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USING LOGFRAMES TO MONITOR AND REVIEW FARMER PARTICIPATORY RESEARCH

John Farrington and John Nelson

Farmer participatory research (FPR) is difficult to monitor and review because it uses a 'process' approach; it is done in variable, unpredictable situations; it produces some outputs that are hard to measure objectively; and it involves different types of stakeholder, each with their own aims and ideas of success or failure. For these reasons, FPR projects tend to have permeable boundaries, with sometimes important spillover effects, and less than direct relationships between inputs and outputs.

This paper examines how far a conventional project management tool, the logframe, can be adapted to the monitoring and review of FPR. Normally used in 'blueprint' projects, the logframe presents some difficulties in handling those with 'process' characteristics. But it has a number of strengths: it requires clear specification of purposes, anticipated outputs, activities, and the relationship among them, as well as performance indicators and means of assessing them. Also, it is becoming almost universally adopted by funding agencies, so organisations using FPR may in future have to structure their proposals and monitoring activities in logframe format.

FPR aims to achieve one or more of three outputs using participatory methods:

(i) to develop improved agricultural technologies in response to farmers' needs;
(ii) to develop the human resources of the farmers and collaborating organisations;
(iii) to develop the institutional capacity of farmers' groups and collaborating organisations.

For the first of these, the relationship between the project activities and its outputs is fairly direct, making this fairly easy to monitor. It is less direct with the second and third, but can still be captured by suitably adapted project management tools.

Because of their mandates and philosophies, NGOs and public sector organisations differ in how they view 'participation'. Government agencies are concerned largely with (i). NGOs, on the other hand, are interested in participation mainly as a way to empower the poor. NGOs are therefore concerned at least as much with (ii) and (iii) as with (i).

This paper offers a generic logframe that readers can adapt to suit their own FPR projects. For each output, it provides illustrative performance indicators that might be relevant to each of the two most important groups of stakeholders (researchers and farmers). The paper also suggests some means of verification for each of the indicators. Readers should select, adapt and add to these to suit their own situations.

An overall conclusion is that, whilst logframes **can** *be constructed to cater for many of the requirements of monitoring and reviewing FPR, they have to be updated frequently to incorporate 'process' changes, and become cumbersome with the more empowering dimensions of FPR. Here they can usefully be complemented by more inductive techniques such as process documentation and monitoring.*

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ACRONYMS

CIMMYT	International Centre for Maize and Wheat Improvement
CIP	International Potato Centre
FPR	Farmer participatory research
FSC	Farm Science Centre (India)
GO	Government organisation
IRR	Internal rate of return
ISNAR	International Society for National Agricultural Research
NGO	Non-governmental organisation
NPW	Net present worth
ODA	Overseas Development Administration (UK)
OVI	Objectively verifiable indicator
PRA	Participatory rural appraisal
R&D	Research and development
R&E	Research and extension
RRA	Rapid rural appraisal
ZOPP	Objective-oriented project planning

Using Logframes to Monitor and Review Farmer Participatory Research

John Farrington and John Nelson

1 Background

1.1 Introduction

This paper develops a framework for the monitoring and review of farmer participatory research (FPR). FPR can be difficult to monitor and review for several reasons:

- It uses a 'process' approach, where the activities and results cannot always be determined at the outset and may change over time.
- FPR is often done in environments which are variable and difficult to predict.
- Many of its outputs are qualitative rather than quantitative, so are hard to measure objectively. Conventional monitoring tools use numbers as measures of progress.
- Many of the agencies (especially NGOs) promoting FPR are concerned with the 'empowerment' of local people and organisations. Because of this, some claim that FPR cannot be monitored in the same way as conventional projects.
- Farmers and other stakeholders have a say in controlling the project, and may have different ideas about what constitutes success or failure.

The paper adapts the **logical framework** ('logframe') approach to the monitoring and review of FPR. Donors and others increasingly use logframes (variously called 'project frameworks', 'ZOPP frameworks', and so on) to set out objectives and indicators of project performance in advance. They have a number of advantages but they also have disadvantages, and may require extra information to be collected, as we outline in Part 3- Many organisations implementing FPR have not used logframes, but they may have to do so in future if they wish to continue drawing on donor funds.

What FPR can and should achieve depends largely on local conditions, so it is impossible to set out universal criteria for monitoring and reviewing. This paper presents a general framework that can be used in most situations, but the details (the performance criteria, means of assessment and main assumptions) are given as examples only. Agencies using the framework must define their own, locally relevant, measures. This is especially important in the case of the farmers' own criteria.

Structure of the paper

Part 1 provides a background to FPR, 'process'-type projects and logical frameworks (logframes). **Section 1.2** briefly reviews existing ways of classifying FPR. **Section 1.3** details the typology used throughout the remainder of the paper. **Section 1.4** discusses the project cycle and introduces the logframe, which we use as a template for monitoring FPR projects. **Section** 1.5 discusses how the logframe, which is usually used in managing 'blueprint' type projects, can also be adapted for process-type projects such as FPR. **Section 1.6** discusses some common practical problems encountered in the management of project monitoring.

Part 2 describes how logframes might be used to monitor FPR. **Section 2.1** proposes a generic logframe that can be adapted to suit specific circumstances. **Section 2.2** then expands this generic logframe further, focusing on the project outputs in three areas: improved agricultural technologies, human resources, and institutional capacity. This section also suggests indicators for two major sets of stakeholders in FPR projects: researchers (both government and NGO) and farmers. **Section 2.3** discusses how these indicators might be measured.

Part 3 examines four generic issues in more detail. **Section 3.1** discusses ways to deal with conflicting interests of stakeholders. **Section** 3-2 looks at how to assess the effects of FPR on different groups in the community. **Section** 3-3 addresses how to assess the performance of groups. **Section** 3-4 discusses the particular difficulties of monitoring multi-agency approaches.

Three **Appendices** provide details of aspects that could not be covered in the main text without cluttering it unduly. **Appendix** 1 summarises key aspects of the monitoring approach used by the UK Overseas Development Administration. **Appendix 2** provides a framework for classifying FPR developed by Biggs (1989) that forms one of the bases for this paper. **Appendix** 3 discusses qualitative and quantitative research methods and sampling issues and reviews the literature on the technology development aspects of FPR.

Why this paper, and for whom?

Most case studies of FPR in the last 20 years have claimed that participatory approaches are an effective way to generate and disseminate technology and to build farmers' capacity to identify and solve their problems. However, the hard evidence to support these arguments is limited. Even where such evidence does exist, it rarely takes account of the potentially higher costs of participatory vs. conventional approaches. Investment by governments, donors and NGOs in FPR therefore remains largely an act of faith. The interest of funding agencies is likely to shrink

rapidly unless they are given hard evidence of its performance.

This paper is intended for middle and senior-level practitioners in NGOs, government research and extension (R&E) services and donor organisations who design, implement, monitor and evaluate technology generation and dissemination activities. It should also be of interest to those who fund such work.

Limitations

As yet, very few experiences of FPR have been monitored or evaluated. The few documents that do exist generally do not have enough detail for readers to understand how the techniques were used and what their strengths and weaknesses were. For this paper, we have therefore had to draw on or adapt from two existing spheres: methods for monitoring conventional technology generation and dissemination, and participatory rural appraisal (PRA).

We have confined ourselves to skills and inputs directly related to farming technologies, such as varietal improvement. We do not cover areas such as processing and marketing, or such generic inputs as finance and credit. Nor do we discuss the monitoring and review of the performance of the organisations that implement FPR. We therefore do not cover general tools such as on-site analysis, self-assessment tools for non-profit organisations, or social audits, all of which apply at the level of the organisation. The substantial literature on these is reviewed by Smillie (1995) and at least one recent manual covers the performance of organisations (Horton *et al.*, 1993). Here, our concern is with learning techniques that can be applied to individual activities.

It should be stressed that the various organisations involved in FPR have a wide range of philosophies and may pursue different objectives. It is impossible to detail them all here. Instead, this paper is indicative: it sets out some of the most common outputs of FPR and illustrates how they might be monitored. Readers should select, adapt from and add to these ideas in developing their own monitoring methods suited to their specific situation.

1.2 Farmer participatory research

Why farmer participatory research?

Until recently, most agricultural research in developing countries was conducted in laboratories, on research stations and experimental farms. Scientists controlled the research conditions, chose what to study, and how to study it. But poor farmers who cultivate rainfed land do not have the luxury of such control: they face diverse, complex agro-ecological and socio-economic conditions and high levels of risk. If research is to generate technologies that such farmers can adopt, then it should be designed and implemented based on a farming systems perspective. Recognising that farmers' conditions cannot easily be reproduced on-station, scientists started doing adaptive research in farmers' fields. Even here, however, consultation with farmers was fairly perfunctory; researchers still largely controlled the research objectives and methods.

What came to be known as 'farmer participatory research' has its roots in two distinct sets of concerns:

(i) The concerns of (mainly) government research and extension (R&E) services with the **functions of technology generation and dissemination.** R&E services became aware that their work could be more effective and efficient if they interacted more closely with farmers.

(ii) The concerns of (mainly) NGOs with **empowerment of the marginalised.** Some NGOs have developed FPR as part of a strategy of participation, permeating economic, social and political life. Much of their work draws its inspiration from the conscientisation literature and traditions of action research, and is further influenced by specific philosophies such as the Gandhian movement in India.

To a large extent, these two approaches remain distinct. They help determine the structure of this paper.

Clearly, those who use participatory approaches must have a philosophy of client-orientation in their research. This does not imply that clients' needs or knowledge should be the only basis for identifying research priorities. Rather, it means relating what science (government or private sector) can offer with the requirements of its clients (farmers, other scientists, government departments, the food processing and marketing industries, and so on).

In the broadest definition of participation, those who can afford to engage in market transactions, and for whom the market works adequately are 'participatory'. Richer farmers use the market and lobbying to articulate their demands. Markets that function adequately give clear signals on the economic performance of specific technologies. But in many contexts, markets do not work well for poorer farmers. FPR has therefore aimed to support them in articulating their needs and obtaining feedback on technical changes that have been tried. It generally tries to do so in ways consistent with their local knowledge and conventions.

At the risk of some oversimplification, it can be argued that the biophysical and socio-economic conditions of farming vary broadly with farmers' income levels. These variations are summarised in Table 1.

They are important for FPR in two ways:

(i) NGOs' concern with lower income groups makes them acutely aware of the importance of systems interactions in natural resource management. Improved management of common resources

Table 1. Generalised characteristics of richer and poorer farmers

	Richer farmers	**Poorer farmers**
Biophysical	Few commodities produced High levels of inputs Favourable agricultural areas, strong physical infrastructure Few systems interactions	Many products Low inputs Difficult areas, poor soils, hilly topography, little irrigation or flood control. Strong systems interactions, especially between farming and common pool resources (trees, water, fodder)
Socio-economic	Individualistic, market-oriented production Limited group action (mostly in water management and input/output marketing)	Subsistence production Group action important to manage common pool resources; create demands on government services; and for exchange labour

such as forest, water resources and grazing land can yield substantial 'systems' synergies:

- Bringing in fodder from outside the farm improves livestock productivity in the short term, and soil structure and fertility in the longer term.
- Improving vegetative cover, and constructing bunds and checkdams all enhance rainwater percolation. This, in turn, this raises water tables in the lower slopes, so makes irrigation using groundwater easier.

Common resources can, of course, be transferred to a few private individuals (usually the wealthier farmers), who can manage them successfully. However, the management of common resources usually affects the interests of many - farmers, farm labourers and the landless, both men and women. The most usual way of ensuring their interests are represented is through the formation of a group to manage the resources.

Much of the interest of NGOs in participation focuses on the empowerment of groups of farmers, not individuals. Two reasons for this interest are:

- Groups can ensure that the rights and responsibilities over common resources are distributed fairly.
- NGOs desire to protect and promote traditional practices (such as labour sharing arrangements), which depend on the existence of cohesive groups.

Richer farmers have a different set of interests from poorer ones. They own or rent many of the resources which poorer farmers would regard as 'common pool', such as trees or water. They therefore have little reason to form groups to manage such resources. Instead, groups of richer farmers tend to focus on commercial activities such as processing or marketing.

This paper does not deal with wealthier farmers, but with middle and lower income farmers who operate under difficult farming conditions where risk is high and infrastructure poor. The very poorest tend to rely more for their livelihoods on safety nets of various kinds than on agriculture. Our concern is not therefore with them, other than as a 'stakeholder' category of the landless whose livelihoods may be made up partly by providing agricultural labour and gathering products (e.g. grass, fuel) from common pool areas.

Can FPR be 'projectised'?

Some organisations concerned with empowerment may argue that participation is an open-ended process. It aims (they say) mainly to enhance awareness among the poor of the causes of their poverty, and to facilitate social action to respond to these causes - from their own resources or by creating demands on the state. Participation (they might argue) is fundamentally incompatible with the structured, time-bound relationship between inputs and outputs which underlies the concept of a 'project'.

Whilst the authors have some sympathy with this perspective, we take the following position in this paper.

Functional types of participation (those concerned with technology generation and dissemination) have time-bound objectives and a fairly direct relationship between inputs and outputs. They lend themselves to 'projectisation' without great difficulty, particularly since recent advances in project design and

implementation allow 'process' approaches to be used, in order, for example to: explore any 'indirectness' in the relationship between inputs and outputs; consult stakeholders extensively; phase activities to allow them to be reformulated periodically; modify project design in an iterative way.

No matter how open-ended the approach, it is necessary to define the purpose of activities by consulting with stakeholders early on. Once this has been defined, intended outputs and activities can be defined iteratively over a period of time, so that projectisation may not be entirely incompatible with empowering types of participation.

We therefore think it is useful to explore how far current project preparation techniques can be applied to FPR. However, we accept that these techniques have shortcomings, especially when applied to the more empowering types of participation. We consider these shortcomings towards the end of this paper.

1.3 A framework for monitoring and reviewing FPR

Existing classifications of FPR

An early review of FPR (Farrington and Martin 1988) simply examined the evidence on different types of FPR at the main points of the project cycle, from diagnosis through the implementation of experiments, to the assessment of results and dissemination. A more ambitious classification, by degree of participation, was set out by Biggs (1989), starting from contractual, through consultative and collaborative to collegiate (see also Appendix 2). Although conceptually appealing, this approach presents three difficulties:

(i) 'Contractual' can hardly be thought of as involving participation,

(ii) It is difficult in practice to distinguish between 'consultative' and 'collaborative',

(iii) There is an underlying assumption that the types of participation are more important than the type of institution involved. We believe that the type of institution promoting FPR is particularly important: NGOs have mainly associated themselves with empowering 'collegiate' types of FPR, whereas government. R&E services have tended to implement FPR on a more functional basis. These differences are discussed in more detail below.

Farrington and Bebbington (1993) distinguished between 'shallow' and 'profound' levels of participation. They drew up a 4-way classification: shallow and deep levels of participation, each combined with a narrow and broad scope of subject matter. Okali *et al.* (1994) took this classification a stage further by distinguishing between the different contexts in which FPR takes place. They analysed FPR according to whether it was being undertaken by research versus development programmes, and by the degree of intervention undertaken by researchers.

Framework for this paper: Types of participation

The classification used here draws on elements of all of the above, but owes its origins most directly to Mosse (1996), who argues that one or more of three concerns underlie most participatory approaches:

(i) **Consultation for improved agricultural productivity.** Participation has been used extensively as a way of consulting with rural people in order to assess their needs, draw on their knowledge, experiment together with them and jointly assess the outcomes. In this way, their requirements can influence both on-farm experiments and research on-station or in the laboratory. Comprehensive consultation can also distinguish the needs of different groups by such characteristics as access to resources and gender. Such consultation aims to improve agricultural productivity by enhancing the efficiency and effectiveness of the functions of technology generation and dissemination.

(ii) Human **resource development.** Participation can also be used for capacity building, in the sense of enhancing the principal stakeholders' capacity to diagnose problems and respond to them. This may involve developing technical skills, self-confidence, interpersonal skills, and the ability to plan and implement future initiatives. It also involves developing farmers' ability to generate the finances necessary to recover costs and develop common funds.

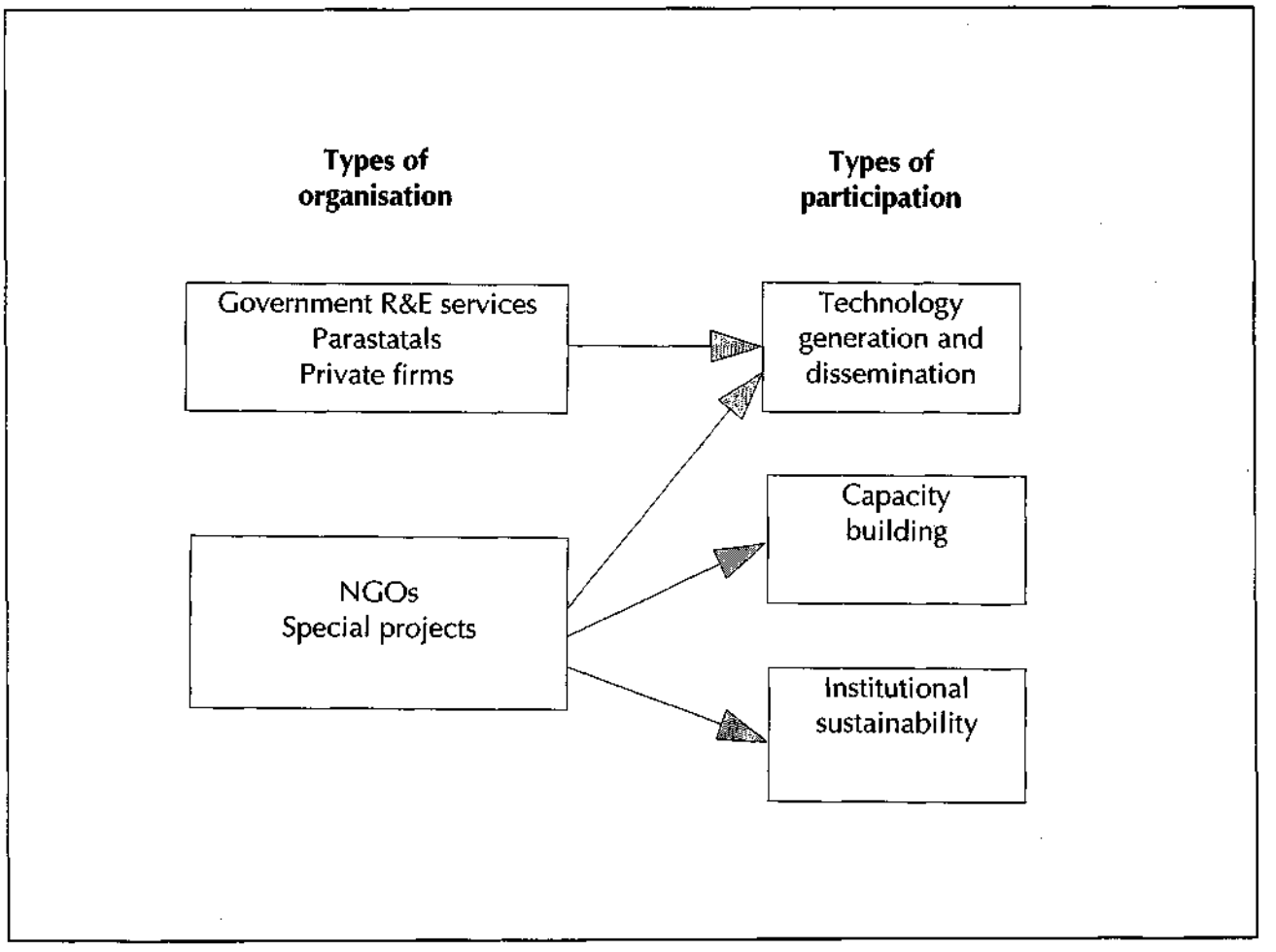
(iii) **Institutional development.** Sustainability of the institutions and organisations of immediate relevance to the principal stakeholders is essential to provide support for participatory approaches over time. This concern includes access to technical advice, back-up research, inputs, credit and training facilities.

Later in this paper we develop a generic logframe for FPR that treats these three concerns as 'outputs' (see section 2.1).

Participation is not pursued in an organisational or political void. The main types of institutions involved in FPR are predisposed in different ways to the three concerns above (Farrington, 1996). Government research and extension services have a mandate to generate and disseminate new technology efficiently. When used in a consultative mode, participation may help them increase the efficiency of technology generation and dissemination, But the very breadth of their mandate means that they rarely have the resources to pursue intensive, empowering types of participation in any given setting.

NGOs (often working through special projects), on

Figure 1. Interests of government research and extension services and non-government organisations in farmer participatory research



the other hand, tend to be concerned with both technology generation and dissemination and the more empowering applications of participation in capacity building and institutional sustainability. NGOs can mandate themselves to allocate large volumes of resources to a few villages, so that intensive, face-to-face, empowering types of FPR are entirely feasible for them.

The monitoring guidelines in this paper are based on this distinction.

1.4 The project cycle, project management and the logframe

Virtually all funding agencies treat all the activities they support as 'projects', although some have recently introduced 'process approaches' to the design, implementation and review of projects. Agencies differ in how they conceive of and implement projects. Rather than focusing on these differences, we select an approach used by one agency (the UK Overseas Development Administration, ODA) which is in many ways typical of those of other agencies.

This section draws heavily on the project cycle management systems guidelines issued by the ODA Aid Policy Department in March 1995, with two modifications. First, we use the term 'logframe' (logical framework) since it is more readily recognised in international circles than ODA's preferred 'project framework'. Second, for simplicity, we group the activities (or 'stages') in the project cycle into only three major categories: planning, implementation and review.

The ODA guidelines cover: the project cycle; the logframe; and the relationship between them.

The project cycle

The project cycle links a stream of activities through planning, implementation and review. However, the sequence is not rigid: the process may be iterative, especially at the planning stage, and a review may be necessary at the end of a pilot scheme before a larger project is (re-)designed and implemented. ODA's approach to all aspects of the project cycle is based on interdisciplinary teamwork and the participation of project stakeholders. These stakeholders include

intended beneficiaries, in-country organisations responsible for preparation, implementation and overall supervision of the project, and the intended group(s) of beneficiaries.

The logframe

The logframe summarises the main features of a project and how to judge its progress. It consists of a 4 x 4 matrix. The rows consist of:

(1) The overall **Goal** of the project
(2) The project's immediate **Purpose,** through which it contributes to achievement of its Goal.
(3) The **Outputs** needed to achieve the Purpose.
(4) The **Activities** needed to achieve the Outputs.

The columns in the matrix show:

(A) A narrative **Summary** of the Goal, Purpose, Outputs and Activities.
(B) The **Indicators** that can be measured to show whether the Goal, Purpose, etc., are achieved. These are sometimes called 'objectively verifiable indicators' because they should be objective, quantitative wherever possible, and that quality and timing should be specified. These attributes are commonly known as 'QQT (quantity, quality and timing).
CO" The **Means of verification:** the specific sources and methods that can be used to obtain information on the indicators.
(D) The **Assumptions** made about matters outside the direct control of the project.

The logframe helps make the project design more transparent by clarifying the reasoning behind the project. The cells in each row have the same relationship to each other, as shown in Figure 2.

The logframe can be read from bottom to top, as indicated in Figure 3. If the activities (cell A4) are carried out, and the relevant assumptions are valid (cell D4), then the project will achieve the outputs in cell A3. Similarly, if the outputs in A3 are achieved, and the related assumptions hold (D3), the project will achieve its purpose (A2). The two middle columns (B and C) show how to measure whether the summary in each level is being achieved.

It is also possible to construct (and read) a logframe from top to bottom. Begin by deciding on the broad Goal; then determine what narrower Purposes the project should have that will help achieve that Goal. Decide on the Outputs needed to achieve each Purpose, then decide the Activities and inputs required to achieve the Outputs.

Table 2 lists questions that must be answered when compiling a logframe for a project.

Though the convention is to have only one goal and purpose for each project, in all but the simplest projects, there will be several activities and outputs. The logframe accommodates these by dividing each row horizontally into several parts. For instance, project activities may include training, field experiments, and visits to other villages. Each of these activities will have its own corresponding indicators and means of verification. Table 3 gives a hypothetical and partial example of the Activities segment of such a logframe.

Relationship between project cycle and logframe

The ODA guidelines suggest that the principal focus of attention will shift along the project cycle as follows:

Stage of project cycle	Principal logframe focus on:
• Planning	• Goal, Purpose
• Implementation	• Outputs, Activities
• Review	• Coal, Purpose, Outputs, Activities

The guidelines also note that the logframe is not a rigid blueprint, but can be amended in the light of experience with its implementation.

1.5 'Process' type projects

Characteristics of process-type projects

FPR projects have many features of 'process' type projects: they emphasise iterative consultation with beneficiaries; they have indirect links between project inputs and outputs; and extensive qualitative assessments are needed to judge how successful they have been. These features are true of both FPR projects conducted in a 'functional' mode as well as those that aim also to empower their farmer collaborators.

A number of agencies are discussing 'process' approaches to the design and implementation of projects and are introducing such approaches into their working procedures. For instance, in a paper prepared for a workshop with ODA on its projects in India, O'Donovan (1994) argues that:

> *"the process approach... suggests very much the idea of an open system, which is so permeated by influences that it is extremely difficult to precisely state what it will contain, especially in terms of exact costs, time frames and activities ... [lit is possible to state ... goal and purpose, then ... devise outputs and activities for the first year of the project. Subsequent activities and outputs then need to be defined on the basis of project learning and their ability to contribute to goals and purpose... The process approach ... emphasises the following elements:*
> - *A project is a set of activities within a boundary which is permeable.*
> - *Ownership and commitment from stakeholders [are] essential to project success.*

Figure 2. Relationship between cells in the same row of a logframe

Summary A →	Indicators B →	Means of verification C →	Assumptions D
What does the project want to achieve?	How can we tell if has achieved it?	Where can we find information that will tell us this?	What else must happen if it is to succeed?

Figure 3. Relationship between a row and the next higher level in a logframe

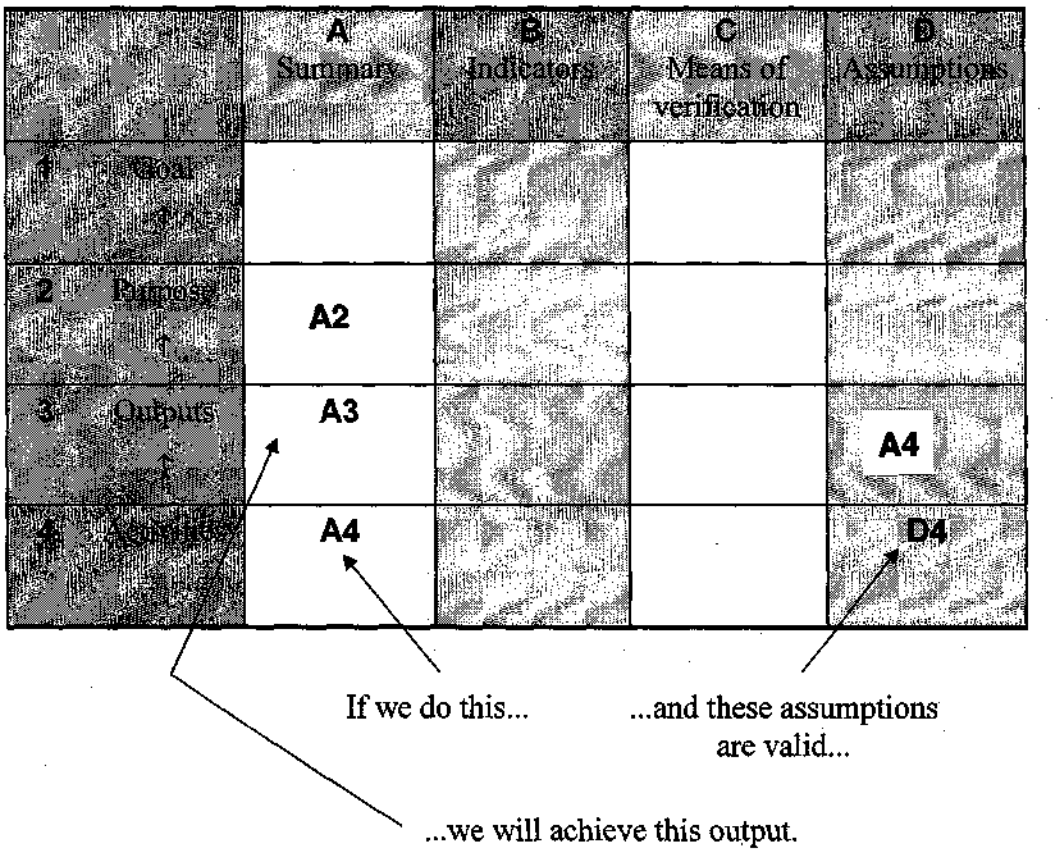


Table 2. Questions to be answered when filling in each cell of a logframe

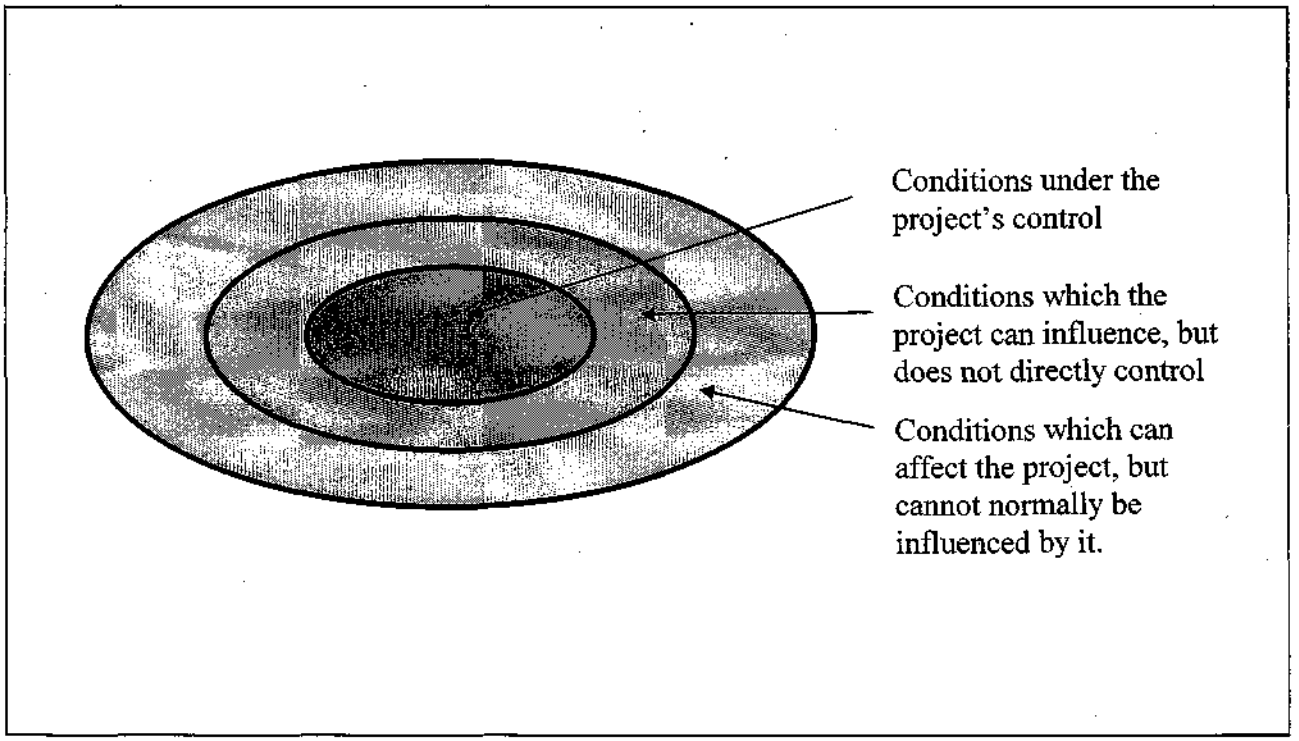
	A Summary	B Indicators[1]	C Means of verification	D Assumptions
1 Goal	What wider problems will the project help resolve?	What are the measures (or other types of evidence) to tell whether the problems in cell A1 have been resolved?	What are the sources of information? What methods should be used for obtaining/accessing it?	**(Goal to Supergoal)** What external factors are needed to sustain objectives in the long run?
2 Purpose	What immediate effects are intended for the project area or target group? What benefits (or disbenefits) are expected, and who wins (or loses)? What improvements or changes will the project bring about?	What are the measures (or other evidence) to judge the project's immediate effects, benefits and losses, and winners or losers?	What are the sources of information? What methods should be used for obtaining/accessing it?	**(Purpose to Goal)** If the project achieves its Purpose, what external factors must be true if it is to help reach the Goal?
3 Outputs	What outputs will the project produce so it can achieve its purpose?[2]	What kind and quantity of outputs, and by when will they be produced?[2]	What are the sources of information? What methods should be used for obtaining/accessing it?	**(Output to Purpose)** If the project produces the Outputs, what factors outside its control might hamper achievement of the Purpose?
4 Activities	What activities must be undertaken to produce the outputs? When must these activities take place?	**Inputs/resources:** What materials, equipment or services (personnel, training, etc.,) are to be provided by the donor(s) and recipient, at what cost, over what period?	What are the sources of information? What methods should be used for obtaining/accessing it?	**(Activity to Output):** What external factors must be realised to produce the planned Outputs on time? What actions outside the control of the donor are necessary to begin the project?

[1] 'Measures' here implies quantitative measures; 'other evidence' implies qualitative evidence. Ideally, the quantity, quality and timing of all these indicators must be specified.
[2] Cells A3 and B3 (with heavy outline) are expanded further in Part 2 of this paper.

Table 3. Hypothetical example of the Activities rows in a logframe

	A Summary	B Indicators[1]	C Means of verification	D Assumptions
3 Outputs	Five promising technologies identified for further testing and adaptation			
4 Activities 4a	Training for 40 farmers in simple experiment techniques (year 1)	**Inputs/resources:** Staff time Training handouts	Training attendance register Training handouts	**(Activity to Output):** Good weather at time of training
4b	Twenty field experiments to test and adapt technologies by end of year 2	Seed (50 kg) Staff time	Purchase receipts Farmers' diaries Experiment logbook	No prolonged drought Landlord allows access to borehole Seed obtainable from research station
4c	Three visits to assess technologies in other villages by end of year 1	Vehicle hire (9 days) Staff time	Farmers' diaries	Other villages willing to receive visits at convenient time

Figure 4. Widening spheres of information gathering for process projects



- *Therefore all known stakeholders should be involved from inception.*
- *The project process must be a joint learning process between stakeholders.*
- *The learning process is expected to build capacity and contribute to sustainability.*

Learning implies the ability to reflect on current practice within a project and, if necessary, adaptor change procedures and approaches."

O'Donovan goes on to argue that, in its emphasis on ownership and commitment, the process approach emphasises the **relationships** among stakeholders.[1] It relies at least in part for its success on the implicit relationships among these stakeholders. Furthermore, stakeholders need to learn not only about the factors directly controlled by the project (the innermost oval in Figure 4) or where it has some influence (the second oval). They also need to gather information about areas where it has no control but which may affect the project performance (the outermost oval).

Summary of experience

In summary, experience with process-type projects so far shows that:

(i) They involve complex interactions among stakeholders. A broad measure of agreement on stakeholders' priority needs must be obtained at the outset. It may, however, be impossible to obtain perfect agreement on priorities.

(ii) Process-type projects cope better than blueprint approaches in complex situations, where there may only be an indirect relationship between project activities and anticipated outputs, where tasks cannot be defined precisely at the outset, and where environments are uncertain.

(iii) Process projects require information to be gathered from within the project setting and from outside it. This information must be incorporated into sequences of decision-making. The project is therefore best treated in a number of stages.

(iv) In process-type projects, it may become clear that not all outputs are developing along intended lines. Some may generate more benefits than anticipated; others, less. Some may be relevant to stakeholders other than those initially thought of. The project should take stock of these issues periodically and seek agreement with stakeholders on how to proceed. Logframes for projects of this type may have to be modified yearly, or even every six months.

(v) Ways must be devised of incorporating into the logframe:
- The perspectives of different stakeholders
- Indicators and means of verification that allow important intangibles, such as the learning process, to be assessed.

New methods of monitoring process will have to be devised if logframes are to guide decision-making in process-type projects.

(vi) Process projects are likely to require more frequent monitoring and review than

conventional projects. Monitoring may rely mainly on qualitative information on progress, but should use quantitative information where possible.

(vii) Process approaches require an extended period of preparation, especially where the diverse needs of multiple stakeholders have to be taken into account, and all the effects of the project activities cannot be predicted beforehand.

(viii) It is important to set out the purpose of a project as soon as a broad measure of consensus among stakeholders is achieved. The concern with process should not distract attention away from defining the activities and corresponding outputs which contribute to the purpose.

(ix) If they are to achieve their purpose in a sustainable fashion, process projects must go beyond narrowly defined activities. They must also develop human resources and institutional capital, including complementary linkages among organisations.

1.6 Monitoring as part of management

Establishing administrative procedures for collecting data

Many researchers, especially the more field-oriented ones, find report-writing burdensome. Routine reports are submitted late, or are too sketchy to be useful. Information that is valuable for project management is lost. The result: managers complain that the field staff lack initiative and do not report their work. Field staff complain that managers are out of touch. These problems are magnified if the project is running activities in widely separated, remote field sites.

It is important to develop a smooth administrative procedure for collecting, reporting and analysing information. This should include the following:

(i) **Assign clear responsibilities for reporting monitoring information.** Staff should know whose job it is to collect information, write it up, and analyse it. A shared responsibility is often nobody's responsibility.

(ii) **Link monitoring with the reward system.** Staff should be rewarded for submitting clear, informative information on time, and penalised if they do not.

(iii) **Quantify where possible, qualify where necessary.** It is easier for field staff to collect and report quantitative data (numbers of farmers attending meetings, yield from an experiment plot) than qualitative information (whether the farmers thought the meeting was useful, whether they like the taste of the grain). Numbers are also easier to aggregate and analyse than are words. The project management can develop standard procedures to collect such information, and can design forms to report it (see below).

(iv) **Use a standard format for reporting raw information.** A blank piece of paper is a horror for people unused to writing. Projects should develop a simple, standard format for monitoring reports. The headings can be derived from the logframe.

(v) **Collect information using forms.** Using forms to collect monitoring information has many advantages:they are (or should be) easy to fill in;they show the types of information that should be collected; they enable managers to collect similar data from several sites and aggregate it for analysis.

(vi) **Do not reinvent the wheel.** This paper exhorts readers to develop their own measures to suit their own situation, but there is no point in developing a new method if one exists already. Managers are encouraged to learn from

Box 1. Monitoring for management purposes - how not to do it

Already in its second year, one government-run agricultural research and development project still had not determined how to monitor its activities. The donor's monitoring guidelines were vague, and most of the project managers were inexperienced. The project wasted large amounts of time on meetings discussing what to measure and the administrative procedures needed to collect the data. A succession of consultants (none experienced in project monitoring) advised the managers first to do one thing, then another. In the meantime, the project continued to use the monitoring system developed for a forerunner project, even though this had rather different aims and activities.

This confusion had several adverse effects:

- The lack of clarity about project goals led to confusion among field staff. Unclear about the project directions, their efforts were unfocused. Many had come from the forerunner project and were used to working in a directive manner, so were unfamiliar with participatory techniques. The use of the previous monitoring system biased them to continue using approaches they had used before, but which were no longer appropriate.
- At the management's behest, the field staff collected and analysed large amounts of overly detailed, irrelevant data. Because there was no procedure for them to do so, they did not report valuable (often qualitative) information that might lead to changes in the project's course.
- When time came to report to the donor, some data were missing, and the remainder needed a lot of effort to adapt them into the required format.

A clear monitoring system, based on a carefully constructed logframe, could have helped overcome some of these problems. The Goals, Purposes, Outputs and Activities would have been specified carefully, and there would have been a clear relationship among them. The indicators would also be known, so the field staff would have collected the right types of information. And the whole set of information would have been in a form easy to report to the donor.

other projects and select those measures (including the data collection procedures and forms) that have proved useful there.

(vii) **Integrate monitoring with financial management.** In many projects, the management of the research is separate from the financial management. Two sets of monitoring information must be collected from field sites: research reports and financial accounts. Financial data are necessary to measure certain monitoring indicators, such as travel and input supplies purchased. It should be possible to design monitoring systems that at least partially combine the two sets of information. This could eliminate duplicated effort and ensure that the two sets of information match.

(viii) **Monitor firmly and frequently** - and use the results. Frequent monitoring is necessary if it is to guide management decision-making. The findings from monitoring should be used to guide management decisions - not (as is sometimes sadly the case) confined to the filing cabinet or donor report.

(ix) **Visit the field.** A good paper-based monitoring system is no substitute for frequent visits to the field by project managers (especially to remote, more difficult sites). But neither are such field visits a substitute for a good paper-based system. The paper-based system and visits should be complementary. Detailed data are reported on paper (so it is not necessary to devote scarce management time to collecting them), while visits can be used to clarify areas of concern and to focus on qualitative features that are difficult to express on paper.

Following the donor's guidelines

Most donors provide guidelines on how they want the project to be monitored. They give details on types of information to collect, format for the report, etc. In many cases, it makes sense to collect the data in the donor-preferred format. This eases the preparation of donor reports and avoids much tearing of hair when trying to finesse the wrong type of data into the required format.

Problems arise where an implementing organisation has its own procedures for collecting and reporting data that do not match the donor's. Such problems also occur if a project is supported by more than one donor, each with different reporting requirements. In such cases, project managers must make sure that the information collected is enough to satisfy all these requirements. Some donors may be open to a different mode of reporting from the one they suggest. Project implementers should check with the donor if their format is acceptable before proceeding.

2 Using logframes for monitoring FPR

2.1 A generic logframe for FPR

Table 4 offers a generic logframe for FPR. It suggests what FPR projects might typically aim to achieve at the Goal, Purpose, Output and Activity levels. However, the precise combinations of activities and outputs must be identified on a project-by-project basis.

We have included as rows in this logframe the three concerns of FPR identified by Mosse (1995) and discussed in section 1.3 above. At the Purpose level (row 2), the concern with **improved agricultural productivity** is reflected in row 2a. At the Output level, this concern is shown in row 3a, and at the Activity level, in row 4a. In the same way, **human resource development** is shown in rows 2b, 3b and 4b. **Institutional development** is reflected in rows 2c, 3c and 4c.

We assume that all FPR projects (both those concerned mainly with agricultural productivity and those focusing on empowerment) seek to enhance agricultural productivity. Rows 2a, 3a and 4a (or some adaptation of them) will therefore appear in logframes for all FPR projects.

In addition to improving productivity, the more empowering projects (typically those under NGOs) may also aim to enhance human resource skills or strengthen institutions, as discussed in section 1.2. For these projects, rows 2b, 3b and 4b, and 2c, 3c and 4c are relevant. For projects that do not have an empowering agenda, these rows can be ignored.

Columns B — D of this 'generic' logframe contain fairly broad statements on the indicators of performance, the means of verifying (measuring) these, and the assumptions that must hold if the Activities are to lead to the expected Outputs, the Outputs to the Purpose, and the Purpose to the Goal.

Much of the remainder of this paper focuses on refining and expanding column B: the indicators that are used to measure project performance. We have done this by building into the logframe two key features of process-type projects discussed in section 1.5:

- The fact that different stakeholder groups may assess the project performance in different ways. We do this by dividing vertically the Indicators and Means of Verification columns (columns B and C) vertically: one for each group of stakeholders. This is shown in the column headings of Table 4.
- The need to assess intangibles such as the learning process. We do this by dividing each row horizontally between the 'products' produced by the project and the 'processes' used to attain them.

Table 4. Generic logframe for farmer participatory research projects

	A Summary	B Indicators	C Means of verification	D Assumptions
1 Goal 1	Livelihoods of producers and consumers enhanced through more efficient agricultural production	Real change in per capita incomes over time	Published statistics Focused surveys	
Purpose 2a	Improved agricultural productivity through adoption of needs-based technologies	Changes in physical productivity of and financial returns to individual farm enterprises, common pool resources, etc. in relation to types of technologies adopted	Published statistics Focused surveys Key informant interviews	**(Purpose to Goal)** Technologies can be identified and adopted which make a substantial difference to physical/financial performance of farm enterprises and/or common pool resource management
2b	Sustainability of agricultural change enhanced through human resource development	Changes in capacity of farmers to obtain advice and inputs in support of technical change, secure market outlets, etc., and in the capacity of NGO and GO staff to support them.	Focused surveys Key informant interviews	Farming communities coherent/homogeneous enough to permit rapid and wide adoption of technologies Linkages to input supply, advice, markets, etc., can be made
2c	Sustainability of agricultural change enhanced through institutional development	Changes in capacity of farmers' organisations and NGOs to draw on gov't services, influence research & extension agenda, implement joint activities, etc.	Records, minutes of meetings Focused surveys Key informant interviews	Government organisations willing to respond to requests from NGOs/farmers' organisations and to undertake joint activities
Outputs 3a	Technologies identified, developed and adopted using participatory methods	Over a given time period: Number, type and characteristics of technologies identified/developed and adopted	Focused surveys Key informant interviews	**(Outputs to Purpose)** Farmers see that new technologies can address constraints; new technologies exist (or can be developed) to address them
3b	Human resources developed using participatory methods	Changes in capacity of farmers to screen, test and implement technologies, and of NGO and GO staff to support them	Focused surveys Key informant interviews	Farmers demonstrate interest in active role in identifying technologies and experimenting
3c	Institutions strengthened using participatory methods	Changes in the capacity of farmers' organisations and NGOs to identify and test relevant technologies	Records, minutes of meetings Focused surveys Key informant interviews	Farmers' organisations and NGOs strong/numerous enough to support farmer experimentation. Gov't services and NGOs/farmers' organisations willing to work together
4 Activities	Participatory methods developed, tested, documented and promoted which enhance the efficiency of:	Resources to be provided over what periods, at what cost, from what sources	Financial and other records	**(Activities to Outputs)** Resources available and official approval obtained on schedule; partner organisations perform agreed roles.
4a	Technical change			
4b	Human resource development			
4c	Institutional strengthening			

2.2 *The 'Outputs' level of the logframe*

Performance indicators

Tables 5-7 show in more detail the Outputs and the Indicators that could be used for a typical FPR project. They are an elaboration of the first two columns of row 3 (enclosed by a heavy line) in Table 4.

We have chosen the Output level because it is the most appropriate for a general guide of this type. In process-type projects, monitoring of Outputs allows corrective action to be taken before the project is too far advanced. At the Activities level, indicators can derive from the resources made available in order to undertake the activities. At the Purpose level, indicators provide signals later in the project's life.

Table 5 shows Outputs and their Indicators for the functional concern of increasing agricultural productivity (corresponding to row 3a in Table 4). Table 6 shows the Outputs and associated Indicators for the human resources development aspect (row 3b

Table 5. Output row of generic logframe for agricultural productivity concerns

	A Summary	BR Researchers' indicators	BF Farmers' indicators
Outputs 3a1	Needs-based technologies identified, developed and adopted by using participatory methods in: 1 Adaptive research into, and dissemination of, specific technologies	*n* technologies developed, taken up by *x* farmers within *y* time period. Net additional value of FPR divided by its net additional cost > Net additional value of conventional research divided by its net additional cost	FPR develops technologies that meet farmers' criteria for yield, drought tolerance, pest and disease resistance, plant architecture, suitability for intercropping, cooking, processing and storage qualities, colour, size, etc. Technologies and outputs are compatible with wider opportunities and constraints, belief systems, and indigenous knowledge.
3a2	2 Prioritisation of GO's and NGOs' agenda for research at adaptive, applied and strategic levels	*For farmer visits to GO experiments*: No. of farmers visiting; % active in discussion; no. of ideas per 100 farmer visits that lead to modification of existing research, new research, re-ranking of priorities... *For research prioritisation meetings*: No. of positions for farmers; their attendance records; their representativeness; frequency of meetings; % of resources allocated in response to farmer requests at the end vs. start of project.	% of technologies that farmers see as relevant; their view of whether this has changed over time. Farmers' view of how far research priorities respond to their concerns.
	Process issues	• What is socio-economic & technical sustainability of technologies & external inputs? • How are technologies distributed among sub-groups of rural people (collaborators and others)? • What are the spillover effects of the technology? How are they distributed?. • Can time or money be saved by working with key informants? • What are merits of groups vs. individualistic approaches? • What are merits of different depths of participation and different techniques at various points in the research. • Do the researcher time and cost inputs produce sufficient information valuable for prioritising research and testing technologies? • What are socio-economic characteristics of farmers who do and do not participate? What bias results, and how to deal with this? • Do farmers understand technical issues? Does any lack of understanding hamper priority setting? • What are the differences between farmers' and researchers' priorities? Whose priorities are followed?	• How far do technical constraints stop farmers from achieving their goals? • Have changing circumstances made farmers more demanding, and so kept them dissatisfied? • Do farmers think the amount of time they devote to FPR and spreading technologies is reasonable? Does FPR clash with other commitments? • Do researchers seriously consider farmers' views? • How has the context changed? (e.g. reduced funding for research and extension may increase demands on farmers' time)

in Table 4). Table 7 shows Outputs and Indicators for the institutional development aspect (3c in Table 4).

Stakeholders

Tables 5–7 show indicators seperately that might correspond with the perspectives of two groups of stakeholders: researchers (whether in government departments, NGOs, universities or special projects), and farmers. Broadly defined, stakeholders are all those who might in any way be affected by an intervention. For practical reasons, we limit this presentation to these two groups of principal stakeholders.

Note that FPR performance indicators from farmers' own perspectives have been discussed very little in the literature. The indicators are likely to be very specific to particular situations. The ones presented here are therefore only indicative. Readers can, of course, develop similar indicators for sub-groups of farmers (by type of enterprise, resource endowments or gender) and researchers (government, university, NGO). Readers can also introduce completely new categories, such as the private commercial sector, and develop indicators for each.

Table 6. Output row of generic logframe for human resource development concerns

	A Summary	BR Researchers' indicators	BF Farmers' indicators
Outputs 3b1	Human resources developed using participatory methods to enhance capacity of farmers and GO & NGO staff to engage in technological change, via: 1 Enhanced farmer capacity to understand technology opportunities and constraints; meet these from their own resources; and screen, test, assess and disseminate technologies jointly with researchers.	No. of technical changes considered by farmers rises by *x*% per year Time spent by researchers in obtaining farmers' views on candidate technologies falls by *x*% over *y* years No. of suggestions from farmers for new joint experiments rises by *x*% over *y* years	Farmers able to outline agro-ecological and socio-economic conditions of village, and to predict more accurately the acceptability and impact of individual technologies. Farmers more readily articulate these conditions to researchers.
3b2	2 Enhanced farmer capacity to conduct experiments designed jointly with researchers	No. of joint experiments rises by *x*% over *y* years Proportion of mismanaged experiments falls by *x*% over *y* years	Farmers' criteria and management practices are more fully accepted in design and implementation of joint experiments.
3b3	3 Enhanced farmer capacity to design their own experiments	Number of farmers' own experiments increases by *x*% in *y* years	Number of new inputs/combinations of inputs/management practices incorporated into a given number of farmers' experiments over *n* years increases by *x*%.
3b4	4 Enhanced farmer capacity to respond to unforeseen events	Farmers replant after early drought or respond to pest/disease attack quicker than before	Reduced time and greater accuracy than previously in a wide range of decisions.
3b5	5 Enhanced skills of GO & NGO staff in using participatory methods	*n* GO and NGO staff trained in participatory techniques over *x* years	Farmers able more easily to obtain GO/NGO responses to articulated needs and opportunities.
3b6	6 Enhanced skills of GO & NGO staff to support and interact with groups	Increased no. of groups in activities where group action is more beneficial than individual action Groups are self-sustaining for longer	Farmers express increased confidence in working in groups.
	'Process' issues	• What are socio-economic characteristics of farmers most actively considering technical options? • What are characteristics of technologies being considered? How far these may impact negatively on some sectors of the community? • Is there bias in skill/techniques to particular types of technical change, stages in the research cycle, or sub-sets of clientele? • What are positive or negative side-effects of experiments (such on farmers' capacity to conduct their own tests)? • Does researchers' focus on efficiency lead to neglecting farmers' needs or using methods inappropriate to farmers, labourers or other groups? • Do tests maximise the value of adoptable technologies per unit of researcher effort? Can the results be generalised to other areas? • Does training maximise learning per unit of researcher/trainer effort? • Do groups maximise their capacity to assess and introduce technical change?	• How far do farmers gain capacity not only to conduct specific trials, but also to screen, test and select technologies? • Are farmers' criteria and management practices compatible with environmental sustainability? • Are tests constrained by access to materials? • Can GOs/NGOs respond to ever more complex requests? • Are activities needing group action and those needing individual action identified early on? • What are strengths and weaknesses of each method used to: • Help farmers analyse and articulate their needs • Translate their criteria and management practices into joint experiments • Select ideas and acquire materials for experiments • Speed and improve accuracy of decisions on other questions • Obtain responses from NGOs and GOs. • How far do the formation of, support for, and performance of groups meet farmers' criteria?

Table 7. Output row of generic logframe for institutional development concerns

	A Summary	BR Researchers' indicators	BF Farmers' indicators
Outputs 3c1	Capacity of institutions supporting technical change in agriculture enhanced through participatory methods, specifically via: Enhanced capacity of GOs & NGOs to deliver inputs and services (including R&E) in response FPR findings	% of cases where GOs & NGOs fail to respond to requirements identified by FPR falls by *x*% over *y* years Average lag in GO/NGO response to requirements identified by FPR falls by *x*% over *y* years % of non-responses by GOs and NGOs to requirements identified by FPR falls by *x*% over *y* years	Amount of farmers' time spent in fruitless negotiation with NGOs and GOs reduced by *x*% over *y* years
3c2	Enhanced capacity of farmers' organisations to develop need-based technology	No. of adopted technologies developed by farmers' organisations increases by *x*% over *y* years	No. of adopted technologies developed by farmers' organisations increases by *x*% over *y* years
3c3	Enhanced capacity of farmers' organisations and groups to create demands on NGOs and public sector	No. of demands from farmers' organisations rises by *x*% over *y* years No. of demands from farmers' organisations rises relative to number from individuals	No. of demands from farmers' organisations rises by *x*% over *y* years No. of demands from farmers' organisations rises relative to number from individuals
3c4	Strengthened capacity of GOs and NGOs to train and share experiences	Average of *x* training or refresher courses held per year By year *y*, *x* examples can be cited in each NGO and GO of sharing of lessons	*x*% of training curricula contain at least *y* ideas from farmers by year *z*
3c5	Strengthened ability to use multi-agency approaches to FPR, involving GOs, NGOs and farmers' organisations jointly	No. of multi-agency initiatives yielding adoptable technologies rises by an average *x*% per year	No. of multi-agency initiatives yielding adoptable technologies rises by an average *x*% per year
	'Process' Issues	• Are activities biased to specific types of technology or sub-groups? • Do revised training approaches improve interaction between researchers and low resource farmers? • Do multi-agency approaches lead to design and adoption of technologies more appropriate to low-income farmers? • Is conventional training supplemented by hands-on practicals? • Do NGOs and GOs jointly identify areas where they have shared objectives? Do they design and implement joint FPR activities? Do they monitor progress and make corrections where necessary? Do they jointly assess outcomes and incorporate lessons into planning? • Do NGOs & GOs have enough 'common ground' to work together? Does the common ground broaden over time?	• How far does change in agro-ecological or socio-economic context of farming increase the complexity of farmers' demands? • Do technical changes introduced by farmers' organisations conform with traditional cultural values, belief systems, indigenous knowledge...? • How far do multi-agency initiatives address the principal constraints or opportunities perceived by farmers? • Do NGO & GO staff understand and respond to farmers' needs? • Can farmers involved in experimentation, advisory services and input supply influence GOs directly, or via NGOs? • Do reward systems in the public sector encourage or inhibit multi-agency approaches? Can changes can be made?

'Products' and 'processes'

As noted in section 1.5, it is important to monitor not only the 'products' of a project (the technologies tested and adapted, financial costs and benefits, etc., but also the processes used in the project. For each Output, Tables 5-7 also show Indicators for the 'processes' as well as the 'products'.

An insistence on objectively verifiable indicators presents two difficulties for FPR projects:

(i) Many of the indicators, especially those concerned with processes as distinct from products, are likely to be entirely qualitative. Appendix 3 gives a general overview of the main differences between quantitative and qualitative approaches. Specific techniques, such as 'process documentation and monitoring', may have to be developed or adapted to document these indicators adequately and incorporate them into the overall assessment. These techniques are complementary to logframe approaches.

(ii) It may be difficult objectively to verify some of the indicators, especially those drawn from the farmers' point of view. At least some of these indicators will be subjective. Farmers can be asked how to verify them, but the means of verification may still be less than fully objective.

In each of Tables 5, 6 and 7, the first group of indicators relate to the intended, tangible 'products' to be generated by the Outputs. Many of these are

quantifiable and time-bound, so meet logframe criteria. A set of questions on 'process' issues is then presented in the Indicators column. These questions cover the following:

- criteria that may be important to one or other stakeholder group in arriving at the intended outputs;
- potentially important outputs, other than those which are directly quantifiable;
- issues which, if not addressed, may lead to outputs other than those intended.

Some of the process issues relate closely to the 'product' indicators listed above. Others are more general in nature. Users should choose those process issues that are relevant for their own project and convert them into verifiable indicators.

2.3 Means of verification

Table 4 (column C) suggests some generic means of verification that might be appropriate. However, Tables 5-7 do not include means of verification since these vary widely according to circumstances. Readers should develop these themselves, where possible through participation with farmers and other stakeholders. It is impossible to identify appropriate means of verification until the indicators have been agreed.

However, we can give a number of examples of the types of means of verification that might be used. Appendix 3 reviews a range of indicators commonly used in FPR.

Means of verification for improved productivity

To measure improved productivity, (Row 3a in Table 4, and the contents of Table 5), farm-level data must be collected to discover how far the new technologies have been adopted. How this is best done will vary. The project can: use data routinely collected by government statistical or agricultural services; collect its own information using rapid assessments; use in-depth surveys (including, for example, plot and yield measurement).

Discovering whether participatory methods develop new technologies more efficiently than conventional methods requires, in addition, an analysis of records of researchers' time allocations, field travel costs etc., in comparison to the costs and benefits of implementing non-participatory methods of research. Clearly, detailed quantitative comparison of costs and benefits among methods needs a lot of data, and will be feasible only in the most favourable circumstances (but see Magrath *et al.* (1997) for one option.

Analysing how far research priorities have changed after taking into account farmers' ideas means reviewing the records of discussions and formal meetings, attendance lists, and records of resource allocations at research stations.

As the indicators in this area become more sophisticated, the amount of information needed can rise dramatically. However, relatively cheap rapid appraisal methods can help keep a broad check on, for instance, the effects of technical change on different sub-groups of clients. It might also be possible to adapt such appraisal techniques to obtain information from researchers as well as from farmers.

Data collection and the means of verification must relate to the criteria set by both researcher and farmers. For crop improvement, for instance, these criteria may have to cover more than just grain yield alone; they may also have to include drought tolerance, pest and disease resistance, straw production, processing qualities, and other features of concern to farmers.

Means of verification for human resource development

To measure human resource development, (Row 3b in Table 4, and the contents of Table 6), a similarly broad range of means of verification is needed. The project will have to question farmers about the number of technical options they are considering, the number and type of their own experiments, and their response to unforeseen events. This questioning will also shed light on any distributional effects. Rapid appraisals can be used to generate much of this information. Levels of participation in formal courses can be obtained from course registration records.

Much qualitative information will be needed to permit adequate interpretation of the numerical data. This qualitative information can be collected by interviews, surveys and observation of field practice. Many of the same means of verification can also be used to measure the criteria important to farmers.

Means of verification for institutional strengthening

To measure institutional development, (Row 3c in Table 4, and the contents of Table 7), an array of means of verification is also needed. These may include: interviews and surveys of farmers and researchers to assess performance, as well as 'tracer' studies, for instance, to assess the lag in NGO or GO response to specific requests made by farmers.

As above, much of the necessary information will be qualitative. Examples include information on changes in training, institutional learning and inter-organisational collaboration.

Institutional change is often a long-term process which is difficult to assess. It may be necessary to consider events far removed from the farm setting. For instance, changes in the way organisations reward their staff or assess their performance may be essential before participatory approaches are adopted more widely in the public sector. The nature and extent of such changes, and how quickly they are introduced,

Table 8. Typical project activities

4a Improved agricultural productivity (produce Outputs in Table 5)	1 Select and refine the participatory methods to be used. Develop new methods if necessary. 2 Use these methods to: • Assess needs. • Screen technical options. • Implement experiments. • Assess outcomes. • Disseminate preferred technologies. 3 Obtain farmers' ideas on future research priorities through informal interaction or formal meetings.
4b Human resource development (produce Outputs in Table 7)	1 GOs and/or NGOs together with farmers: • Assess needs. • Screen technology options, conduct experiments, assess outcomes, disseminate results. 2 NGO and GO staff observe and learn from each others' and farmers' experiments. 3 Farmers observe and learn from NGO, GO and other farmers' experiments. 4 Farmers receive training in skills (agriculture, leadership, group formation, conflict resolution, negotiations with outside agencies...) from GO/NGO staff. 5 Farmers train GO/NGO staff and other farmers. 6 NGO/GO staff trained in technology-related skills
4c Institutional development (produce Outputs in Table 7)	Meetings, field visits, experiments, training courses, documentation to: 1 Re-orient GOs away from top-down and towards needs-responsive provision of services and inputs. 2 Strengthen technical capabilities of GOs, NGOs and farmers' organisations. 3 Scale-up the participatory approaches used. 4 Enhance institutional learning, including reflecting on earlier experiences and incorporating them into current activities. 5 Enhance organisations' capacity to monitor and review their own performance and feed lessons into new activities. 6 Increase resilience of institutional procedures and systems in the face of staff transfer, absences, etc. 7 Improve reporting on field visits, preparation of agenda for meetings, minute-taking, and other procedures.

may therefore be valuable indicators of institutional change. This means that it may be necessary to include government regulations and operating procedures among the means of verification.

2.4 Activities

Table 8 lists a typical set of Activities that aim to produce the Outputs in Tables 5-7. These activities correspond to the cells in the first column of rows 4a, 4b and 4c in Table 4.

While these Activities may be typical of many FPR projects, readers should revise and adapt them as necessary for their own situations. The types of inputs required (and therefore the Indicators and Means of Verification used to measure the Activities) will vary widely from place to place. In constructing the Activities row of the logframe (row 4 in Table 4), readers will have to determine their own items to include in these cells.

The task of collecting monitoring information itself may involve a significant amount of effort and money. It may have to be included as an Activity in the logframe.

3 Further dimensions of monitoring and review

A number of recurrent concerns arise in the discussion of indicators and means of verification in Part 2. This section addresses four of them. They are: conflicting interests of different stakeholders; the distributional impact of change; the contexts in which group approaches are stronger than individual approaches, and how to assess their performance; and the contexts in which multi-agency approaches have advantages

over individual approaches, and how to assess their performance.

3.1 Conflicting interests of stakeholders

As discussed above, the verifiable indicators must reflect the interests of different stakeholders. In FPR, the two main groups of stakeholders are the project implementers (e.g. an NGO or government research unit), and farmers. Other stakeholders may also have to be included. For instance, a project on livestock nutrition may have to consider how non-livestock holders might also use fodder trees. In an area in which pastoralists graze their livestock on crop residues in the off-season, a project on soil fertility will have to take their interests into account as well as those of the arable farmers.

Comparison between the final two columns in Tables 5, 6 and 7 shows that the project stakeholders may differ in their ideas of project success. There is no guarantee that the interests of different stakeholders will be mutually compatible. Or, they may be compatible at the outset, but then diverge as the project progresses. For instance, farmers' concerns with risk, processing quality, etc., may not be the same as researchers'. There may also be tensions over how much time participatory approaches take.

The possibility of divergent, even conflicting, indicators derived from these criteria must therefore be explicitly recognised. Project preparation and implementation relies on discussion among stakeholders to resolve such differences. In reality, however, the differences may be so wide that only an uneasy compromise can be reached. Where the compromise breaks down and views on 'success' diverge, the project will, at best, have to be reformulated and, at worst, abandoned altogether. Complementary techniques such as process documentation and monitoring can be used to keep track of changing expectations and performance criteria (Farrington and Rangnekar (eds) 1997; Mosse *et al.* (eds) (forthcoming).

3.2 Assessing distributional impact

Who gains or loses from FPR? To answer this question, we must first divide the intended beneficiaries (i.e. the stakeholder group broadly referred to above as 'farmers') into sub-sets. These can be grouped according to their:

- land type (the extent of irrigation; slope; fertility; risk of flooding...);
- size of holding (including, where relevant, those with no land at all);
- type and security of land tenure;
- access to other resources;
- farming system (crops only; crops and livestock; perennial crops only...);
- period of residence;
- income or wealth;
- age and gender.

The next step is to design a series of questions to assess the potential impact of change on the sub-sets concerned. Box 2 contains sample questions on the gender impacts of a specific project. Most of these questions could be adapted and used for the other categories listed above.

A further step is then to define indicators for monitoring the changes caused by the project. Thus, for instance, an FPR project may be expected to reduce the amount of time spent by women in field operations by *x%* over *y* years (without any negative effects on crop performance or on women's rights and responsibilities). Interviews and surveys of various kinds, including rapid appraisal techniques, might then be used to verify these indicators.

We can portray these measures in logframe form (Table 9).

3.3 Group approaches

Is a group approach better than working with individuals? What are the strengths and weaknesses of using groups? These questions arose several times in section 2. We discuss them further here.

Section 1 suggests that government research and extension services are concerned primarily with using FPR as a consultative device to enhance the efficiency of the functions of technology development and dissemination, whereas NGOs are more concerned with longer-term questions of empowering

Box 2. Assessing distributional impact: gender concerns

A gender appraisal involves asking a set of key questions of any proposed activity:

- Which role of women does the activity address (productive, reproductive or managerial), and how?
- Which of women's informal 'areas of influence' will be affected directly or indirectly by the activity?
- Are the managerial aspects of women's existing roles enhanced (e.g. increased access to technology, information)?
- How compatible is the activity with existing demands on women (e.g. time, labour)?
- What practical needs/interests of women are addressed?
- How will the activity address women's strategic needs/interests (e.g. what opportunities does the activity have for enhancing women's access to, and control over, resources?
- What changes are required in the design of the activity to ensure a better gender focus?
- What support is needed by the local membership group, external project, NGO etc. to implement these changes?

Source: Mosse, D. (pers. comm). See also Goldey *et al.* (forthcoming).

Table 9. Sample output row for amount of time women spend

	A Summary	B Indicators	C Means of verification
Output	Reduced time spent by women in field operations (without negative effects on the crop or women's rights and responsibilities)	% of time spent by women in field operations	Interviews Survey (rapid appraisal)

marginalised rural people. These differences are reflected in the types of groups favoured by government departments and NGOs and the ways in which they work with them.

Temporary farmers' groups

Many objectives of government departments can be met by temporary groups brought together for specific purposes. These might include, for instance, assessing particular technologies or eliciting farmers' priority needs for future research. In such cases, researchers may wish to obtain the views of a representative cross-section of the community, or of specific sub-sets. They will therefore be concerned with indicators such as how far group membership represents one or other category of the community. They will also wish to know whether working with groups to design and disseminate new technologies is more efficient than are individualistic approaches.

Permanent farmer groups

It is impossible for temporary groups to deal with certain issues, such as managing externalities (such as pests), and managing common pool resources (such as grazing land, forest, water and, in some places, soil).

- **Externalities.** Many types of pest (insects, diseases and weeds) move freely from one farm to another. If one farmer does not control them, there will be negative external effects on neighbouring farms. Furthermore, control measures are likely to be more efficient if they are implemented jointly than individually. A more permanent, cohesive group of farmers is needed to ensure this happens.
- Common **pool resources.** The same arguments apply to the management of common pool resources. Many of these resources are managed principally off-farm, for instance in the upper reaches of micro-catchments. A cohesive group is needed to determine the rights and responsibilities of individual members, to implement decisions on access rights, and to resolve conflicts with other villages or individuals.

NGOs' philosophies towards working with groups vary widely. A minority see groups as a vehicle for consulting with farmers to enhance the efficiency of technology development and dissemination — in much the same way as do government departments. Typically, though, NGOs see groups in a fundamentally empowering vein. Many marginalised farmers lack the self-confidence and skills to examine the causes of their condition. They are also unable to address these causes, either by drawing on their own resources or by making demands on outside agencies such as government or NGOs. As individuals, farmers lack the strength to negotiate with merchants, landowners or local elites. NGOs see strong, democratic groups as an effective means of representing the interests of the poor over the long term. Eventually, they hope, these groups will no

Table 10. Relationships between type of farmers' group, implementing organisation, and their typical roles in farmer participatory research

Type of group	Typically formed by/work with	Typical roles in FPR	See
Temporary	**Government, NGOs**	**Consultative, functional:** • **Diagnose, test, disseminate technologies**	**Table 11**
Permanent	**NGOs**	**Consultative, functional:** • **Diagnose, test,** disseminate technologies **Empowering:** • **Manage externalities (e.g. pest control)** • **Manage common pool resources (e.g. water, trees)**	**Tables 11 and 12** **Table 12**

Table 11. Indicators of the performance of temporary groups in relation to technology development

	A Summary	B Verifiable indicators		
		BR Government researchers' criteria	BN NGOs' criteria	BF Farmers' criteria
Outputs 3c	1 Groups capable of enhancing the function of technology development formed.	*n* groups formed by year *x* Time spent by researchers in obtaining farmers' views on *x* candidate technologies falls by *y*% over *z* years compared with individual approaches Suggestions from farmers for new joint experiments rises by *x*% over *y* years compared with individual approaches Number of farmers' own experiments rises by *x*% over *y* years compared with individual approaches Once appropriate technologies are identified, they spread to *x*% of farming community within *y* years compared with individual approaches		Adoptable technologies rise by *x*% over *y* years compared with individual approaches, but without proportional rise in costs (especially of farmers' time)
	Process issues	• Group dynamics allow participation of a high proportion of group members • Groups' composition reflects desired sub-sets of farming population • Group retains adequate cohesion to provide consistent assessment of a technology over necessary minimum time (eg, one season) • Groups' performance will be influenced by the likelihood that group views more readily obtained, or group-based dissemination more readily achieved, in some types of technology than others	Processes of group formation should allow them to be constituted in ways permitting progression to more permanent status	• Overall amount of time required of farmers in group approaches not perceived as excessive • Group approaches do not require sharing of ideas to an extent that may prejudice individual pursuit of profit • Groups more effective in acquiring technologies from others than are individual approaches • Needs assessment, screening of options, design of experiments and assessment of outcomes performed more efficiently under group than individual approaches • Possible tensions over what is done collectively and what is done individually need to be addressed. For instance, experimentation itself is likely to remain individual as far as *agricultural* technologies are concerned

Note: For government researchers and NGOs (columns BR and BN), the indicators apply to groups in general. For farmers, they apply only to the one group to which they belong.

longer need the outside support that is needed at first. Permanent, democratic groups are more likely to result in increased human capacity of farmers (Outputs in Table 6) and their organisations (Table 7) than if the groups are merely temporary.

Indicators of group performance

Tables 11 and 12 present typical performance indicators for approaches to working with groups. Table 12 considers **temporary** groups. The tables list indicators that might be used for three different types of stakeholders: government researchers, NGOs, and the group members themselves. The indicators also differ by stakeholder type:

- **Government researchers' indicators.** For both temporary and permanent groups, government researchers will typically be concerned with how efficient the group is as an agent of technical change. For permanent groups (column BR in Table 12), they may also be concerned with the group cohesiveness, which will influence its effectiveness in managing externalities and common pool resources.
- NGOs' **indicators.** For temporary groups (column BN in Table 11), NGOs may apply many of the same criteria as government researchers. They may also hope that groups be constituted so it is easy for them to become more permanent. For permanent groups (column BN in Table 12), NGOs are interested in some of the same indicators as researchers, but they are likely also to include indicators of group organisation and management. For instance, they will hope that office-bearers change on a regular and transparent basis, that the groups undertake new types of activities, that disadvantaged elements play an active role, and that groups become self-sustaining.
- **Farmers' indicators.** Farmers' ideas of what makes an effective group are likely to vary widely. One of the early tasks for a project should be identify a set of criteria upon which most collaborating farmers agree. Tables 11 and 12 tentatively suggest criteria which farmers may typically share. For temporary groups (Column BF in Table 11), farmers may want to know how effective the group is in identifying and accessing technology, and how much of their time it will take up. For more permanent groups (Column BF in Table 12), farmers may want to know how effective the group is in solving externality problems and in managing common resources. They may also want the group to define the rights and responsibilities of people who use the common resources, and to

Table 12. Indicators of performance of permanent groups in relation to managing externalities

	A Summary	B Verifiable indicators		BF Farmers' criteria
		BR Government researchers' criteria	BN NGOs' criteria	
Outputs 3c	1 Groups formed able to manage externalities in agricultural production and common pool resources	Suggestions from farmers for new joint experiments with management practices rises by *x*% over *y* years (compared with individual approaches) No. of farmers' own experiments rises by *x*% over *y* years (compared with individual approaches) Groups agree to jointly implement *x* on-farm interventions over *y* years Groups agree on rights & responsibilities in managing common resources (trees, grazing land, etc.) on *x* area over *y* years Appropriate management practices spread *x*% faster than with individual approaches		Advantages of the group's managing externalities outweigh the cost of time needed Improved technologies and rights and responsibilities are applied to *a*% of the common pool resource in year 1, *b*% in year 2, etc.
		n groups formed by year *x* Groups include *x*% of farmers in area *y* within *z* years Time spent by researchers obtaining farmers' views on *z* management options falls by *x*% over *y* years (compared with individual approaches)		Available off-take of fodder, poles, minor forest products, etc., rises by *x*% over *y* years Changed practices in common pool areas do not lead to unmanageable conflict with other villages
	Process issues	• Can groups resolve conflict with others over access to resources? • Does group composition reflect desired sub-groups? • Are groups cohesive enough to agree on and implement on-farm interventions and manage common pool resources?		• Is group formation too long and drawn out? Must would-be members give too much of their time? • s group formation more than purely preparatory — does it also yield tangible benefits? • Is sufficient lead time allowed before benefits come on-stream? (Lead time will vary by type of activity, socio-economic setting, etc.)
		• Do groups consume too much researchers' time and other resources?	• Are groups formed and managed in a sufficiently accountable fashion that: - Their leadership changes regularly? - They can introduce and manage new activities such as savings schemes, and make agreements with banks? - They can put up candidates for local elections? - They can collaborate with and influence NGOs and GOs? - Marginalised elements in the village play an active part, or form a separate group? - Groups function without outside support after an agreed deadline? - They can consistently assess a technology over the minimum time needed (e.g. one season)? • Does the group give its views more readily for certain types of technology than for others? Is dissemination of some technologies easier?	

Note: For government researchers and NGOs (columns BR and BN), the indicators apply to groups in general. For farmers, they apply only to the one group to which they belong.

guard these resources in ways which do not lead to open conflict with neighbours.

3.4 Multi-agency approaches

FPR frequently seeks to strengthen the ability of organisations to work together. This aim is reflected in row 3c5 in Table 7. Much has been written in the last five years about the potential synergies of having NGOs (and, by implication, the farmer groups with which they work) work together with government research and extension organisations (see e.g. Farrington and Bebbington, 1993, and companion volumes). Very broadly, NGOs' strengths lie in:

- Close working relations with farmers, allowing participatory diagnosis of farmers' constraints and opportunities.
- Holistic, issue-oriented approaches which highlight constraints in farming, support services and such wider contexts as education, health and nutrition.
- A focus on improving livelihoods among the rural poor.
- A strong presence in remote areas in which the government's reach is weakest.
- Interest in creating demands on government services, where possible by strengthening local groups.

Further, NGOs often work with low external input, low risk, environmentally benign technologies. They try to develop and disseminate these in ways that reinforce indigenous knowledge systems and local institutions. However, NGOs are weak in defining technological problems precisely, and in devising solutions to the problems identified.

Government research organisations' strengths and weaknesses are the mirror image of those of NGOs: most are strong in devising new technologies, but few adequately identify clients' needs before doing so.

Two general factors might restrict NGO-GO interaction. First, NGOs vary widely in their philosophies, objectives, and mode and scale of operation. Governments also differ in the development policies and objectives they pursue, the role they envisage for the rural poor, and their capacities for implementing planned intervention. Second, each NGO has its own history and was created for specific purposes. Few NGOs confine themselves narrowly to specific functions. Many NGOs were established in opposition to inefficient, corrupt or repressive governments and may hesitate to become associated with them. Many governments are equally reluctant to engage with NGOs: some see them as potentially subversive; others see their development work as implied criticism of the state's shortcomings. Many resent what they see as the diversion of external funds into NGO activities.

There are also more specific constraints. NGOs and GOs may have different perspectives on the future of the rural poor. NGOs typically aim for economic and social self-determination by the rural poor in their existing settings; governments may view the rural poor as a pool of cheap labour which will respond to opportunities in more dynamic sectors. As discussed above, NGOs and GOs may have very different views of the purposes of participatory approaches. They may also have very different views on the purposes of collaboration. For instance, governments typically see NGOs as a way of reducing their operating costs in rural areas. Even if higher government officials see complementarities between the two sides, lower level staff may block collaboration because they feel that their own positions are threatened, for instance, by the transfer of village-level extension functions to NGOs. Yet, official policy in several countries continues to favour collaboration between the two sides in rural development. In some countries there is financial provision to allow NGOs to take over certain functions in defined areas.

An example: The Udaipur pilot programme

In India, some State Agriculture Departments encourage collaboration with NGOs of a type similar to that common in primary health care in India. One response to this is a pilot programme in Udaipur District, Rajasthan, supported by the Ford Foundation. This pilot effort comprises several initiatives:

(i) A district NGO-GO Forum enables NGOs and research and extension services to outline current activities, and plan cross-visits and joint projects in adaptive research, extension and training. The Forum is hosted by a government Farm Science Centre (FSC) which is located at an NGO, and so is regarded by each side as 'neutral' territory.

(ii) A small grant to the FSC allows it to plan training courses and demonstrations jointly with NGOs, in response to NGOs' (and it is assumed, farmers') requirements.

(iii) An agricultural research fund allows NGOs and farmer groups to commission problem-oriented research not currently being conducted.

(iv) Consultations with the state government aim to generate agreement on the state-level institutional arrangements necessary to facilitate closer NGO-GO collaboration in the district.

The project did not pre-set quantitative (or even qualitative) indicators of performance. Its concern has been more with identifying how interaction between the two sides might be intensified and monitored against expectations, so that necessary course corrections can be made. In logframe jargon, the concern has been more with the means of verification than with indicators. One prerequisite of closer interaction is that reward structures (such as promotion criteria and means of assessment) in government organisations should be changed. This is a key issue in all government research and extension organisations. The staff of the agricultural universities draw their salaries from core funds; as long as promotion is geared more to age than performance, there is little incentive to seek additional funds for research projects. Much the same applies to extension staff: they are unlikely to take risks by identifying and responding to farmer needs if they are rewarded on the basis of their achieving pre-set targets (e.g, number of demonstrations or training courses).

A number of (as yet, imprecisely formulated) indicators of performance are emerging, some common to the different actors, some differing markedly. Common to all actors is the objective of enhancing the flow of technologies adoptable by small-scale rainfed farmers so that livelihoods can be improved. However, substantial differences exist among the actors, not least over how this might be achieved:

- The **extension service** exploits its limited scope to respond to farmers' and NGOs' requirements. But it must still try to meet targets set from above, for example for the number and type of demonstrations it should hold.
- The **Farm Science Centre** expects NGOs to become 'more serious' in their capacity to

understand technical issues in agriculture, to help it to design training courses, and so on.

- **NGOs** expect government services to respond to concerns identified in a small number of villages. They also expect the government to understand that farmer groups should manage common resources to make water and fodder more available for farming. In order to take on these responsibilities, the groups require long-term preparatory work.
- **Watershed development authorities** (almost uniquely among government agencies) appreciate the value of micro-watershed development, but expect it to be achieved by farmer groups after only minimal preparation.

The project is experimenting with several innovative ways of monitoring progress. Many of these draw on 'process documentation and monitoring' methodology. They include:

(i) **Publication of activities.** The project documents 'Recent Developments' in NGO-GO interaction, within and beyond the district, and publishes these twice a year. Initially established with donor support and expatriate involvement, this publication is increasingly being taken over by the Farm Science Centre. It is now published in both English and Hindi and is distributed widely. NGOs and GOs in the district are beginning to contribute short reports to it, although the editors still have to seek out much information.

(ii) **Case histories.** The project has prepared several case histories illustrating the difficulties rural people face in:

- making their farms more productive (with less variation from year to year);
- building a basis for intensified farming, for instance by installing pumped irrigation or improving management of common pool areas on the higher slopes;
- creating demands on NGOs and government services to support their efforts.

This series also documents how far NGOs and government services have tried to work together to meet these demands (and to identify further requirements), and the reasons for any success or failure. Following from this, a number of NGOs have now spontaneously started to document case histories of villages in which they have been working.

(iii) **Working papers.** The project has published several working papers to present case histories and analysis of efforts by NGOs and GOs to work together in and outside the district.

In addition, a number of other devices have proven particularly illuminating as monitoring tools. These include:

(i) **Minutes of meetings such as the Forum.** These are important not only for their accuracy in recording discussions and decisions, but also for noting action points. They thereby improve the prospect that those asked to follow up specific decisions will report back at subsequent meetings.

(ii) **Meeting agendas.** The process of setting the agenda for meetings is similarly illuminating. If agendas are broadened over time to include the concerns of an increasing number of stakeholders, this can be taken to reflect a growing spirit of collaboration

Conclusions

Logframes offer a number of advantages for the monitoring and review of FPR. In particular, they require specification in advance of the intended purpose, output and activities to be undertaken, the logical links among these and means of verifying progress towards their achievement. This integrated 'set' can then be used as a basis for iterative modification in a process mode.

Logframes also have a number of disadvantages: to accommodate process approaches adequately, they require frequent updating which involves high time costs for all stakeholders, and they handle qualitative information less comfortably than quantitative. The most fundamental problem in the case of work conducted in a process mode such as FPR is that they are premised on:

- A fairly direct relationship between activities and outputs. Where project boundaries are permeable, as they are particularly in the more empowering efforts, activities can have effects on actors other than intended beneficiaries, and outputs can be influenced other than by planned activities.
- The capacity of stakeholders to arrive at consensus on purpose, outputs, activities and performance indicators. We have argued that, as the lessons from early activities become evident, different stakeholders may in fact have different views on what should be done next and on how performance in doing it should be assessed. In process projects consensus is not necessarily high nor at a constant level: the degree of consensus can vary considerably as events unfold.
- Performance indicators are objectively verifiable. We have argued that, in fact, the indicators considered important by different stakeholder groups are embedded in their own perceptions of reality, and so are to a greater or lesser degree subjective. Equally, there may be no objective means of verifying some indicators.

In applications of logframes to process projects, many of these potential difficulties are simply subsumed into the assumptions column.

Recent experimentation with inductive techniques, such as process monitoring and documentation, suggests that these can help to identify key actors and events that influence the relationship between activities and outputs. In doing so, they reduce the volume of unexplained variation currently swept into the 'black box' of the assumptions column. An important challenge for the future is to identify in practical terms how these techniques can complement logframes. It is certainly conceivable that such approaches might handle more satisfactorily several of the issues relevant to monitoring and review with which logframes are likely to cope ineffectively, or at best, in a cumbersome fashion.

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Endnote

1. For a review of current techniques of stakeholder analysis, see Grimble and Wellard (forthcoming).

Appendix 1: Project reporting, monitoring and review

The primary aims of monitoring are to provide a basis for decisions on subsequent stages of work, to inform judgments on performance, and to contribute to accountability for the use of resources. By contrast, economic evaluations are concerned with the overall costs of a project in relation to the benefits generated. Since benefits may take some time to come on stream, evaluations are usually conducted well after completion of the activity. Evaluations may also be conducted at an aggregate or generic level, embracing many activities of a similar kind as, for instance, in overall evaluations of research contributing to the Green Revolution (Dalrymple, 1986).

This Appendix provides some definitions of the procedures used in management of the project cycle. One difficulty in doing so is that the underlying concepts of a project cycle vary from one agency to another. Ideas on how projects should be managed also differ. Rather than comparing these concepts, we below quote the definitions used by one agency - the UK Overseas Development Administration—which has recently spent considerable effort in producing definitions for use in all its projects (ODA Office Instructions, vol. 1, sections G and H, 14 March 1996).

The number and frequency of project reviews will depend on the nature of the project. These may be conducted only at the end of a project for projects of 1—2 years' duration. Longer projects may have a mid-term review, or a review coinciding with the end of specified phases of work. In logframe terms, reviews are usually concerned with progress towards achievement of Goals, and checks whether the respective assumptions remain valid.

1.1 Definitions

Project reporting, monitoring and review form a central part of the project cycle management system.

- **Project reports** compare the progress of project implementation with what was planned at the activity and output level of the logical framework.
- **Monitoring** focuses on progress to achieving Outputs and Purpose. It includes a look at the assumptions in the logical framework both at Activity-to-Output and Output-to-Purpose levels.
- **Reviews** take a strategic overview, particularly assessing progress to achieving the project Purpose and Goal.

1.2 Purpose of monitoring, reporting and reviews

Project monitoring, reporting and reviews are management tools that:

- Help ensure that all ODA project funds are used effectively and efficiently, within the agreed time frame and budget;
- Ensure continuous learning and quality control for ODA both during the specific project and into new projects.
- BUT they are not ODA 'policing' activities.
- Reporting should be seen by ODA, the recipient and project staff as an integral part of the project's activity, supported by periodic monitoring and review within the ODA.
- Mechanisms for participatory monitoring should be developed during the project design stage in partnership with the recipients.
- ODA monitoring should be designed and implemented to support the broader project management requirement.

1.3 Project memorandum

The project memorandum and supporting documents must describe how the project will be implemented. The logical framework must show how progress towards achieving the project purpose will be demonstrated.

- The project memorandum must also describe the plan, frequency and responsibilities for reporting, monitoring and review.
- Depending on the project, the memorandum may include a detailed work plan and activity chart.
- If not, the project memorandum must clearly set out how detailed work plans will be drawn up and approved.
- Some projects could have work plans for the full project period, for instance, whereas others may only have a detailed plan for the next six months and an outline for the balance of the project which will be defined and approved as implementation progresses.

Good, objectively verifiable indicators (OVIs) are needed in the logical framework against which progress will be monitored. Other stakeholders should be encouraged and assisted to select their own indicators which ODA should incorporate into assessments of progress particularly at the outcome to purpose level. For process projects it is especially important to set clear OVIs for each project stage.

The **project memorandum** must describe, where appropriate:

- **Roles and responsibilities**
  - The roles and responsibilities of [government] team members and recipient's team members;
  - Terms of reference for the ODA financed personnel;

- Roles of all agencies involved in the project;
- System for preparation and submission of reports by project staff;
- Reporting relationship between project staff and between the project staff and the project manager(s), ODA's field manager, British Embassy or High Commission, ODA's lead adviser and ODA project officer.

• **Other arrangements and responsibilities**
- The system for procurement of goods and services, relationship with the procurement agent;
- Responsibility for maintenance/running costs of project buildings and equipment;
- ODA-financed staff accommodation and local administration;
- Property inventories;
- Imprest accounting instructions;
- Any authorities delegated from the ODA project officer;
- Responsibilities and membership of any local steering or review committees.

1.4 Project reports

During project implementation physical, institutional and financial progress has to be monitored at the level of outputs, activities and plans. This information should be generated within the project itself and reported regularly.

Work plans

• The project management must have a work plan agreed with ODA and the recipient which:
- Is developed from the work breakdown activity chart in the project memorandum;
- Is regularly reported against and updated.

• The work plan content must:
- Relate to the logical framework;
- Include activities needed to gather data against which to assess progress in relation to agreed targets/indicators in the logical framework and reporting frequency.

This requirement applies to all projects but is all the more important for process projects.

The **report format** must require reporting against the logical framework and the work plans to review against activities and outputs (and purpose where appropriate). Reports should give full reasons if progress is not proceeding as planned, check that the assumptions in the logical framework remain valid, highlight recommended action points by ODA, recipient or others and identify responsibility for follow up with a target date for action.

Reports should be sent to the ODA project officer, who is responsible for arranging circulation within ODA to all those who should see the report and for ensuring relevant follow up action is taken.

1.5 Monitoring

Monitoring is a responsibility of both the recipient's project management and the ODA. The project management must include plans for monitoring. This will usually include visits by ODA staff to project sites and regular meetings with project management, as well as arrangements for monitoring the project's progress through perusal of the reports provided by project staff. It is preferable that monitoring visits are undertaken with the recipient's project management staff, but this may not always be possible. Aid Secretaries in the overseas Post also play an important role in the day to day monitoring of project progress and in drawing attention to any problems experienced.

1.6 Frequency of monitoring

There is no set pattern for the frequency of monitoring meetings or visits. Smaller, straightforward projects may need ODA staff (for example, Advisers or Field Managers) to meet project staff and/ or visit project sites only once a year, whereas for larger projects every three months might be appropriate. The frequency of monitoring and review reports will be set out in the Project Memorandum.

1.7 Content and circulation of monitoring reports

ODA monitoring reports may include recommendations for changes in the logical framework or work plans, and advice on how to solve problems experienced by the project. Reports should monitor progress at Activity to Output level and provide an overview of overall progress particularly in relation to project Purpose using the indicators of achievement as milestones. It is good practice to leave a written record (subject to ODA management endorsement if necessary) with the recipient - for example, in the form of an aide memoire at the end of a monitoring visit.

1.8 Format for monitoring reports

Detailed reports are required against the logical framework and work plans to provide the information on projects towards outputs and purpose. Any recommendations for changes in the project should be in the form of suggested revisions to the logical framework and/or work plan; action points and responsibilities for follow up must be clearly identified with a target date for action.

1.9 Reviews

Most projects' monitoring plans will include arrangements for an Output to Purpose Review. They should be undertaken jointly with the recipient, and should involve key project stakeholders. The main function is to assess progress towards achievement of

the project's objectives (Purpose and Goal).

Meaningful reviews, involving primary stakeholders, require long term planning and may include a number of stages for information gathering and assessment. The main ODA project team should participate in the final stage of the Output to Purpose Review so that the widest interdisciplinary view and assessment can be taken. Output to Purpose Reviews can also provide material on aid effectiveness and Impact.

1.10 Review reports

The content and format for review reports should be the same as for monitoring visits but should concentrate on the higher levels of the logical framework rather than day to day detailed technical questions.

Appendix 2: The Biggs framework for classifying FPR

The main text of this paper draws largely on the concepts underlying FPR outlined in Appendix 2. However, it also draws on the work of Biggs (1989), who set out four modes of farmer participation, distinguished by 'differences in objectives and the organisation and managerial arrangements they require for implementation (p3).' These four modes are briefly described below, and their main features are summarised in Table A2.1.

The **contractual** mode of agricultural research embodies the lowest level of participation, and is most closely associated with researchers who focused on field testing varietal performance. In this mode researchers are primarily interested in testing varieties under local soil and climatic conditions. Farmer participation is limited mainly to providing land or labour. To most, this would scarcely constitute 'participation'.

Most public sector agricultural researchers work in the **consultative** research mode; it was the dominant mode encountered during the literature reviewed for this paper, in the comparative case studies conducted by ISNAR (Biggs 1989), and during a review of research methods carried out by Lightfoot and Barker (1988). Consultative researchers actively seek out farmers' views and experiences from the start of the research, while taking most of the decisions about experimental design.

In the **collaborative mode,** agricultural researchers work with farmers on a continuous basis. Researchers and farmers are equal partners in the research process, each using their respective comparative advantage to feed into the formulation of research questions, the design of experiments, and the evaluation of experiments and technologies.

Biggs (1989) defines the **collegiate** research mode as 'where the formal research system actively strengthens the informal R&D system at the farmer, village, and community levels (p8).' While working in this mode, researchers service the ongoing research activities of the local community or individual farmers, explicitly supplementing their knowledge about new technologies and experimental methods.

The Biggs framework can be broadly reconciled with that used in the main text of this paper as follows: contractual and consultative modes of participation relate principally to the development of technologies through the application of FPR methods (Output 3a in Table 4) These modes of research are generally conducted by public sector scientists concerned with the functional objective of enhancing the efficiency of research.

The collaborative mode may be undertaken both by public sector and by NGO researchers. It may yield both enhanced efficiency in a functional sense through improved information flows to researchers. Equally, however, NGOs (especially) are likely to see it as a means of empowerment, and it may have capacity building and institutional strengthening aspects (Outputs 3b and 3c in Table 4), as well as those concerned with technology development.

Table A2.1. The four modes of farmer participation: Main features

	Contract	**Consultative**	**Collaborative**	**Collegiate**
Type of relationship between researchers and farmer	Contractual	Doctor (researcher) to patient (farmer)	Partners	Researchers as facilitators
Research emphasis	Technology testing and verification	Surveying, and diagnosis, testing and adaptive research	Learning from farmers to guide research	Understanding and strengthening informal R&D
Type of farmers involved (who chooses them?)	Those who can guarantee contractual conditions, primarily chosen by researchers	Determined by course of research, mainly chosen by researchers, based upon their own criteria	Jointly defined by farmers and researchers, research collaborators chosen by both groups	Experimenting farmers
Priorities during on-farm research	Trials and written reports	Informal and formal surveys, trials, reports or researcher analysis, field days for extension -purposes	Village research legitimacy meetings, farmer-researcher meetings for diagnosis, planning and interpretation, trials, formal surveys	Supporting experimenting farmers and research-minded local representatives and farmer information networks

(adapted from Biggs, 1989)

Appendix 3: Qualitative and quantitative types of enquiry: concepts and practice

It was suggested in Part 1 that the more participatory the mode of research, the greater is the role of qualitative over quantitative enquiry likely to be. Here we set out the main differences between qualitative and quantitative enquiry.

Quantitative information answers questions such as: How much is produced? What is the change in productivity associated with this crop? How long does the crop take to reach harvest? How much labour or chemical inputs is needed? What are their costs? How many farmers have adopted this variety?

Qualitative information answers questions such as: Why do farmers like this technology? Who would use this technology? What conditions have to be in place if this technology is to be taken up? What social constraints hinder the adoption of this technology? What are the key elements to this farming system, and how has it evolved?

Our literature review confirms that even though most researchers collect both qualitative and quantitative data during the implementation of FPR, the collection of qualitative information has been relatively more important for researchers working with higher levels of participation. The reasons for this appear to be twofold:

The first reason is related to the particular goals of the researchers. Some researchers may attach more importance to the process of research than the outcomes (to address, for example, empowerment agendas), or may be concerned with understanding how various social factors constrain the development process, the adoption of certain technologies, or the process by which farmers implement experiments with researchers (See Okali *et al,* 1994 for a detailed review of these differing objectives of FPR). These researchers are often very interested in descriptive qualitative information about the experimentation process and other factors not directly related solely to the technology generation aspect of FPR. Other researchers hold the opposite view, being interested simply in how well a particular technology performs in an specific agroecological context, using participation merely as a means to implementing an experiment. These researchers are generally more interested in the quantitative information collected concerning technology performance (e.g. growth rates, yield). Other researchers employ a combination of approaches.

Second, one of the key strengths of using many participatory approaches is that they help researchers and development workers quickly and cost-effectively to collect extensive information about the context within which FPR is to be conducted, about the characteristics of the farmers with whom they plan to work, the relations amongst them, and their perspectives. This was the major impetus for the development of, for example, rapid rural appraisal (RRA) strategies, and the less extractive participatory rural appraisal (PRA) (Moris and Copestake, 1993). Researchers using a wide range of participatory approaches are in a good position to collect this information, and many do. Much of this information is qualitative in nature.

Basic principles of qualitative and quantitative enquiry

Qualitative research methods

> *"While there are elegant philosophical rationales and theoretical underpinnings to qualitative enquiry the practical applications come down to a few very basic and simple ideas: pay attention, listen and watch, be open, think about what you here and see, document systematically (memory is selective and unreliable), and apply what you learn." Patton 1990, pl39*

The first principle of qualitative enquiry is that there are no blueprints; the techniques used for qualitative enquiry must be adapted to the research purpose and context. Moris and Copestake (1993) have also highlighted a second key principle upon which all qualitative enquiry rests, that of triangulation.

Triangulatlon is the process by which identical issues are investigated through the use of different techniques. For example, information about varietal performance gained through open discussions with groups of farmers may be more closely examined through the use of structured interviews with individual farmers. Individual structured interviews can help researchers to understand more clearly how or why certain varieties fit better into the farming system, perhaps by exposing key constraints to their use (e.g. labour availability).

Experience shows that the use of triangulation can lead to useful research insights, but its main purpose is to help to expose bias. For example, agricultural researchers who go into the field looking for certain information may be at some risk of biasing any qualitative data they collect through, for example, field observations. In most cases the information collected through field observations should be combined with interview data and possibly detailed descriptive information collected over the course of a growing season before firm conclusions may be made about, for example, farmer cultivation practices.

An important approach to triangulation employed by agricultural researchers is that of using a combination of qualitative and quantitative data. Few qualitative modes of enquiry are not supplemented by or do not incorporate some use of quantitative approaches. For example, in West Java, Amir and Knipscheer (1987) discuss how they combined monthly visits to conduct interviews and informal discussions with farmers (qualitative approach), with intensive data collection on animal status and an end-of-experiment survey (quantitative approach) to understand the effect of individual farmer behaviour on production. Comparable experiences are common in the FPR literature.

Similar combinations of qualitative and quantitative approaches can help researchers to overcome the 'black box' approach to FPR associated with some modes of agricultural experimentation. For example, if new varieties are assessed only in terms of an analysis of inputs (e.g. labour, fertilisers, pesticides) *vis a vis* outputs (the harvest), and this information is collected during a structured survey, researchers may not be able to explain variations between the harvests of 'identical farmers.' These variations may be caused by, for example, different cultivation practices rooted in differing farmer livelihood strategies. The data generated through the use of qualitative methods may often help to explain quantitative findings, or may even show the weaknesses of survey-oriented techniques, which may not be able to tease out the 'cutting edge' of farmer efforts (Ashby, 1986; de Jager, 1991).

So even though many of the qualitative approaches identified above are used primarily to elicit qualitative information, in practice they are often accompanied by quantitative approaches to data collection.

There are three main areas of activity associated with qualitative enquiry. Patton (1990) names them as: documents, observations, and interviews. Below we have adapted his framework to better describe the methods employed by those implementing FPR. Many of the methods encountered during our review fit under at least one of the following headings:

- Background reviews of documentation.
- Observations in the field.
- Interviews, discussions and meetings.

In FPR work these data collection activities are usually used in combination with one another. In addition, the mix of methods of each type used by researchers are highly variable. There are no strict rules governing when and how individual methods should be used. The key criterion is that they support the immediate purpose of the investigation in question.

So qualitative research methods are used to investigate what people are doing, thinking and feeling through observation, interviews, and the analysis of documents. They are particularly suitable for helping researchers and development workers understand how things happen by helping to illustrate **process.** They help researchers to trace individualised outcomes, through case studies, for example, and to understand how context contributes to the variability of experience among individuals exhibiting similar personal and structural characteristics (Patton, 1990). They tend to follow an inductive approach, and be subject to researchers' interpretations (Moris and Copestake, 1993).

Qualitative research methods allow researchers to study situations 'without being constrained by predetermined categories of analysis' (Patton, 1990, p3); they are most often used to collect a large body of detailed information about a small number of cases. Biographical case studies of key informants (e.g. Box, 1987) are an example of this approach. Understanding the differences between individual cases is an important aspect of this work (Koppel, 1990).[1]

Quantitative research methods

Quantitative research methods, on the other hand, aim to generate 'empirical measurements which (may) be analysed within the framework of a deductively justified methodology' (Moris and Copestake, pp. 3-4). In order to generate these measures, quantitative methods rely on closed questions, numerical data collection, and a rigorous approach to handling data in order to ensure objectivity (Casley and Kumar, 1988; Moris and Copestake, 1993).

Quantitative methods tend to generate answers to. a limited set of questions which may be analysed statistically, and generalised. For example, a simple survey may ask for a limited set of data (e.g. crops grown, input and labour use for each, prices, and yields) and be administered to hundreds of farmers who have been selected randomly. The data generated in this way will help researchers to establish firm correlations between variables and develop a firm idea of an 'average scenario,' which they can use to help to focus research efforts. Surveys are most useful in identifying the common characteristics of farmers (Koppel, 1990).

Quantitative methods of generating information for monitoring and review purposes generally fall under two headings. They are:

- Surveys or questionnaires
- Direct measurements

Again, many of the data collection activities encountered during our review fall under one of these headings, and these areas of data collection are often used in combination.

The principal criteria for carrying out quantitative enquiry is that the data used must be **objective.** Researchers using quantitative methods should be ableto treat the data with various statistical tests. Survey respondents therefore should be randomly

Table A3.1. Qualitative and quantitative information for monitoring and review

Qualitative information (examples)	**Stage of research**	**Quantitative information (examples)**
• Farmer opinions about problems, constraints, and opportunities. • Descriptions of farming systems, social relations, etc., and the process by which they have evolved. • Identification of who involved in farming and why. • Relative importance of farming within the economy.	Planning	Past and current yields, incomes, labour use, climate, rainfall, soil nutrient status, erosion rates.
• What are the difficulties in implementing the experiment? • How should the research be adapted or how have farmers adapted the experiment? • What do farmers think of the progress of the research or the technology being tested?	Implement -ation	Growth rates, climate, rainfall, erosion rates, labour use, prices, input use.
• How do farmers think the research could be improved? • What are their opinions about the tested technology? • What are the potential constraints to its adoption? • How well was the experiment carried out?	Review	Yields, prices, soil nutrient status.

selected, and experimental plots carefully designed and controlled. There is a rigorous, set form to the use of quantitative methods (e.g. Casley and Kumar, 1987 and 1988)

An important rationale for supporting the use of quantitative methods with qualitative methods to monitor and evaluate FPR is that generating quantitative data which satisfies basic statistical requirements is chronically difficult in FPR. Fluctuating rainfall and other exogenous factors, coupled with the integration of complex social factors (e.g. varying farmer treatments), or complex plant mixtures means that it is very rare for FPR work to generate firm, quantifiable conclusions about technology performance over the course of only one cropping cycle, or even over several seasons. In their discussion of project monitoring and review of agricultural projects Casley and Kumar (1987) note that 'the determination of yield or production trends in rainfed smallholder farming areas may be impossible within the implementation periods of most projects' (p. 119). This point applies equally to participatory agricultural research projects.

Qualitative methods help on-farm researchers to 'flesh out' what are often, at best, approximate conclusions based upon quantitative data sets. Many on-farm researchers combine quantitative and qualitative methods during research, and they should be expected to complement each other in the same way in monitoring and review activities. For example, iterative, qualitative data-gathering approaches are often now used in combination with quantitative methods during all stages of research (e.g. Floquet, 1990), researchers are using qualitative preference evaluations to focus breeding programmes (Ashby, 1990), and researchers are developing and refining qualitative indicators (e.g. sustainability) to augment quantitative evaluations of, for example, the changing nutrient status of a farming system (Lightfoot *et al.*, 1993). As researchers increasingly attempt to incorporate contextual information into their analyses of farming systems and agricultural technologies through FPR, qualitative assessment has become more important during the evaluation of experiments.

Table A3-1 sets out some of the information relevant to monitoring and review that may be pursued by researchers during different stages of the research cycle, distinguishing between quantitative and qualitative indicators.

Sampling issues

Sampling methods assist in economising on the resources needed to collect and analyse data, and to provide a framework to allow detection of any bias. Merrill-Sands *et al.* (1991) argue that although participatory researchers often develop formal selection criteria, these criteria are often not applied in the field, resulting in *ad hoc* selection. As a result, there is often a systematic bias in favour of male, wealthy, and politically active farmers. Since this affects the outputs of research, Merrill-Sands *et al.* suggest the development and application of explicit and defensible sampling criteria which reflects both the research objectives, and the type of participation sought.

Quantitative and qualitative approaches to data collection tend to use different sampling approaches. Quantitative approaches rely on **probability sampling,** where: the probability of any one farmer being selected is known; there are clearly defined selection procedures; sampling frames or lists are

employed; sampling theory is applied; and there is a possibility of estimating the sampling error. If probability sampling procedures are adequately applied, the data generated may be analysed statistically, and generalised. The issues involved in using probability sampling techniques are reviewed in Casley and Kumar (1987 and 1988).

Qualitative approaches, on the other hand tend to rely on small sample sizes, and these samples are often selected **purposively.** There are many different approaches to purposive sampling. Patton (1990) reviews 16 different approaches to purposive sampling. Some of these are summarised in Table A3.2.

Qualitative and quantitative research methods also use different approaches to collecting data. Some of the main differences are set out in Table A3.3-

In practice there is a trade-off between the cost of information gathering techniques, and the precision of the data gathered (e.g. Graff *et al,* 1991). Most researchers are unable to carry out hundreds of detailed case studies or conduct extensive structured surveys containing hundreds of questions, due to basic resource and time constraints. This highlights a key constraint to information gathering methods for monitoring and review; the trade-off between breadth and depth of data collection (Patton, 1990).

As a result, researchers are constrained in their choice of data collection techniques. Again, the use of a combination of quantitative and qualitative approaches to carrying out monitoring and review is implied.

Table A3.2. Purposive sampling strategies

Type	Purpose
Extreme or deviant case sampling	To learn from exceptional cases
Intensity sampling	To learn from information-rich, but unexceptional cases
Maximum variation sampling	To identify common patterns that cut across variations
Homogenous sampling	To reduce variation and simplify the analysis
Typical case sampling	To illustrate what is normal or average
Stratified purposive sampling	To facilitate comparisons between subgroups
Critical case sampling	To permit logical generalisation and maximum application of information to other cases
Chain sampling	To identify cases of interest from people who know people who know people...
Criterion sampling	Picking all cases that meet some criterion to assure quality
Confirming and disconfirming cases	To elaborate and deepen initial analysis, to test variation
Opportunistic sampling	To take advantage of the unexpected
Random purposive sampling (still small sample size)	To add credibility to sample when potential purposive sample is larger than one can handle
Sampling politically important or unimportant cases	To attract attention or to avoid undesired attention to study
Convenience sampling	To save time, money and effort. Yields information poor-cases
Combination or mixed purposive sampling	For triangulation, flexibility, meeting multiple interests

Adapted from Patton (1990)

Qualitative and quantitative indicators in practice

Most practical experience hitherto has been gained in developing indicators for the technology development functions of FPR (see section 1.3). Here we draw together some of the evidence and arguments on indicators and means of assessment.

The objectives of the institutions involved in FPR are important determinants of the approach to participation employed, the monitoring and review approach which should be taken up, and the relative importance to be accorded to quantitative or qualitative data. There are also other considerations - cost or research capacity, for example - which may act as practical constraints to the amount and nature of information that can be collected in a given amount of time. Indicators of performance of FPR therefore need to be identified which (a) provide adequate information to researchers and others and (b) do so within the levels of resources available.

Here we review perceptions on why indicators are needed, and then review some of the indicators which have been used in the past to evaluate FPR. We first review quantitative indicators conventionally used during the evaluation of agricultural research. We then review various qualitative indicators which may be use to help researchers to assess technologies, and highlight the problems and opportunities arising.

Purposes of indicators for monitoring and review

As emphasised in Part 1, without the prior identification of FPR purposes and anticipated outputs, and the establishment of corresponding baseline indicators, it is impossible to conduct adequate monitoring or meaningful evaluations of FPR. Any work conducted in the absence of those would be largely arbitrary, and would be unlikely to establish a

Table A3.3. Main traits of qualitative and quantitative approaches

Qualitative	Quantitative
Inductive approach to conducting interviews	Deductive approach to taking physical counts
Sampling approach related to relative value of data sources	Sampling approach related to a pre-determine statistical design
Observation recorded in representational form (images, narratives, notes)	Observations recorded as preclassified categories or numbers
Open-form observation approach subject to contextual variables	Closed-form observational approach to meet already-established methodological criteria
Interpretation situationally driven, representing specific situations and difficult to generalise	Interpretation procedurally-driven, deriving objective facts, and easy to generalise

(Adapted from Moris and Copestake, 1993, p5)

'causality of change' (Casley and Kumar, 1987). Linking cause with effect is an essential function of a monitoring and review system.

It is therefore essential that institutions conducting FPR establish clear research objectives from the outset. Depending upon the institutional mandate and corresponding approach, these objectives may be determined largely by researchers, by researchers and farmers working together, or largely by farmers. Those controlling the experiment must then identify relevant performance indicators, which, in turn, will determine what means of verification are appropriate during and after research.

This is not to say that additional information arising during the experiment which does not fulfil immediate monitoring functions should not also be collected. It is important to stress, however, that there should be a minimum amount of data collected which may be related to a 'starting point,' the baseline. Identifying these minimum data needs is important to ensure that research resources are used efficiently to collect relevant and useful data for monitoring and review.

Quantitative indicators

In the past, most researchers have focused on the use of quantitative criteria to assess FPR. The most common ones are listed in Table A3.4. The most obvious quantitative criteria have been agronomic or agroecological; growth and yield data, and information on environmental impact are central characteristics of new varieties and practices which are used for evaluation by both farmers and researchers. The most common agronomic indicator used to evaluate FPR is yield (e.g. Denning, 1991; Ashby, 1987; Fernandez, 1991), including, for example livestock weight gain (Baker and Knipscheer, 1987; Peterham and Basuno, 1986) and stability of yields (Ashby *et al*, 1987). Researchers may also be interested in growth rates over the course of a season (Edwards, 1987), or farmers' perceived agroecological benefits (Reynolds *et al.*, 1991). Some have even attempted to determine relative efficiencies of resource use by employing the Land Equivalency Ratio[2] during their assessments (Arbab and Prager, 1991), or by determining how the nutrient status of a system increases or decreases over the long term in response to the introduction of new technologies (e.g. Arbab and Prager, 1991; Lightfoot *et al*, 1993).

The use of inputs (e.g. chemicals or fertilisers) is also an important indicator, especially as it relates to how feasible the adoption of a technology will be for farmers with low assets, farmers facing incomplete or undeveloped markets for their goods, or farmers not inclined to use inputs at agronomically optimal levels or, more reasonably, at economic levels. Data on the prices of inputs and outputs as well as input application levels are the assessment of agronomic performance and of the potential economic benefits of technologies (e.g. Ashby, 1987).

Economic criteria are widely used to assess the success of FPR (e.g. Graff *et al*, 1991; Ashby, 1987; Tan, 1986). Economic analysis may be used to determine net benefits from a technology (Potts *et al*, 1983), total profit, labour use or opportunity cost (e.g. Arbab and Prager, 1991; Repulda *et al*, 1987), income effects (e.g. Adesine and Zinnah, 1992), impact upon production and market risk (Janssen and Lynam, 1990), measures of farmers' willingness to pay for technologies (e.g. Baker and Knipscheer, 1987) or the returns to investment in the FPR programme (Martinez and Arauz, 1984; Martinez *et al*, 1991). These assessments may be carried out with farmers in the field immediately after the harvest (Edmeades *et al*, 1991) or over the long term to assess socio-economic impacts of adoption (Worman *et al*, 1991).

There are other standard financial and economic techniques which are used widely to generate evaluative indicators for agricultural research. Echeverria (1990) reviewed a range of economic studies assessing the impact of research and extension, identifying three main approaches: Schultz's (1953) 'value of inputs saved' approach, the widely-employed economic surplus approach to estimating the returns to investment, and econometric approaches to determine the marginal rate of returns on investment. In a standard text on the financial and economic analysis of agricultural projects, Gittinger (1982) identifies a range of undiscounted and discounted economic measures of project worth which

Table A3.4. Qualitative and quantitative criteria for monitoring and review of FPR

Quantitative indicators	Qualitative indicators
Agronomic or agroecological criteria • Growth or growth rates • Yield and stability of yields • LER measures • Impact on system nutrient status • General environmental impact • Effects on production risk *Economic criteria* • Measures of profit or net benefit • Net present worth • Economic measures of input use • Effects on market risk • Opportunity costs • Returns to investment • Internal rate of return • Economic surplus generated *Other criteria* • Adoption • Impacts upon wealth distribution • Storage abilities	*Aesthetic criteria* • Suitability • Taste • Plant architecture • Colour • Size • Shape • Texture • Marketability *Farming criteria* • Compatibility with existing system • Impacts on drudgery • Satisfaction of multiple production objectives • Intercropping characteristics • Environmental impact • Impact on perceived risk *Other criteria* • Sustainability • Equitability • Skill building • Satisfaction of multiple socio-political objectives (e.g. Empowerment) • Synergy • Quality of relationships • Satisfaction • Cooking response • Texture • Storage qualities • Quality

researchers may use to evaluate their work. The most 'widely used measures are the net present worth (NPW) of investment and the calculated internal rate of return (IRR). Mutsaers *et al.* (1986) also review a limited selection of standard approaches.

The important point to emphasise with respect to all of these approaches to economic assessment is that no researcher uses all of them to evaluate individual experiments. A small selection of these methods often provides sufficient information to evaluate individual projects. For instance, in areas where labour is a key constraint, determining the returns to labour invested may provide sufficient information to make a reasonable assessment of technology adoption potential. Again, it is important to identify clear research objectives before identifying a limited range of simple economic indicators to use in evaluations. CIMMYT has developed an informative guide to carrying out economic assessments of on-farm experiments (CIMMYT, 1988).

Additional quantitative information may be collected to help researchers to understand the wider complex of socio-economic factors affecting the suitability of technologies. For example, researchers may need to understand the income distribution within a community in order to properly assess how well a technology is suited to a particular socio-economic context. This information is most often obtained through the use of socio-economic surveys of households, but participatory approaches may be more rapid and cost efficient. For example, participatory wealth ranking methods are sometimes used to achieve this objective (e.g. Grandin, 1988).

The quantitative indicator used most widely by researchers to indicate success or failure of FPR is that of adoption rates (e.g. Denning, 1991; Martinez and Arauz, 1984; Collinson, 1986; Tripp, 1991). Potential for adoption may also be an important evaluative criteria. Sumberg and Okali (1988) noted the importance of maximising the range and variability in which technologies are tested, to understand 'how, under what conditions, and for what ends the technology could be manipulated,' in order to assess the probability that farmers would take up alley cropping technologies. Adoption is an especially important indicator for researchers working at the adaptive end of the spectrum.

One of the problems with the use of adoption as an indicator is that it is often difficult to describe in terms of an absolute figure (Casley and Kumar, 1987). For

example, if there is a package of recommendations accompanying a technology and, as is often the case, farmers adopt some of them, have they adopted the technology? If so, does it matter how long they use it? Similar problems arise with farmers who introduce a technology, but in only a limited area on their farms. Adoption rates should be examined after several years, and assessed in terms, for example, of how adoption rates were self-sustaining despite decreased institutional support, or well after project has terminated (e.g. Simaraks and Khammeang, nd), in addition to many other factors. CIMMYT has published a comprehensive guide for developing surveys to assess adoption rates which reviews many of the above issues (CIMMYT, 1993).

Qualitative indicators

As argued above, sole reliance on quantitative data has a number of drawbacks, not least that they may be insufficient to establish causality. However, many qualitative methods are still in the early stages of development. Some of those that have been used are listed in Table A3.4. Furthermore, agricultural scientists are unaccustomed to what they might regard as 'non-objective' criteria, and some have been reluctant to use them. However, even if it were possible to quantify all the attributes of a new technology, it would be impossible expensive to do so. Researchers often therefore add their own qualitative observations (e.g. on plant vigour or architecture, or on grain size, colour, etc.) in order to supplement quantitative data. What is becoming more common in FPR is for researchers to obtain farmers' criteria and assessment of such characteristics (e.g. Sperling, 1989; Prain *et al.*, 1991 and 1994; Fernandez, 1991; Baker and Knipscheer, 1987; Ashby, 1990).

For example, in Rwanda farmers were asked to discuss their expectations about the ability of a crop to associate with other crops, and its tolerance to pests and diseases (Sperling, 1989). Elsewhere farmers have been consulted about storage qualities (Fernandez, 1991; Prain, 1994), or various 'quality' criteria like grain type, often distinguished by physical qualities like colour, size, shape, cooking response or, plant architecture (Ashby *et al*, 1987; Kean, 1987; Fernandez, 1991). This work is usually carried out via visual rankings by farmers (e.g. Ashby *et al.*, 1987). Farmers' assessments of a crop's drought avoidance characteristics (Ashby *et al*, 1987), or its pest resistance (Ashby *et al.*, 1987; Kean, 1987) have also been sought. Few researchers have attempted to quantify these criteria rigorously.

However, in an effort to compare farmer criteria with researchers' criteria, research has been conducted into the performance of farmers' seed preferences under research station conditions (e.g. Prain *et al.*, 1994). In some cases was found that farmers' choices perform poorly on-station (e.g. Maurya and Bottrall, 1987).

Table A3.5. Evaluation of sweet potato varieties during group assessment

Variety	Evaluation	Reasons
Jewel	Select	Good appearance; certainty of market acceptability.
Tambena	Select	Final colour, good size, and excellent number of roots of good size.
Kontiki	Select	Small but numerous roots, good colour.
Trujillano	Select	Perceived marketability, similarity to old 'lost' variety.
Mochero	Reject	Deformed shape
ST87122	Reject	Pale skin similar to old rejected variety.
Trulillano	Reject	Late maturity.
Huarco	Reject	Deformed shape.

Adapted from Prain et al. 1994

In Peru CIP has developed some alternative approaches to involving farmers in the evaluation and selection of potato and sweet potato varieties including both surveys and group assessments (Prain *et al.*, 1994). During group assessments farmers evaluated varieties, noting down various characteristics which they deemed important (see Table A3.5). These characteristics were subsequently ranked to produce primary, secondary and tertiary criteria.

Prain *et al.* also found that farmers participating in potato trials evaluated the varieties according to seven categories of criteria. These included: ease of peeling, texture, taste, dormancy period and sprout growth, water loss, tuber rotting, appearance after storage. These subjective 'quality' characteristics had different relative importance with respect to marketing requirements (Prain *et al.*, 1994).

Farmer evaluations of technologies show great promise in helping breeders better to focus their work in developing new crops and seeds for farmers. By incorporating farmers' criteria into formal research processes from an early stage, these approaches help to set up a more direct 'demand-pull' on researchers by farmers, one of the important rationales for encouraging greater farmer participation in agricultural research (Farrington and Martin, 1988).[3] Okali and Sumberg (1995) suggest that whether or not farmers have experimented with and continue to experiment with raw materials provided to them by researchers is the key evaluative activity for collegiate research.

One task not widely addressed by the qualitative

criteria arising during farmer technology evaluations is how they may be used to generate farmers' assessments of researchers' work over the course of experiments. A few of the experiences identified during the preparation of these guidelines have directly addressed how farmers may help to evaluate researchers' work in their own terms. For example, some researchers have tried to determine farmers' relative satisfaction with trials carried out (Baker and Knipscheer, 1987), or to catalogue the personal opinions of farmers about a technology development and transfer programme (Jintrawet *et al.*, 1985), or to identify other qualitative indicators concerning an on-farm programme, for example, farmers' views on the practicality and acceptability of technologies addressed (Norman and Modiakgotla, 1990), or farmer perceptions of animal performance over the course of the trial (Baker and Knipscheer, 1987). However few have treated this issue in depth.

It remains to be seen how farmer-based technology evaluations may be used more directly to support the monitoring and review of FPR which goes beyond varietal development into, for example, resource management. For example, agroforestry technologies to improve soil and water conservation need to be assessed in terms of their impacts upon land tenure arrangements, the availability of secondary products (e.g. for forage, medicines, or condiments), and agricultural productivity — all over the long term. A similar situation arises with respect to, for example, research into the agricultural service delivery, which needs to consider the social, political and economic setting in which agricultural development is taking place.

The arguments for the use of a systems approach in such areas as the development of low external input agricultural methods and long-term agro-ecological management approaches is well-established (e.g. Altieri, 1987; Edwards *et al*, 1990). Technology-focused FPR rarely provides space for adequate consideration of the internal and external biophysical and socio-economic factors affecting farming systems' productivity, or the achievement of additional farming system objectives of 'security, continuity, and identity' (ILEIA, 1991). This poses a dilemma for researchers in terms of how to develop ways of addressing these issues in an integrated way, given the time and resource constraints they all face. This is the reality faced by farmers which needs to be addressed by development workers and researchers involved in these areas.

Agroecosystem analysis (Conway, 1986 and 1985) is one approach to addressing the multidisciplinary and holistic needs of researchers. It uses systems analysis in a workshop environment to identify the key system properties of productivity, stability, sustainability and equitability, and to develop a set of questions for future research or guidelines for development. This model situates farming systems within the context of a livelihood system incorporating a wide range of activities and so is capable of generating wider questions for researchers than they usually face. The model indicates the importance of using an iterative learning approach during research and development activities (Conway and Barbier, 1990).

Conway and Barbier define **sustainability** in terms of how well it determines the persistence or durability of a system's productivity under known or possible conditions; **productivity** as the output of valued product per unit of resource input; **stability** as the constancy of productivity in the face of small disturbing forces arising from normal fluctuations and cycles in the surrounding environment; and **equitability** as the evenness of distribution of the productivity of the agricultural system among the human beneficiaries, i.e., the level of equity that is generated (Conway and Barbier, 1990, pp 41-42). Clearly, the criteria suggested through the use of agroecosystem analysis remain somewhat ill-defined. Phrases like 'possible conditions,' 'valued product,' 'normal fluctuations,' and 'the level of equity' imply some level of normative judgement by researchers using them. This does not, however, detract from the validity of the use of such indicators to help to form research agendas. In fact, their broad base hints at their long-term potential as performance criteria for FPR.

Lightfoot *et al.* (1993) attempted to quantify sustainability in order to assess the potential impact of research which involved the diagramming of resource flows with farmers. Out of a possible list of criteria which included complexity, structural homogeneity, nutrient cycling, energy flow and storage, resilience, diversity, resource use efficiency, stability, productivity and equity, they chose a set of 'sustainability indicators' measured in what they admit are 'crude' units. These included:

- **Economic efficiency:** net farm income or profit.
- **Bioresource cycling:** the number of farm-generated bioresource flows as identified on the bioresource flow diagram.
- **Species diversity:** the number of individual species cultivated or otherwise utilised.
- **Natural resource capacity:** derived from dividing biomass output from all natural resource types by the number of resource systems.

This ambitious attempt to quantify what is widely admitted to be a normative concept highlights a basic problem with the development and use of qualitative indicators by researchers working in the deductive mode. Their subjective basis precludes any adequate quantification. Lightfoot *et al.* (1993) admit their use of 'common sense' in choosing their indicators; this would seem to be a key element of any successful FPR process. (Perhaps the 'level of common sense

employed' should be included in a list of evaluative criteria for FPR!)

FPR is centrally concerned with the process by which farmers and researchers work together to develop strategies to improve agricultural production. As was highlighted during the discussion in Okali *et al.* (1994), it has been used to address a wide agenda. Much of this agenda is laced with normative assessments, whose potential bias impossible to eliminate altogether. Perhaps it should be accepted by researchers working with farmers that normative assessments are an important component of FPR, but more attention should be paid to poor rural farmers' perceptions and bias. They are, after all the principal clients of FPR work. The stakeholder approached embodied in the revised logframe set out in this paper allows more space for these normative judgements on new technology to be integrated into research processes without sacrificing the essential objectivity of the work.

Going beyond the assessment of technology, the main body of this paper identifies two further areas of concern — capacity building and institutional development - in which qualitative assessment, whether by researchers or farmers, have long been recognised as important (Ashby, 1987; Lightfoot *et al*,, 1993).

Endnotes

1. There is not much difference between me and the president, but that difference is very important (overheard from a farm labourer).
2. The Land Equivalency Ratio is a measure of the relative amount of land planted in monoculture that would be required to produce the same yield as that planted in an intercropped systems. For intercropped systems, this figure is often greater than one (Stinner and Blair 1990).
3. However, care should be taken to allow for the influence that temporal factors (e.g. the weather characteristics of the season in question) may have on farmers' assessments (Sperling, 1988).

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