of life. These include: songs, legends, stories, plays, traditional accounts or family histories passed down through the generations, personal life histories, recollections and memories. Such oral testimonies can focus entirely on the past or they can provide evidence about more recent events and articulate future plans and aspirations. Oral testimony can be collected individually or in groups. It provides an opportunity for the often quiet majority to speak out about their concerns and priorities in a way that is compatible with their main form of communication.

Oral testimony is often regarded as anecdotal and unreliable because it is subject to the vagaries of people's memories and changes

over time. Lindblade (1997) suggests that "as recognition of the magnitude and complexity of local knowledge has grown, there has been a tendency to accept it at face value". She cautions that a discriminating attitude must be displayed towards oral information gathered from communities (although this is true to some extent for any methodology that relies on informant recall, including questionnaire surveys which conceal many non-sampling errors). From her work in Uganda, she suggests that local perceptions may have been shaped by external forces, such as government campaigns or the agendas of development agencies. Without the triangulation of information using other methods, 'received wisdom' can be perpetuated because it is difficult to gain an in-depth understanding of the internal and external processes that have shaped local conditions (cf. Leach and Mearns 1996).

However, Showers and Malahleha (1992) contest the unreliability of oral environmental evidence as they argue that it is based on ecological knowledge and detailed observations from residents of a particular location. For many decades, anthropologists have gathered numerous examples of indigenous inventories, classifications and taxonomies of the natural world (e.g. Levi-Strauss 1962). In Box 21, Gündel (1996) describes the Mayan classification of forest types. This information is passed on orally between generations and is grounded in its practical application to the local context. It shows how language construction and classification is based on an intimate knowledge of the environment and can be used to detect environmental change.

Retrospective analysis, using oral histories, is particularly useful in exploring environmental change (see Box 22). It is likely to produce primarily qualitative information on 'what was there' in terms of natural resources, and local assessments of how and why the changes have occurred. It is unlikely to provide quantitative information defining exactly 'how much there was' during previous time periods. However, given the large number of projects implemented in Africa before formal monitoring and evaluation existed, Showers and Malahleha (1992) suggest techniques of historical environmental impact assessment would help contemporary planners who must begin with the legacy of the past and move forward (cf. Fairhead and Leach 1995). Although many people are aware of the importance of environmental monitoring for understanding change in the landscape, there is no standard methodology for evaluating historical interventions. Showers and Malableha's concept of au 'historical environmental impact assessment' (see Case Study 6) arose out of a concern that most technicians operate in an ahistorical and largely non-social context and that social scientists are generally unaware of the significance of technical information.

### Box 21. Environmental classification and change

Peasant farmers in the Yucatán, Mexico make their comparison of changes over time. Changes in crop performance are observed between cropping seasons, temporal rather than spatial. Farmers point to the differences between the present situation and the time when their fathers and grandfathers prepared the milpa (slash-and-burn system). In the Mayan language, the different forest types are classified according to their age and the composition of species. A main distinction is made between the Chee'che kaax, which describes a forest with a dense tree population, and the Pl'ice káax, which means literally 'if you look into the forest, you can see far'. As high forest stands are becoming very rare in the region, the Mayan name for them, Kanaan kāax, is losing its importance in the active vocabulary of younger generations. The typical vegetation type to be found is the Hub'che, which refers to a vegetation of two to three years regrowth. There are three different stages of low vegetation - Hub'che, Kaba Hub'che (3-4 years regrowth), and Kana Hub'che (4-6 years regrowth). The following stage is called Yaux káax (káax meaning forest). On the other hand, new categories are being created as new vegetation types or new ways of using them emerge. For instance, abandoned sisal plantations with forest regrowth are being converted into milpa plots as the access to available forest areas becomes restricted. A new category Xla'pach, has therefore been added to the traditional classification system.

Source: Gündel 1996

#### Box 22. Listening for a change

In 1986, at a conference on drought and desertification, two satellite images of Africa taken a year apart and costing tens of thousands of dollars showed either the 'advancing' Sahara or 'retreating', vegetation in lurid colour. A few weeks earlier, at Taragma village, Sudan an elderly villager was entertaining a small group of villagers from the UK development agency SOS Sahel. Stepping outside his front door he pointed towards nothing – just a wide expanse of desert occasionally relieved by the odd, unpalatable shrub. Here, he said, just 40 years ago the trees and shrubs were so numerous that it was difficult to ride a donkey to market without getting scratched.

Satellite imagery and oral testimony both have a part to play in shaping our understanding of environmental change. The people on the ground, several miles below the camera, know exactly what has happened in their locality; they may be amused or interested by the broader picture, but they can't see that it tells them anything they don't already know. They have been taking mental snapshots all their lives.

Source: Slim and Thompson 1993

Oral testimony allows for socially differentiated monitoring of changes, as individuals recount their personal histories. Megan Vaughan used oral testimony to delve back over 30 years and piece together the history of famine in Malawi and the role of gender in shaping the disaster (see Box 23). In addition to interviewing people, she collected the local songs, prayers, and the taboos that accompanied them. Of particular interest were the 'pounding songs' that women sing when pounding maize. These showed the extreme vulnerability of women and "locate the famine within a larger historical process of change in the economic and social status of women". These songs are

still in use and demonstrate the diverse ways in which events and change are recorded in cultures that are, or were, primarily oral.

#### Box 23. The story of an African famine: gender and famine in twentieth century Malawi

Famines gather history around them. In the Blantyre District of Southern Malawi many people remember the famine which occurred in 1949-50, and many more have been told about it. There are stories and songs and recollections of the famine: accounts of foraging and migration; of 'famine discase' and death; of both the cohesion and the disintegration of communities and families; of selflessness and the extremes of individualism. Survivors of the famine can give close accounts of the events of that year. They begin with the abnormal weather conditions – what the clouds looked like and what this meant; how high the crops grew before they died, and which crops survived; the names of the children who starved and the busbands who left; the wild foods caten and their methods of preparation; the minute details of the famine relief system – the coarseness and the colour of the grain distributed, the size of the tins which acted as measures, the behaviour of the queuing people who waited to receive it. Older people can tell stories of famines that went before – the 1922 famine and famine of 1903 which drove people into the area from Mozambique. They say nothing comparable to 1949 has happened since. People calculate their ages by reference to it, and women consciously keep the communal memory of the event alive when they sing the pounding songs they composed then.

Source: Vaughan 1987

Oral testimony may be used in combination with the visualisation techniques of PRA and ecological assessments. This is particularly important for triangulating the findings, which Lindblade (1997) suggests is essential for developing a meaningful local level assessment of the environment. Slim and Thompson (1993) suggest that "PRA experience has shown that people's ability to express themselves verbally can be heightened if they can simultaneously present things visually" particularly if the interview process is unfamiliar to the interviewee.

Two key challenges for oral testimony in the context of participatory monitoring are; (1) how to ensure that testimonies are given at regular intervals to enable a time series of information to emerge; and (2) how to ensure that the information provided deals adequately with the quantitative data that are so often necessary.

# 4.3 | Ecological methods

There are few approaches to assessing and monitoring plant and animal populations that are reliable and easy to understand and implement. Marks (1994) notes that a basic question in animal ecology remains: how to obtain consistent estimates for population numbers of wild mammals in an area so that trends can be examined? When assessing animal population numbers, ecologists continue to debate the most appropriate sampling methods (Norton-Griffiths 1978, Inauthar 1997). Much of this debate relates to increasing the precision of

estimates of animal abundance. The key challenge, however, may be to achieve an optimal level of accuracy (accuracy being a measure of the extent to which the estimate is 'correct', while precision is the resolution of the estimate *cf.* optimal ignorance, Chambers 1992). A monitoring exercise should distinguish between an imprecise but accurate estimate of animal populations (which may be sufficiently useful) and a precise, but inaccurate estimate (which may be both wrong and deceptive).

Many problems are associated with the standard wildlife census techniques, such as aerial and ground counts. Aerial surveys are capital intensive operations that record only the larger and more visible species, such as elephant, buffalo, rhinoceros and hippopotamus. The derivation of the estimated counts are difficult for anyone but technicians to understand<sup>14</sup> and require sophisticated statistical analysis. Also, aerial counts only record animal species in semi-open terrain and are not appropriate for more forested habitats.

Ground counts are an alternate method whereby animals or animal spore are recorded. But because of biases due to factors such as the visibility of different species and comparability between different habitats, ground census data require sophisticated sampling strategies and analysis. Any sampling method requires extrapolation for estimates of density to be made and this introduces margins of error.

Despite the challenges associated with estimating plant and animal. populations, several authors have tried to include local people in ecological assessments using standard techniques. A joint faunal survey of Uluru National Park undertaken by scientists and traditional Aboriginal custodians was described earlier in this paper (Reid et al., 1992). Fabricius (1997) describes how traditional healers participated in transect-based plant surveys in South Africa. In a similar vein, Steinmetz and Mather (1996) describe how Kayen villagers helped to survey the fanna of Thung Yai Naresuan Wildlife Sanctuary in Thailand. They suggest that through their local environmental knowledge, individuals can become involved in the data collection process and in the interpretation of results. However, because of the complexity of conventional ecological assessment, in both these cases local people are excluded from the research design (the sampling strategy being determined by statistical demands) and data analysis (which is often technically sophisticated). Steinmerz and Mather believe their approach could be the starting point for community-based ecological monitoring, but note that "outside wildlife researchers would still be necessary for a few years to launch a monitoring program".

All these approaches assess the extent of the resource base, rather than the availability to the community of the elements of the resource base which they use. Although these two measures are often correlated, a number of factors, such as legal constraints on resource utilisa-

14: But see The Aerial Survey Game below as an example of how to introduce technical information to a non-technical audience

tion, technological limitations to what can be harvested, and localised patterns of animal distribution, create disparities between a scientific assessment of animal numbers and the actual availability of the resource to the community (see Box 24). This highlights the importance of identifying the objectives of the monitoring programme and the end-users of the information as this will shape the methodology.

#### Box 24. The ups and downs of counting elephants

Garamba National Park in the Democratic Republic of Congo (formerly Zaire) is a protected area, managed by a national conservation authority in collaboration with international wildlife organisations. These institutions monitor the resource base using conventional ecological methods. This includes regular aerial counts of the key manual species in semi-open areas of the Park and supporting ground transect samples in the forested areas of the hunting reserves. The aerial counts show a statistically significant increase in elephant populations over an eleven year period (1984-1995) from 4,500 to over 11,000 individuals.

Resident communities reside in the hunting reserves surrounding the national park. Intensive anthropological fieldwork in the reserves reveals that the availability of clephant meat in the rural economy has declined over this same period. Recent hunter surveys undertaken with the resident communities found no elephant hunting in the villages studied. Yet older residents recount elephant hunting prior to effective conservation activities in the area.

The decline in the availability of elephant must to local people, which tuns parallel with increasing elephant populations, is attributed to an increase in the efficacy of law enforcement within the protected area and, possibly, to international restrictions on trade in elephant products.

The ecological and anthropological assessments both provide accurate and tigorous measures of elephant numbers but one measures abundance, while the other measures availability and access. The study highlights the importance of defining the objectives of the monitoring programme and the users of the information, as this will determine the methods used, the results obtained and their interpretation. Here, the international and national stakeholders monitor elephant populations at the ecosystem level, while the monitoring that is important to the community stakeholders is the availability of elephant at the local level, which does not just measure abundance but rather access to the resource. The data produced are not always compatible.

Source: Hillman Smith et al. (1995) and de Merode (1998 and pers. comm.)

Case studies 8, 9 and 10 use novel approaches to adapt ecological assessments and make them more accessible to local people. While more of a one-off assessment of ecological resources than a regular monitoring programme, Case Study 8 describes how local people in Kalimantan assessed the value of tree resources by counting all of the tree resources in each of their field plots. Although laborious, it ensured that each participant could contribute to the design and implementation of the methodology and analysis of its findings. By avoiding a sophisticated sampling strategy, local people were able to understand and manage the survey. They could therefore participate in the entire survey process, and were not confined to a data gatheting role.

Marks (1994, 1996) has experimented with local hunters in the Luangwa Valley to record the animals they encounter (see Case Study 9). The method assumes that local hunters seek to maximise their contacts with wildlife during each foray. Rather than sample along predetermined transect lines, numbers of animals observed as a function of time spent in the field is used as an indicator of local wildlife abundance. This method reduces problems of sampling strategy and requires little in the way of capital investment – a watch, a notebook and pencil.

Marks suggests that the method increases the capacity of local hunters to collect data and analyse change. Additionally, it increases their awareness of wildlife management and protection. The method is also cost-effective when compared with standard census techniques. The employment of local hunters legitimises their status, encourages accountability and the monitoring of local resources upon which their livelihoods depend. Marks notes that developing this participatory approach to monitoring requires a shift in organisational culture by wildlife agencies to devolve responsibility to local communities. He recognises that changing direction and implementing new methods will not be an easy process, as the new approach will test the commitment of wildlife management agencies to local level management.

While the methodology developed by Marks in the Luangwa valley enables local hunters to participate in data collection, the analysis is undertaken by outsiders. Case Study 10 builds on this method and shows how multiple stakeholders, including communities, can be involved in the analysis of data for setting the quotas for commercial wildlife offtake in Zimbabwe. In this approach, a workshop is held and each group of stakeholders provides a different source of data (DNP&WLM/WWF 1996). Adapting Marks' approach, local communities complete ground transects counting the number of animal encounters per unit time. This is a cheap and quick way of assessing wildlife numbers which can be understood by all the participants within the communities. Although more technical information, such as aerial counts, is provided at the workshop by wildlife agencies, interactive exercises are used to 'demystify' and explain the data to all participants (see The Aerial Survey Game, DNP&WLM/WWF 1994). This case study provides a good model of how different stakeholders can be integrated into a participatory monitoring exercise.

# 5

# Framework for choosing a participatory approach to monitoring

It is difficult to compare the 10 approaches to participatory monitoring that are described in Chapter 4. Some of the approaches have only been piloted, some are in progress and few include discussions about their impacts and problems. Thus, the framework in Table 5 is a subjective assessment of the methodologies used in each approach. The criteria used to compare the monitoring approaches are adapted from those derived for monitoring sustainable agriculture in Brazil (see Box 25).

Table 5 separates the different components of the monitoring methodology into design, data collection, compilation, analysis and dissemination. The table indicates that few of the methodologies have been designed by, or with, local people. While all the methodologies are highly participatory in data collection, few of them enable local people to participate in the very early or later stages of the monitoring process.

Table 5 suggests that there are costs to selecting approaches that secure and sustain local participation from data collection through to dissemination. These approaches take longer and are more difficult to implement. However, on a more positive note, Table 5 also suggests that the information derived from the more participatory approaches is of greater use than those approaches where the role of local people is confined to data collection.

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#### Box 25. Monitoring the monitoring process in Brazil

In February 1997, a third workshop was held in Paraíba as part of a process of designing participatory monitoring. One important objective was to assess the quality of the monitoring work carried out so far. To evaluate the experiences with the indicators identified in July 1996, four criteria were used to assess the methods used and two to assess the indicators. These criteria were selected prior to the workshop by a small organising committee consisting of two NGO staff members, one Rural Worker's Union representative, and the HED facilitator.

#### Method-related criteria:

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- the level of participation of farmers in the collection, collation, analysis and dissemination of the data;
- time demand (for collection, collation, analysis and dissemination of the data);
- the degree of difficulty in applying the method (mainly related to collection and analysis);
- the potential to extend the application of the method beyond the current monitors.

#### Indicator-related criteria:

- reliability of the information;
- relevance of the final information (for different audiences: farmers, union, NGOs, donors, public agencies).

Initial discussions were lengthy as no systematic review had been undertaken immediately after the use of a new method for the different indicators. That already offered one valuable lesson – immediate reviews after each new application to ensure a smoother learning process.

The discussion enabled refinement of the chosen methods, a rich exchange of tips about dealing with application problems, and clarification of the need to think through the end-use of the information in more detail. For example, the reliability of data from one particular set of indicators related to contour planting was questioned. We identified several reasons for this that will help improve the next application of the methods:

- different definitions between farmers of the word atravessado (an approximate form of contour planting) – one definition is needed before asking how much area is planted in this way;
- the degree of precision of the indicators (exact area and yield from fields) does not match the
  degree of precision of the farmers' knowledge, as they do not need this for their everyday lives –
  so we either accept the margins of error or verify farmers' information with time-consuming
  direct measurement;
- ambiguous questions about 'where they learnt about atravessado' could mean from whom they
  first learnt it as a child or who reactivated their interest in using it so this question must be
  reworded without the current ambiguity of interpretation.

The discussion about reliability of information was particularly interesting as the different value systems were revealed between the university-trained NGO staff and the union representatives, many of whom have farming backgrounds.

Source: HED/AS-PTA/STR-Remigio/STR-Solanea 1997

# 6

# Key findings and knowledge gaps

Participatory monitoring to assess environmental change is a growth topic. Much is written about the potential benefits of involving multiple stakeholders in monitoring in general, but documented experiences of participatory monitoring – particularly for environmental change – are relatively few. Even rarer are experiences that document the impacts of a participatory monitoring process. Some of the examples illustrate the potential, rather than the actual benefits, of more participatory forms of environmental monitoring. Furthermore, consensus on the definition of participatory monitoring is difficult to reach. This makes it difficult to assess 'best practice' in participatory monitoring or to advocate approaches that seem to be more successful than others. Nevertheless, our review has highlighted common questions that emerge from these experiences and that merit further research if the potential of participatory monitoring is to be realised.

# 1 Does participatory monitoring deliver all that is promised of it?

Because of the many claims made by advocates of participatory monitoring, there is a real need to assess its impact by asking:

- Does participatory monitoring deliver on its promises, and if so, what benefits accrue to whom?
- Does participatory monitoring increase the sustainability, accountability and efficiency of the activities being monitored, as is often claimed?
- What are the (positive and negative) impacts of participatory monitoring for local people?

# 2 What are the most appropriate roles of different stakeholders?

Development of participatory monitoring requires a clear understanding of the different roles of different stakeholders. It requires careful thought about whether the type of data required, and expected end-use of the information, warrants more or less participation of different stakeholder groups.

The Brazilian experiences highlight the difficulties of trying to ensure that the needs of different stakeholders are balanced in the monitoring process. It is easy for those groups who are familiar with monitoring, such as scientists and funding agencies, to dominate the selection of indicators and methods, without appreciating the needs of local people and the practicalities of implementing the monitoring. Furthermore, few experiences have dissected the needs of 'local people' and addressed the social differentiation of monitoring. The community or village sub-group is often the 'local stakeholder' with little consideration of the different roles of people within the community. Clearly, priorities and indicators will vary depending on how one depends on the natural resource in question. Further research should address this local diversity and explore the complexity of negotiation between stakeholders in the development of a participatory monitoring process.

# Who bears the costs of participatory monitoring (and how high are they?)

Ensuring and facilitating the participation of a diverse group of stakeholders is a much more demanding process than designing a monitoring questionnaire in an office, and is time-consuming and expensive (see Box 26). How can the interests of different stakeholders be maintained throughout the monitoring process? Campilan (1996) highlights that participatory monitoring "can be costly not only for an organisation or a project, but also for local people themselves". It is local resources that underpin the implementation of a participatory monitoring process and there need to be clear incentives for them to be interested in monitoring over a longer period. Although "often considered taboo in participatory research and development projects", Campilan notes that financial incentives have been used to compensate farmers for the time they invest in several South Asian agricultural development projects. Although contentious, some "consider it highly justified considering the opportunity costs involved in taking away a significant amount of time which farmers could otherwise have spent for income-earning activities".

### Box 26. Acknowledging the cost of participatory monitoring

The first year of developing a participatory monitoring methodology in Brazil has cost one of the NGOs involved about US\$10,000. This is mainly comprised of day rates for NGO and union staff to attend the many meetings required. This amount does not include expenses occurred in developing the proposal and securing funding, the costs of HED (which is facilitating the process), the voluntary days that farmers spend at the meetings, the support of local CBOs in facilitating some of the planning meetings, most of the transportation costs to travel to/from meetings, and some of the day rates for the time spent monitoring that which the NGO had already identified. The actual application costs will be low, due to the limited technical nature of the chosen indicators but the final costs of implementing the monitoring will be much higher than was originally anticipated.

This issue of expense is particularly pertinent for funding agencies who often demand the most complex data on impact, without allocating extra funding for designing or implementing this process. One environmental NGO in Australia, implementing a multi-million dollar community-based revegetation programme, often commented that it would cost as much to count how many trees had been planted through its efforts as it would to plant them! This is directly related to the participatory nature of their work. A community-based facilitator encourages community groups to revegetate but has no direct way of knowing what they have actually implemented. The time it would take to chase up each individual who had been influenced by the facilitator would be inordinately expensive relative to the value of the information that was produced. How to monitor effectively without spending a disproportionate amount of the overall budget on it, is an ongoing concern for many organisations. A recent condition of funding set by the government agency for this NGO is that between 2 and 5% of the total budget for the community revegetation programme must be spent on monitoring for accountability. But is this enough? And is it money wisely spent if the information has no local relevance?

Recognising the true cost of participatory monitoring is important for both the developed and developing world context. In a discussion of catchment health monitoring in Australia, Irons and Walker (1996), describe two economic factors that limit the potential of community-based monitoring, notably:

trends in natural systems can only be determined by consistent longterm monitoring but community groups rarely have access to sufficient resources to enable this;

the time spent by participants' needs must be valued carefully, as despite much current interest, "there is no reason to believe that it is sufficient to motivate consistent, long-term monitoring services in the community without proper remuneration".

### 4 | What trade-offs are involved?

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Participatory monitoring seems to require trade-offs, yet few articles address this issue directly. In this paper we have discussed one area of apparent conflict, that between attaining 'scientific rigour' and 'local participation'. The balance between rigour and participation depends on the objectives of the participatory learning exercise, on whether it is

predominantly a learning exercise or a way of gaining evidence. Alternatively, new standards of validity need to be developed. Another compromise is the need to gain comprehensive information while recognising the reality of limited resources. Information that is 'good enough' must be provided 'soon enough'.

Another central trade off is between the need for standardisation while recognising the value of site-specific indicators and standards. This is a particular issue where data aggregation at higher levels is being pursued through collating, comparing or contrasting community monitored data. As Irons and Walker (1996) explain:

"The difficulties of matching data collected over various physical areas is compounded by the variation of scale for which each data set is appropriate. Data concerning a paddock, for example, becomes inconsequential at the sub-regional level. ... To select one scale and assume that it can be treated as a static bounded entity, has tended to be the usual approach."

In a community environmental monitoring survey in Australia, most groups were in favour of standardisation, as long as this happened through a supportive, consultative process and with sufficient time and resources (Alexandra et al. 1996). In contexts with less high-technology and less information exchauge, the challenge will be even greater than in Australia. Perhaps standardisation in other contexts will not be the most important or pressing objective of participatory monitoring. It should be stressed that the less immediately-relevant the information, the more likely it is that those collecting the data will lose interest over time. Requiring farmers to collect information that is not directly relevant to them may require a more commercial approach to participatory monitoring (as discussed under point 3).

# 5 How can we deal with baseline data, and the general lack thereof?

Many donors demand that baseline data is used against which to measure the impact of one or the other intervention. Likewise, to assess the full extent of environmental degradation or regeneration, many scientists urge for the collection of reference data. However, identifying the point in time and/or the condition against which the current situation should be compared is a recurrent problem the world over. Trying to establish a realistic starting point often proves fruitless if basing it on existing data, or prohibitively expensive if commissioning a baseline survey. Irons and Walker say that there is little that can be done about it:

"the alternative is to adopt monitoring procedures which side-step the need for a baseline, meanwhile indicating the direction of change – improvement or decline – against either the previous measurement or a desired condition". In Brazil, the NGOs are using the first year of monitoring data as their 'baseline', plus some supplementary data they can collect through the little that has been documented about local biophysical and socio-economic conditions. They simply cannot afford more, yet are worried that the funding agencies will find this unacceptable. This has clear implications for funding agencies and the scientific community alike. It requires the development of approaches that are not dependent on the use of baseline data, or the provision of sufficient funding and time to enable this to take place.

# 6 How are monitoring data used – what are the information feedback loops?

It cannot be stressed enough how important it is to know exactly who the end-user(s) of the information will be and how the information is to reach them. This determines the entire framework for the methodology: the indicators, the methods, the timing, the reporting and analysis style, the costs, etc.. This has been particularly clear in the Brazil work discussed in this paper (see Box 9). In the first stage of identifying indicators, sophisticated suggestions were made by farmers and academies alike. When the reality of who was actually going to use the information surfaced, indicators were thrown out en masse, in favour of others that are more finely tuned to the anticipated end-users (HED/CTA/. STR-Araponga 1997).

In spite of this, few participatory monitoring approaches invest sufficient time in the planning stages, identifying and clarifying the endusers and uses. Much energy is spent refining monitoring methods and developing sophisticated techniques, without thinking about the translation of the data into practical application. One example of this comes from the USA (Bosch et al. 1996):

"The Nevada Rangeland Monitoring Handbook (1984) amply describes monitoring methods and techniques, as well as providing definitions of terms used in range condition assessment. Unfortunately, little or no space is devoted to explaining what to do with the data, or how to interpret it once it has been collected. The result is that very little monitoring is today carried out in the rangelands of this area."

A central challenge and objective for future research is the application and integration of information from participatory monitoring into a participatory development process. Without sufficient feedback from monitoring into development processes, the monitoring process becomes an end in itself, rather than a means to sustain the participation of stakeholders and improve the development process and the local environment.

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### Annex

# Case studies of participatory monitoring

Participatory Rural Appraisal (Case studies 1-5) Oral testimony (Case studies 6-7) Ecological methods (Case studies 8-10)

### Participatory monitoring of sustainable agriculture, Paraíba and Minas Gerais, Brazil

Unit of analysis: varies per indicator as some relate to individual activities and others to collective efforts. Pataiba: individual and community level; Minas Gerais: individual, community and municipal level. Both: group and individual discussions and exercises.

#### Sequence of methods:

There is no fixed set of methods as each indicator has its own (combination of) methods. Also, the methods tend to be more complementary than sequential. Methods being used to date include: participatory maps of the community and the municipality to assess the spread of various innovations, models of individual properties to assess land management changes, individual questionnaires filled in by members of seed bank committees, a wooden frame and stick to assess revegetation rates, various forms (with diagrams and scales to rank impacts of certain measures) for group-based assessments, critical incident analysis to assess institutional relationships.

#### Process:

The stages of developing a monitoring methodology together in both areas are:

- prioritising which of the different field activities of the partnership would be evaluated
- identifying objectives of each activity per stakeholder group.
- merging the objectives of the stakeholder groups to create a common understanding of the partnership
- prioritising which objectives would be monitored (about 2 to 4 per activity).
- identifying the indicators for each prioritised objective (about 2 to 4 per objective).
- selecting a feasible, reliable method for collecting and registering the data, that could be managed by farmers and union representatives
- identifying when and how often measurements would take place
- identifying who would be involved in data collection, collation, and analysis
- clarifying with whom the final information would be shared and for what purpose (and refining indicators/methods to be more fine-tuned to the end-users)
- implementing the 'monitoring calendar'
- interim assessment of the viability and value of the methods and indicators
- use of the information for farmer discussion, planning, and donor accountability.

Most indicators are measured only once or twice a year.

#### Indicators:

In Parafba, 24 indicators are being monitored to date, related to four key activities (contour planting, IPM for banana weevil, community seed banks and nitrogen-fixing forage experimentation).

In Minas Gerais, four key activities are being monitored, with work proceeding on developing indicators and methods for a fifth activity in bee-keeping:

- Agroforestry: percentage of soil covered, diversity of production, costs incurred, production.
- Mineral Salt (for cattle): number of meetings of each mineral salt group, number of participants
  at each meeting, number of farmers who make and use salt, number of farmers who have started

using salt as a result of contact with the group, number of farmers who only use salt (and do not adopt another of the other livestock related improvements), state of hide of cattle cating salt.

- Traditional Maize Varieties: number of fields with traditional varieties and the varieties on them,
  the number and type of farmer (besides those participating in the experimentation fields) who are
  planting traditional varieties, the number of farmers who are substituting the use of chemical
  inputs with alternative practices that have the same positive effect, annual production.
- 'Biodigital' (local medical diagnosis and herbal treatment): number of people who have seen specialist and who return for follow-up, number of people seen per specialists, number of diseases per person treated with 'biodigital' per year.

#### Comments:

Four stakeholder groups are involved: farmers (male and female); representatives of the Rural Worker's Union (who are often also farmers); staff of a local NGO; academics from the Department of Soils of a nearby university (only in Minas Gerais). No one knew anything about systematic monitoring before the collaboration started. The collective skill building has been a valuable process, bringing the partners closer together in understanding why each is involved and what each expects to get our of the collaboration. A challenge that remains is how to extend the monitoring approach to all areas of the work, without overburdening already heavy workloads.

Sources: Guijt et al. 1996a, 1996b, 1997, Guijt and Neto 1996, 1997, Guijt and Sidersky 1996

# Participatory monitoring of village-level soil and water conservation programmes, India

Unit of analysis: Farmer (Stages 1 and 2) and village subgroup (Stage 3)

#### Sequence of methods:

- 1 Paper map of farmers' field, copied from a ground map, of conditions prior to soil and water treatments: 'Before'
- 2 Paper map of a farmers' field showing the conservation treatments carried out: 'After'.
- 3 Group meeting: 'Before' and 'After' maps and indicators are aggregated at the watershed outlet group level by extension volunteers (EVs) and consolidated amongst the group members.

#### Process:

Village institutions nominate village EVs who are trained and take responsibility for the programme. Presentation of findings in watershed outlet groups leads to a discussion of alternative technologies and adaptation to local conditions.

Key implementation indicators, such as gullies which have been partially or fully filled and reclaimed, are recorded on the 'After' map. Comparisons are made of crop growth and productivity levels in the farmers' treated and untreated fields (as well as those of neighbours).

#### Comments:

The approach can be linked easily to planning and management activities, but appears to depend heavily on the ability of the EV. Monitoring becomes an internalised process for the community: they start collecting information because they need it to inform their farming activities.

Source: Shah et al. 1993.

# Towards more sustainable soil fertility management, Southern Mali

Unit of analysis: Farm households

#### Sequence of methods:

- 1. Diagnosing and analysing farmers' strategies:
- i. Mapping natural resources by groups of men and women from the village
- ii. Analysing the diversity in soil fertility management:
- assessing farmers' criteria of diversity (e.g. good management and socio-economic indicators)
- selection of key criteria, farm classification and selection of 'test' farms for farm-level discussions.
- iii. Visualising farmers' soil fertility management practices. Farmers from each class draw resource flow models to:
- analyse present strategies and linkages between farm enterprises and off-farm activities.
- identify improvements adapted to farmers' conditions and strategies
- iv. Motivating other farmers through village meetings held to present visualisations, exchange ideas on technologies and discuss the implications of improvements.
- Planning of systems adapted improvements:
- Farmer workshops, exchange visits and demonstrations of 'new' technologies
- choice of methods to improve management and drawing of planning map by 'test' farmers.
- 3. Implementation of activities. At their demand, 'test' and other farmers are assisted in implementing the 'new' techniques.
- 4. Evaluation of planned activities, one year after Phase 2. Individual evaluations by 'test' farmers using the original planning map (comparing planning with execution, visualisation of flows effectively implemented, comparing diagnostic map with improvements), discussion in a general village meeting.

#### Process:

The participatory action-research approach is designed to guide farmers in improving soil fertility management practices. Initial mapping activities are differentiated by gender. Farmer criteria for assessing the diversity of soil management practices are assessed separately by three groups of farmers: older men, younger men and women. This classification is suggested by researchers but ultimate definition is by villagers. The outcomes, however, are pooled in a list of key criteria.

#### Indicators:

Farmers' criteria for differentiating soil fertility management centre on: crop residue recycling and crop-livestock integration. Differences in the criteria listed by older men, women, and younger men were minor. Socio-economic differences underpin diversity in soil fertility practices. Access to productive resources (such as active household members, cattle and carts) plays a major role in managing soil fertility. Knowledge, courage, household organisation and decision-making structures influence the way farmers manage soil fertility. Physical factors also play a role: farmers with little fallow land, low quality soil or erosion-sensitive soil put more emphasis on manure production to maintain soil fertility.

#### Comments:

Farmers participate in collecting data and analysing the diversity in soil fertility management practices. The process is said to be quick, participatory and relatively easy. Farm classification is made by farmers and based on their own criteria. Farmers felt the resource flow models helped them to prioritise and keep records of changes but felt that more household members needed to be trained in the mapping technique. This would reduce the reliance on one person and could promotes greater discussion within and between households. Further work is needed to develop sustainability parameters and more attention given to inter- and intra- household organisation as determinants of decision making processes. The paper suggests that to maintain the interest of the researchers, "there is a need to further upgrade the participatory methods to allow for quantification and statistical muslysis without sacrificing farmer participation".

Source: Defoer et al. 1995, 1996

### Participatory insect analysis, South East Asia

Unit of analysis: Farmers

#### Sequence of methods:

1. Transect walk with a group of farmers through a field

2. Observation of crops and drawing of individual plants, including: the plant, beneficial insects, pests, neutral insects (those which are neither pests nor beneficial) and diseases.

#### Process:

The task is to train farmers in applying integrated insect management in their own fields. This requires them to develop skills in: assessment, transects, observation, drawing and quantification of insect incidence. Farmers are often initially slow and unsure of drawing. But with repeated transect walks, they gain confidence and improve their drawing and analytical skills. Crops are usually inspected weekly, as insect numbers change quickly. This allows farmers to create a regular habit of field observation and demonstrates the evolution of the ecosystem over the cropping season.

#### Indicators:

Beneath each plant drawing, the farmers prepare a table showing the number of beneficiary insects by type, the number of pests by type, the number of neutral insects and the number of diseased plants for each known disease.

#### Comments:

Previous work suggests that farmers may not have the skills necessary to identify insects, distinguish between the different types of insect (beneficial or harmful), or know the appropriate spray to use. This approach develops the skills that a farmer needs to monitor the kinds of animals that are in their fields: identification skills by careful observation and drawing, analytical skills by considering and discussing the complexity of ecosystem interactions, their judgement by responding to questions after presenting findings and critically assessing other farmers' analysis, their understanding of pestnatural enemy relationships by asking and answering questions in peer groups. By building the capacity of individual farmers, they can decide whether or not to apply pesticides to their own field.

Source: Mangan 1997

### Farmer participatory procedures for managing and monitoring sustainable farming systems, Philippines

Unit of analysis: Village group (Stages 1 and 2) and household (Stages 3 and 4).

#### Sequence of methods:

1. Natural resources map

2. Village transect of natural resource types and products harvested.

3. Product flow diagram showing the amount and frequency of flow of farm-generated biological materials between enterprises and natural resource types.

 Monitoring diagram, consists of a transect with a matrix underreath it for recording inputs, labour, primary farm produce and by-products (for subsistence and commercial use) for each natural resource type.

#### Process:

When the manitoring diagram is completed, it is displayed in a central place, visible to all household members during the period of monitoring. Recording can be daily or on a more ad hoc basis. Aggregate figures can be used,

#### Indicators:

Selection of appropriate indicators and even knowing where to start was not a simple task. A working set of 'sustainability' indicators was developed: economic efficiency, bio-resource recycling, species diversity and natural resource capacity. It was recognised that some vital parameters of social and institutional nature are extremely hard to measure and were therefore excluded. Ultimately, selection of appropriate indicators was pragmatic, recognising "we cannot do everything".

#### Comments:

Impact assessment must be built into the experimental process. The dynamism of agricultural systems suggests that sustainability may not be characterised by stable outputs, stable inputs and stable income as originally perceived. Sustainability indicators need to be improved, but it is difficult to define indicators that can be compared over time and used to compare between farming systems.

Source: Lightfoot et al. 1993

Oral evidence in historical environmental impact assessment: soil conservation in Lesotho in the 1930s and 1940s

Unit of analysis: Key informants

#### Sequence of methods:

This approach focuses on key informant interviews. Each informant suggested additional informants, providing a snowballing approach to interviewing.

#### Process:

Age, mental lucidity and length of residence at the site were important factors in informant selection. Only two of the nine informants were women, as the population of adult women in the location had not grown up in that area but moved there on marriage. Thus, most women's memory of the location's landscape begins on the date of their marriage. This helped to establish specific dates of when features did or did not exist, but for continuity of changes, men were able to provide a longer time perspective.

#### Indicators:

Oral testimony revealed that soil erosion was not a defined concept in Lesotho in the 1930s but farmers had technologies (e.g. grass field boundaries) to treat potentially erosive spots. But in response to colonial concern about soil conservation in the 1930s, contour banks were installed. The Basotho were not passive recipients of soil conservation technology. Oral testimony shows they made observations, experiments and modifications of the contour system that was imposed on them. For example, one informant described how by changing the location of the contour banks in his field, he made 'plots' that were of a size and shape that he could work with, and climinated the problem of water being concentrated in the same location year after year. However, the removal, relocation and reshaping of contour banks had to be done in secret because of the authoritarian nature of the colonial administration. Fields which were clearly visible to a visiting official were left untouched, but in those fields which were obscured from view by topography, contour banks were modified or climinated. The British administrators acknowledged this 'wilful destruction' of contour banks in their Annual Reports, but never considered that such action could be the result of a coherent programme of monitoring and mitigation.

#### Comments:

Oral testimony is based upon the perceptions of local residents. Its success or failure will depend upon whether people agree to participate fully and tell researchers their observations. Access to information becomes synonymous with rapport and trust. The elderly informants' reconstruction of the 1930s highlighted the existence of an indigenous monitoring and evaluation process. Oral testimony revealed that what was seen as resistance was, in fact, a rational attempt to correct or prevent the negative impacts of an imported soil conservation technology on the landscape.

Source: Showers and Malahleha 1992

Talking back: the role of oral testimony in participatory development, the Sahel

Unit of analysis: Individual informant

#### Sequence of methods:

- Recorded somi structured interviews using a questionnaire or 'checklist of themes' to explore traditional environmental knowledge and chronicle environmental change. Informants included elderly farmers, pastoralists and refugees
- 2. Translate and transcribe the interviews
- 3. Return the evidence

#### Process:

500 interviews completed in 19 locations in six Sahelian countries, generating 600 hours of tape. Interviewers were all local to the interview area or fluent in the local language. The most successful interviewers had a natural curiosity and interest in the respondents. The time allocated to the actual interviews in each country was about a month. A three-day training programme preceded the interviews, involving a review of the questionnaire, role play and a 'pilot' interview and transcription.

#### Indicators:

The tapes indicate that change is recorded everywhere. There is clear agreement about the reasons for environmental degradation and the part humans and animals have played in it: lower rainfall, inappropriate development, and population growth leading to pressure on marginal areas.

#### Comments:

The paper suggests that many oral testimony projects get stuck after the collection phase. What to do with the tapes and transcripts? How to interpret them? How to publish them? How to return them to the informants? These things need to be considered carefully at the beginning of the project. Emphasis was placed on returning information to the community. One of the immediate and significant benefits of the project was that it forced project workers, even those born and raised in the community, to respect traditional knowledge. The project showed that oral testimony takes time, and requires a longer-term time investment than for which many monitoring and evaluation projects may be prepared or equipped. Inevitably oral testimony provides individual responses, prejudices and interpretation that can both delight and infuriate, lead to new questions and answers and new puzzles and potential solutions.

Source: Cross 1993

### Community inventory of natural resources, East Kalimantan

Unit of analysis: Individual farmer

#### Sequence of methods:

Self-recorded inventories of all tree resources (including, 5 species of rattan, 1 species of bamboo, various species of honey trees, and 16 species of fruit trees or plants) within each of the farmers' fields.

#### Process:

In response to an industrial plantation/transmigration project that was causing the clearance of the Dayak farmers' rattan gardens, farmers conducted an inventory of their resources to seek compensation for their losses. The number of clumps, trees or plants of each tesource was counted in each field. Each resource was then quantified in the units by which it was sold in the local market.

#### Indicators:

Although the approach was designed to make an inventory of resources, the data recorded for each resource would serve as useful indicators within a monitoring process:

- Rattan, number of clumps and dry weight (kilograms) per clump per year
- Bamboo, number of clumps and harvestable shoots per clump per year
- Honey trees: number of trees, number of bee hives per tree and number of litres of honey per bee hive per year
- Fruit trees: number of trees/plants and number of fruit/bunches of fruit/kilograms per year

#### Comments:

This inventory was conducted by one community on its own initiative. The community did not develop a sampling design. Instead, individual farmers conducted a 100% enumeration of all the resources in each of their gardens. Harvest quantities were estimated by local farmers, using their knowledge of past harvests. The accuracy of these estimates could not be verified and because the assessment is based on the judgements made by local farmers, the valuation may not be considered sufficiently 'scientific' by the government officials from whom compensation is being sought. If this approach were to be adapted to a monitoring process, the farmers themselves could record the actual productivity of each of the trees and plants throughout the year, increasing the rigour of the approach.

Source: Stockdale and Ambrose 1996

### Engaging local hunters in wildlife surveys, Zambia

Unit of analysis: Hunter key informants

#### Sequence of methods:

Self-recorded wildlife surveys by hunters.

#### Process:

Designed with local hunters in 1988-89, this experiment was carried forward on the hunters' own initiatives since 1990 and was revived formally in 1993. The terrain is divided into blocks and each block includes or is separated by known topographical features, such as streams, saltlicks or waterholes. The blocks enable the hunters' movements and directions plus animal dispersal to be recorded. Hunters keep records of the wildlife sighted, 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 keep journals of events, activities and rainfall, thus broadening the framework for subsequent analysis and interpretation.

#### Indicators:

Direct wildlife counts, number of encounters, number of stalks, time spent: searching, hiding, stalking, following, butchering, preparing and carrying meat.

#### Comments:

Although time-based, rather than line- or area- based, as is the case with more standard wildlife transects, these surveys provide reliable and useful information about species abundance and hunters' interactions. Variations in counts between individuals are related to skill (more experienced hunters count more game), age, location (those hunting further from settlements count more wildlife) and weapon used. Although not providing all the criteria for standard census procedures, the method does provide socio-economic information on time investment in hunting and their allocation of hunting time in the field. By grounding wildlife counts in local lives and livelihoods, a more complete picture of community-based resource management is developed. Moreover, the incorporation of data on resource stocks together with that of its users allows a more 'realistic' interpretation of trends than is obtained when wildlife counts along are considered.

This method is low cost, emphasises local skills and knowledge and allows frequent assessments of the smaller, as well as the larger, animals. Small animals are difficult to census with standard ecological methods, yet these species dominate local consumption. Thus, the method involves hunters in recording and monitoring the resources on which they rely. Employing local hunters to census wildlife emphasises local participation, skills, trust and knowledge – all attributes that are critical in developing constructive relationships between wildlife management agencies and local communities. This approach puts the rhetoric of community-based natural resource management into practice: the method devolves responsibility from wildlife agencies and empowers local people to monitor the wildlife upon which they depend. However, it requires wildlife agencies to acknowledge the role of bushmeat in local livelihoods. The method is developed in Case Study 10 to involve local people in the analysis of the wildlife data which, in this case study, is completed by outsiders.

Source: Marks 1994, 1996

Participatory methods for quota setting in CAMPFIRE areas, Zimbabwe

Unit of analysis: Rural Development Council (District level councils or committees)

#### Sequence of methods:

An annual facilitated workshop brings together the key stakeholders in setting quotes for wildlife offtake: Department of National Parks and Wild Life Management (DNP&WLM), CAMPFIRE ward wildlife committees, villagers who have participated in ground counting exercise, problem animal reporters, traditional and political leaders and safari operators. The workshop is facilitated by Worldwide Fund for Nature (WWF) and Safari Club International and is timed to follow a three day ground counting exercise which is also held annually with local communities and with support from WWF. Other data compiled from stakeholders includes: trophy quality analysis, aerial survey analysis and quota and location analysis. Interactive exercises are used to explain technical methods to the participants.

#### Process:

The objective of the workshop is to examine all available information on sport hunting and to recommend to DNP&WLM CAMPFIRE unit a quota for the Rural District Council. The workshop begins with a review of the ground counting exercise. This is followed by group work on four topics: trophy quality, aerial surveys, ground counts and quota trends. 'Games' are used to develop the participants' understanding of the topics. For each topic, all available data is examined by the participants for trends, such as changes in trophy quality, changes in animal populations observed from the air or from the ground etc. The final part of the workshop examines the available trend information on each species and uses this to adjust the existing hunting quota.

#### Indicators:

The indicator 'wildlife population' is assessed using several different methodologies: aerial surveys ground counts and trophy quality. In addition, a subjective assessment of changes in animal numbers is provided by safari operators. As shown in Table 1, for each indicator, a species is classified as: showing a population increase ( $\wedge$ ), showing a population decrease ( $\vee$ ), showing a stable population ( $<\!\!-\!\!>$ ) or information not available ( $\times$ ).

#### Comments:

Quota setting workshops have been held annually in some areas since 1992. The methods used have evolved from ward and village level mapping and estimation of populations to the current approach where quotas are modified on the basis of available trend information. Participants are informed well in advance so they can prepare relevant information. The workshops are designed to involve the participants in all aspects of the process, from data extraction to analysis and presentation. They are characterised by a high level of interest and where the indicators show a decline in population, participants are quick to reduce the offtake. For most species, the recommended 1997 quota have not changed since 1996 indicating general agreement between the stakeholders that the current level of offtake is satisfactory. Careful facilitation is required to secure and balance the participation of all

stakeholders during the workshop. This appears an elegant approach that is accessible to all participants.

Source: based on discussions with Ivan Bond and Russell Taylor, WWP Harare and project documents DNP&WLM/WWF 1994 and 1996

Table 1. Gokwe North Rural District Council (Area 1) Quota Setting Workshop, a summary of the key indicators and the suggested quota for 1997

See text for details of symbols and the quota setting process.

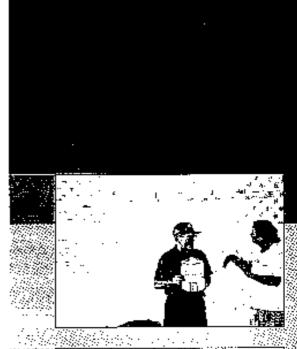
Species	1996 quota	Acrial survey trends	Ground counting trends	Trophy quality trends	Safari operators' assessmezut	Requested quota for 1997
Male elephant	7	< <del>-</del> >	v	<->>	v	7
Male buffalo	20	<→>	<->	<->	<->>	20
Lion	3	х	×	x		3
Leopard	3	х	х	<>	Л	6
Sable	1	< <del>-</del> >		×		2
Eland	1	×	v	×	<->	1
Kudu	7	. х	<->	<->>	<u>~</u> ->	7
Bashback	9	х	<del>&lt;-&gt;</del>	< <del>-</del> >	٧	7
Waterbuck	4	х	<u>~</u> ~>	< <del>-</del> >	<->>	4
Reedbuck	2	×	<->	×	< <del>-</del> >	
Zebra	2	x	< <del>-</del> >	<>	_ <del>-</del> >	2
Impala	44	×	vv	<->	vv	24

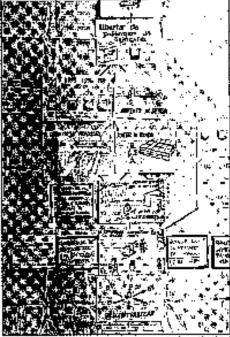
### Discussion Papers of the Sustainable Agriculture and Rural Livelihoods Programme International Institute for Environment and Development

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.





Monitoring and evaluating performance of community seed bank (above) after defining the objectives tree (below).

(photos: I. Guijt).



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Price £8

International Institute for Environment and Development

3 Endsleigh Street London WC1H ODD, UK

email: sustag@iied.org tel: +44 (0)171 388 2117 fax: +44 (0)171 388 2826

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