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Valuing the Hidden Harvest: **Methodological Approaches for Local-Level Economic Analysis of Wild Resources**

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VALUING THE HIDDEN HARVEST: METHODOLOGICAL APPROACHES FOR LOCAL-LEVEL ECONOMIC ANALYSIS OF WILD RESOURCES

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Preface

This paper has been a long time in the making. It represents a steady process of methodological development over the six years that the *Hidden Harvest* project has been in existence. The paper has evolved through an iterative process whereby various papers were written and revised, their content evolving as more and more experience was gained from the five case studies, and from discussions, debates and exchanges between the economists and participatory practitioners involved. Those responsible for this report are: Derek Eaton, Irene Guijt, and Fiona Hinchcliffe. Their work was strongly supported by earlier efforts of Ian Scoones and Michel Pimbert, and recent input from Josh Bishop, Maryanne Grieg-Gran, and Nick Johnstone. Other people contributed greatly in developing the methodological thinking: Jo Abbot, Bruce Aylward, Jo Burgess, Michael Collins, Mary Melnyk, Terri Sarch, and John Thompson. A methodology workshop held in June 1995 also provided many new ideas and perspectives which have enriched this paper.

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1. INTRODUCTION

> *Place a biologist and an economist in a vast savannah landscape, and what do they see? A biologist might see the diversity of plant and animal life in their ecological niches, and seek to understand the complex interactions. An economist might see marketable savannah products, and wish to calculate their actual and potential economic value. Imagine then a local resident. She sees the fruits and wild leaves she collects for the daily sauce, the palm leaves to weave into baskets for sale, and the wild rice essential for special ceremonies. If asked to give the value of the savannah's vegetation, what would they answer? What criteria would they use to justify their answer? And whose values would be most influential in determining land use development?* Guijt, 1997

There is growing interest in the role of wild[1] resources in local livelihoods. It is increasingly recognised that they are not only important to hunter gatherers, but make substantial contributions to the livelihood strategies of settled farmers, pastoralists and traders. Yet many natural resource management policies which affect wild resources and their habitats fail to consider their full economic benefits. Whose knowledge and whose valuations count when conducting economic assessments? In many cases economic analyses are made on the basis of limited, highly aggregated data and with limited insight into local level perspectives. Part of the reason for this is the lack of appropriate methodologies for local level economic assessments. This paper suggests some methodological alternatives.

IIED's experiences with the *Hidden Harvest* research programme (see Appendix 1) aimed to investigate, through local level valuation, the importance of wild plant and animal resources to rural livelihoods. The *Hidden Harvest* studies focused on valuing species that are not incorporated in formal economic calculations, yet which are often part of informal agriculture-based economies. By falling outside official statistics, such species are implied to be 'valueless', thus giving an incomplete and, therefore, false value to the landscapes in which they are found. Development and natural resource policies based on such incomplete assessments of resource values are likely to be inappropriate, ineffective, or counterproductive.

In the search for an effective and appropriate methodology to capture the value of these hidden species, those involved in the *Hidden Harvest* studies identified and debated many dilemmas. The methodology involves seeking local level perspectives on economic questions about resource values and incentives, bringing together the two fundamentally different methodological traditions of participatory research and economics. This paper describes the methodological approach adopted and its conceptual background, illustrated with examples from Zimbabwe, Botswana, Brazil, Nigeria and Papua New Guinea.[2] It also reflects on some of the dilemmas raised in merging these two distinct approaches, within the context of wild resource use.

We hope that these alternative approaches will provide the basis for developing more effective policy formulation and planning mechanisms that start with local level conditions and work upwards. We also hope that this paper will contribute something new to the growing debate on complementarities between qualitative and quantitative research approaches.

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[1] See Section 1.1.1 below for a discussion on the definitions of 'wild' and 'hidden'.

[2] A shorter summary of this methodological approach is also available from IIED: "Participatory Valuation of Wild Resources: An overview of the Hidden Harvest methodology". 1997.

1.1 The Nature of the Hidden Harvest

1.1.1 Defining Wild, Defining Hidden

At this stage it would be useful to clarify what we mean by 'a wild resource' and 'a hidden harvest'. This is not as straightforward as it might appear, with many interpretations of both terms. From whom is it hidden, how is it hidden, when is it wild or semi-wild, domesticated or semi-domesticated? In Brazil, for example, *malva* (*Urena lobata*) was introduced as a fibre crop in the last century. It has now infested natural shrubland to such an extent that it is considered a wild weed. However, as it provides an important commercial source of fibre, farmers actively manage shrubland to allow *malva* to continue its semi-wild existence.

Furthermore, the word 'wild' tends to imply the absence of human influence and management. However, many of the landscapes which are often viewed as pristine or 'wild' by outsiders, have been modified, managed and, in some instances, improved by people for centuries (Pimbert and Pretty, 1997; Gomez-Pompa and Kaus, 1992; Pimbert and Toledo, 1994; Posey, 1995). Care needs to be taken when using the term, as it implies that the resource is not owned and that it can therefore be used by anyone, with implications for local and traditional use rights (Posey, pers. comm.). Anyone undertaking a valuation study of wild resources should be aware of these potential pitfalls and confusions at the start.

'Hidden' also requires further clarification. The hidden harvest refers to those species or types of value that are not incorporated into formal economic calculations (see below). In other words they are species and values which are perfectly visible to local people, but much less visible to policy makers and researchers.

1.1.2 The Importance of the Hidden Harvest

Wild resources are often critically important to rural people's livelihoods (Scoones, *et al*, 1992; Jodha, 1986; Anderson *et al.*, 1985; Saxena, 1986; IIED, 1995; Melnyk, 1995; Wild *et al*, 1995; Rose, D. 1988). This is particularly the case for marginalised social groups, notably the poor, women, and children. Wilderness areas and wild resources:

- enhance food security by providing an important buffer during certain seasons and/or major periods of stress;
- supply vital nutritional supplements to diets based largely on carbohydrate-rich staples;
- have significant economic value by preventing the need for cash expenditure, for example on construction material, fodder, and medicine;
- can provide ready sources of income to cash-poor households;
- have many cultural values, such as sacred sites or species used in ceremonies or for barter;
- hold the key for the future of agricultural production by providing essential genetic material;
- help to regulate climatic patterns and protect against natural disasters and degradation processes;

- represent as yet unknown medicinal values for future medical needs; and

- provide essential indicators of environmental change.

Despite their importance at a local and national level, wild resources are often overlooked by conventional economic assessments, which concentrate on domesticated species (crops, livestock) or resources which are traded in formal markets. Thus, forests have been assessed simply in terms of their timber value, wildlife areas only in relation to conservation and preservation objectives, and arable lands only in terms of the major crops. This ignores the range and value of other wild resources harvested in agricultural and forested areas. For example, in the apparently maize dominated agricultural system of Bungoma in Kenya, people consume at least 100 different species of vegetables and fruits (Juma, 1989).

Ignoring or undervaluing other, often hidden, values leads policy makers to treat many areas as 'economic wastelands'. Resource planners may also view such areas as suitable for more commercial outputs and land uses that can destroy existing biodiversity and livelihoods. To ensure more appropriate and sustainable forms of agricultural and forestry development, it is essential that local values are recognised.

It is also essential to recognise the specific characteristics of wild resources which confound the use of traditional methods for economic assessment, and thus have contributed to their 'hidden' status:

- They are highly site-specific and seasonal.
- Their importance differs from one social group to another.
- They are often collected opportunistically and sometimes illegally, making harvest assessments difficult.
- They are often marketed through informal networks or used as subsistence products and so do not have a formal market value.
- They often represent a value to local people, or to ecosystem function, which cannot be translated into financial terms.
- Their value may vary according to who has access or control over them. For example, arable areas may be controlled by men, and so the value of products may diminish for women. However, there may be portions of field and home areas that women value highly and manage intensively, such as field edges, contour ridges, etc.

These features make it extremely difficult for conventional valuations to capture fully the importance of wild resources and to communicate this effectively to policy makers. An economic assessment of the value of the hidden harvest must come from such a differentiated analysis of economic value, situated within an understanding of how patterns of use are differentiated according to season, year, ecology, tenure, gender, wealth and age (Scoones *et al.*, 1992).

Local valuations can partly overcome these and other problems. Undertaking inventories and valuation studies with the resource users themselves will reveal more comprehensive and relevant, rather than assumed, economic values of local genetic resources and incentives for their management.

Seeking local level information will avoid generalising about a landscape, the use of its resources, and the value of its harvests for local livelihoods. It will help provide better information for policy makers and other stakeholders, thus increasing the likelihood of more appropriate policies and plans.

Greater local understanding of present and/or potential values may also help improve local resource management systems. This, in turn, can increase the value of the landscape and the viability of local livelihoods. These types of valuation can also help local people negotiate resource use with more powerful external interests that may be threatening their sustained use (Hinchcliffe, 1995) Valuation studies can therefore be an important tool to ensure the sustainable use of wild resources.

In an attempt to develop a more appropriate approach to local level valuation, the *Hidden Harvest* studies combined two methodological traditions:

- Economic approaches for resource valuation or for assessment of incentives for resource management; and

- Participatory research techniques, based largely on Rapid and Participatory Rural Appraisal (RRA and PRA).

The process of methodological reconciliation has not been straightforward, as the two traditions have distinct, and sometimes contradictory, methodological principles and procedures. However, combining them is the first step in creating a methodological middle-ground between costly and lengthy resource assessments on the one hand, and making assumptions about or ignoring local resources, on the other. The remainder of this paper summarises the two traditions, describes how they can be combined, and reflects on some of the challenges encountered.

2. PARTICIPATORY RESEARCH AND THE HIDDEN HARVEST

Since the 1980s, rural development research and practice has seen a gradual shift away from top-down, standardised, extractive approaches, towards participatory appraisal and analysis. In these alternative processes, an increasing number of the activities previously conducted by outsiders are carried out with local people or entirely by them (Chambers, 1992; 1994; 1997).

These changes have partly been stimulated by two closely related methodologies, Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA)[3]. In this section we outline the origins, principles and methods of RRA and PRA, with a particular emphasis on their role in understanding the value of wild resources. We also discuss their limitations, particularly in relation to informing policy.

2.1 Methodology and Key Assumptions

RRA emerged in the late 1970s and 1980s, and is one of the precursors of PRA. With accelerating global change and greater awareness of the value of local knowledge, the need for good and timely information and insights became more evident. Four decades of 'development' work, despite its isolated successes, was obviously not solving the problem of rural, or urban, poverty and natural resource degradation. Large scale questionnaire surveys were costly, and generated information that was usually late, inaccurate and little used (see 2.2.1 for more on questionnaires) (Chambers and Guijt, 1995). The anti-poverty biases of 'rural development tourism' provided further misleading information, and the attitudes of many development professionals, that solutions to people's problems could be developed externally and applied in a top-down way, also contributed to this failure.

RRA developed as a research approach to minimise such biases, an alternative that was cost-effective and provided sufficiently accurate information quickly. By the mid-1980s RRA approaches were eliciting a range and quality of information and insights inaccessible through more traditional methods. Agroecosystem analysis contributed much methodological innovation. In both agroecosystems analysis and RRA, a series of methods are applied in the field by an interdisciplinary team working closely with local people. The process is designed to generate timely, new information and hypotheses about local conditions, livelihoods, development constraints, and 'best bet solutions'.

At the end of the 1980s Participatory Rural Appraisal (PRA) began to evolve in the search for practical research and planning approaches that could support more decentralised planning and more democratic decision-making, value social diversity, and work towards sustainability (Chambers and Guijt, 1995). PRA can be described as *"a family of approaches and methods to enable rural people to share, enhance, and analyse their knowledge of life and conditions, to plan and to act"* (Chambers, 1992). In other words, the production of knowledge and the generation of potential solutions should be carried out by those whose livelihood strategies form the subject for research (Cornwall, *et al.*, 1994). PRA therefore combines research with action.

[3] These are but two of a growing number of participatory research and planning approaches which include Participatory Learning Methods (PALM), Rapid Assessment Procedures (RAP), Participatory Action Research (PAR), Rapid Rural Systems Analysis (RRSA), Méthode Active de Recherche et de Planification Participative (MARP) and many others (see Cornwall *et al.*, 1994).

RRA and PRA draw on a diverse range of methods (Box 2.1) which highlight the interaction of group dynamics approaches, diagramming and ranking/scoring techniques. This list is long, and continues to grow as people, local and outsiders alike, develop their own methods and sequences (Chambers and Guijt, 1995). The tenets of participatory approaches (Box 2.2) emphasise the advantages of methods that are flexible rather than rigid, visual rather than verbal, and that compare rather than measure. Through the use of this wide range of methods, PRA encourages diverse perspectives, multiple interpretations and interdisciplinary analysis. The emphasis is on learning for action, combining both qualitative and quantitative insights.

It is not simply the methods themselves, but the combination and sequence in which they are used that make PRA particularly useful. For example, a set of participatory resource models of a catchment, one representing the present conditions and one showing the situation a few decades earlier can be used to identify changes in land use patterns and practices, and their impact on land degradation and deforestation (Shah, *et al.*, 1991). Transect routes can then be planned on the present model, along which local people can lead the outside investigators. In the remaining forested area, a rootstock census of quadrats can be carried out by the villagers, leading to a calculation of numbers of trees to be planted. Finally, matrix scoring of the preferred trees of local men and women can be used to identify the appropriate proportions of different species to be planted, and the correct mix required in individual or communal tree nurseries (Shah, *et al.*, 1991).

However, the approach is more than simply a collection of innovative techniques. It is the behaviour and attitudes of external facilitators that are of primary importance, more important than the methods (Mallik *et al.*, 1996; Absalom *et al.*, 1995). This means asking local people to help outsiders to learn, respecting them, being able to criticise oneself, having confidence in others and developing a relaxed approach emphasising flexibility and inventiveness. It is only with this relaxed rapport, open dialogue and mutual sharing that the methods will be effective, helping to sustain and strengthen the participatory process of which they are a part (see 2.5.4). Meeting these conditions requires great skill on the part of researchers, meaning that successful use of the approach is not always easy to achieve. This is one of the limitations of participatory methods, which are discussed further in 2.4.

2.1.1 RRA or PRA?

Despite the similarity of methods used (Box 2.2), RRA and PRA differ considerably in their purpose and process. RRA began and continues to be a better way for outsiders to learn. RRA studies focus on collecting information, albeit in some cases using participatory methods. PRA emphasises local processes of analysis and sharing knowledge for local-level planning, and is therefore a much longer and open-ended process.

As the *Hidden Harvest* case studies have emphasised externally-analysed research, they are best described as RRA studies using participatory methods.

Box 2.1 A Menu of Methods

Secondary Data Sources and Interviews

- Critically review secondary data. They can mislead, but can also help a lot especially in the earlier stages, eg. deciding where to go, and where gaps or contradictions in understanding exist.
- Local analysis of secondary sources: Participatory analysis of aerial photographs (often best at 1:5000) to identify soil types, land conditions, land tenure, etc. also satellite imagery.
- Observe directly (see for yourself). This can be most effective if combined with self-critical awareness of personal biases that are a result of our specific education and background, and consciously trying to compensate these.
- Seek experts on specific issues. This is so obvious and yet often overlooked. For example: What mechanisms for conflict management/resolution exist and who in the community is involved?
- Case studies and stories: a household history and profile, a farm, coping with a crisis, how a conflict was resolved.
- Group interviews (groups can be formed randomly; focused by topic; representative or structured for diversity; represent specific social groups; or formal).
- Key probes: questions that can lead directly to key issues again based on the assumption that local people are doing something eg. "What new practices have you or others in this village experimented with in recent years?" "What happens when someone's house burns down?"
- Do-it-yourself: Roles are reversed, with local people supervising and teaching skills to outsiders (to fetch firewood, cut and carry fodder grass, level a field, transplant, weed, build a hut...). This builds rapport and allows others to learn about their realities and priorities.

Diagramming and Visual Techniques

- Mapping and modelling: using sticks, seeds, powders, etc. on the ground to make local social, health or demographic maps, resource maps of village lands or forests, maps of fields, farms, home gardens, topic maps (for water, soils, trees, etc.), service or opportunity maps, or three dimensional models of watersheds, etc. These methods have been one of the most widely used and can be combined with or lead into household listing and well-being ranking, transects, and linkage diagrams.
- Transect walks: systematically walking with key informants through an area, observing, asking, listening, discussing, learning about different zones, local and introduced technologies, seeking problems, solutions, opportunities, and mapping and/or diagramming resources and findings. Transects take many forms: vertical, loop, along a watercourse, sometimes even the sea bottom.
- Timelines and trend and change analysis: Chronologies of events, listing major local events with approximate dates; peoples accounts of the past, of how customs, practices and things close to them have changed;
ethno-biographies - local history of a crop, an animal, a tree, a pest, a weed ...; diagrams and maps showing ecological histories, changes in land use and cropping patterns, population, migration, fuel uses, education, health, credit ..., and the causes of changes and trends, often with estimation of relative magnitude.
- Seasonal calendars - distribution of days of rain, amount of rain or soil moisture, crops, women's, children's and men's work including agricultural and non-agricultural labour, diet, food consumption, sickness, prices, migration, income, expenditure, etc.
- Daily time use analysis: indicating relative amounts of time, degrees of drudgery, etc., activities sometimes indicating seasonal variations.
- Institutional or Venn diagramming: identifying individuals and institutions important in and for a community or group, or within an organisation and their relationships.
- Linkage diagrams: of flows, connections, and causality. This has been used for marketing, nutrient flows on farms, migration, social contacts, impacts of interventions and trends, etc.
- Well-being grouping (or wealth ranking): grouping or ranking households according to local criteria, including those considered poorest and worst off. A good lead into discussions of the livelihoods of the poor and how they cope.
- Matrix scoring and ranking: especially using matrices and seeds to compare through scoring, for example different trees, or soils, or methods of soil and water conservation, varieties of a crop or animal, fields on a farm, fish, weeds, conditions at different times, and to express preferences.

Group Processes and Analysis

- Team contracts and interactions: contracts drawn up by teams with agreed norms of behaviour; modes of interaction within teams, including changing pairs, evening discussions, mutual criticism and help; how to behave in the field, etc. (The team may consist of outsiders only, local people only, or local people and outsiders together.)
- Contrast comparisons: Asking group A to analyse group B and vice versa. This has been used for gender awareness, asking men to analyse how women spend their time.
- Drama and participatory video making on key issues: to draw together the problems, analyse and explore solutions.
- Shared presentations and analysis: where maps, models, diagrams, and findings are presented by local people and/or outsiders, especially at community meetings, and checked corrected and discussed. Brainstorming, especially joint sessions with local people.

Source: Adapted from Chambers and Guijt, 1995

Box 2.2 Basic principles of RRA and PRA

- offsetting biases: spatial, project, person-specific (gender, elite), seasonal, professional
- rapid progressive learning: flexible, exploratory, interactive, inventive
- reversal of role: learning from, with and by local people; eliciting and using their criteria and categories; and finding, understanding and appreciating local people's knowledge.
- optimal ignorance and appropriate imprecision: not finding out more than is needed and not measuring when comparing is enough
- triangulation: cross-checking using different methods, information sources, disciplinary insights, and informants in a range of locations
- outsiders learn directly from and with local people
- seeking diversity and differences

PRA processes furthermore emphasise:

- *facilitation skills* which enable local people to do the investigation, mapping, modelling, diagramming, ranking, scoring, quantification, analysis, presentation, planning themselves
- *sharing* of information, of methods, of food, of field experiences between and among NGOs, government and villagers
- *behaviour and attitudes* of external facilitators: critical self awareness; listening to villagers, and a relaxed and creative approach to the fieldwork
- *local action*-oriented discussion and planning: the process focuses on identifying local priorities and resources, and motivating women and men to implement their own plans (with or without support from external agencies).

Sources: adapted from Chambers 1992; Chambers and Guijt, 1995.

2.2 Data Needs and Collection Methods

In a RRA or PRA process, the process of generating information is as important as the information itself. After all, the main objective is to generate sufficient collective understanding of issues and interest to tackle a key development constraint. Therefore, the type of data to be gathered is not predetermined. General discussion topics are formulated and changed to reflect which issues local people consider important. Information generation and analysis is a joint activity that takes place in the field.

As the focus of analysis is the micro-level and diversity is sought, information will be detailed and site-specific. Extrapolation or generalisations are avoided. The emphasis on optimal ignorance means that precise and quantitative data is usually limited[4]. Instead the data sought is relative and explicitly subjective.

In participatory research, the researcher's role is not so much as an 'interviewer' and more as a facilitator, encouraging local analysis of information and data, guiding discussions and probing responses. Often a multi-disciplinary team is involved, which does not work with a pre-determined list of questions but stimulates discussions that allow key context-specific issues to emerge. The role of the outsider in a PRA process also includes facilitation of local development planning.

[4]Although see section 2.5.2 below.

However, these principles do not mean that there is no rigour in the way information is sought. Careful consideration of the selection of participants[5] is important to ensure that the diversity of views and livelihood types within a community are adequately reflected in the findings. All sorts of biases creep into the process of inquiry and dialogue if participant selection is carried out with little forethought. The type of sampling carried out to achieve this will depend on a range of issues. However, the central principle to note is that in participatory inquiry the concern is not only with the 'average' conditions, but with seeking and describing diversity.

Techniques such as reviewing secondary data, participatory social mapping and modelling and well-being ranking all help to build a clearer picture of the range of people within a community. The size of a sample will vary, and there are no strict rules. It is up to the judgement of the individual investigator or team. The inquiry continues until the team judges that further sampling will reveal no more variation or challenge existing hypotheses. Sampling stops when the findings are judged to be trustworthy (see 2.5.3).

Judgements must also be made about the type of information needed. If a qualitative statement about the range of conditions will suffice (eg most of the population grow maize), rather than a quantitative statement (eg X% of the population grow maize), then fewer people need to be consulted. Most descriptive statistics (average, median, standard deviation, standard error) are based on the assumption of full sampling procedures based on random sampling. However, it may be sufficient to have a quantitative description of range (maximum and minimum) and a qualitative description of the statistical distribution (ie., most households have Y) instead.

A range of different approaches to sampling have been used in the course of participatory research, and include:

Random sampling

1. *Systematic random sampling* can ensure a more even spread of views than is often achieved in purely random sampling, especially when time is short. If the investigators are using a map of the village a sample may be derived by choosing one home at random and then choosing the rest of the sample in a systematic way (eg every fifth house).

2. *Stratified random sampling.* To ensure that all sub-groups are represented in a sample it may be necessary to stratify the population by dividing them according to various criteria. The criteria chosen will depend on the question. For instance, if investigating how different age groups use wild resources, it would be necessary to divide the population according to age. Within each age group a random sample could then be used. Often the sample for each stratum is taken in proportion to the size of the whole stratum.

3. *Transect walks* can be another useful way of sampling a community. By walking along a straight line through the site under investigation (eg a village, catchment, region, building), a group of researchers and local people can pass through areas both rarely and commonly visited by outsiders. Transect walks allow researchers to interview the people they meet by chance along the way, in fields, forests and on the road/path. Features of interest and importance to the investigating team and local people can also be recorded and discussed. However, the researcher must be careful to allow for a biased sample, as the people encountered in this way will not necessarily be representative of the community as a whole.

[5] Participants include all those likely to be interviewed or involved in diagramming, ranking or other participatory inquiry exercises. In conventional terminology these are the researcher's "informants" or "respondents".

Non-random sampling

Non-random sampling is just as systematic as random sampling but needs less prior information. It does not require a full picture of the total population. It tends to be cheaper and less time consuming. Non-random sampling is based on the judgement of the researchers, and if they do not know the area well, their judgement of what is important may be inadequate and will introduce biases. Investigators inevitably have their own biases: for or against progressive farmers, for or against women farmers, for or against small farmers etc. However, good teamwork and self-critical reflection during the inquiry process should help to offset these biases.

1. *Purposive sampling.* Although the judgement appears to rest solely with the researchers, it can and will be informed by discussion with local people. For instance, in a study of wild resource marketing, the team would purposively select a number of 'typical' local people involved in marketing wild products for interview. The choice of what is deemed 'typical' cannot be tested. However, with active searching a team can be quite confident that the range of situations is covered in the sample. The building up in this way of case study profiles as a way of investigation is central to participatory inquiry.

2. *Key informants.* Key informants are individuals with specialist knowledge and experience. Examples might include old people who are knowledgeable about village history or carpenters who know about the wood products trade. Key informants should be selected carefully to reflect diverse perspectives and concerns within the study area. The ideal method is to identify various sources or groups from which the key informants can be drawn and select a number of each of them. If, during the course of the interviews, other persons who possess highly relevant knowledge and information are discovered, they can be added to the list of local participants in the inquiry.

2.2.1 To survey or not to survey?

A key advantage of participatory methods when used in the context of research, is that they can be more cost-effective in both time and money than most conventional long-term surveys. Indeed, a growing number of cases from Africa and Asia that allow comparisons to be drawn indicate that PRA for local-level analysis and planning yields positive results that are largely verified by subsequent formal surveys (Gill, 1993; Chambers, 1992; Inglis, 1990, 1991; Bernadas, 1991; Rocheleau *et al.*, 1989; 1997). These comparisons showed that little new or conflicting information was collected in the formal surveys.

For the past 60 years, the formal survey based on the use of a preset questionnaire has been the standard way for gathering primarily socio-economic information in more and less industrialised countries alike (IIED, n.d.). Much has been written on the shortcomings of the questionnaire for data collection (Chambers, 1983, 1997; Gill, 1993; Rhoades, 1990), yet they remain as popular as ever. In this paper we are only able to provide a brief overview of some of the pitfalls associated with them:

- When *constructing* questionnaires, questions and categories are decided away from the field (Chambers, 1997), often before even entering the country where the fieldwork is to take place. The concerns, concepts, categories and questions thus reflect those of the researchers, and not the reality of the 'respondents'. And the rigidity of the design and process means that the findings from questionnaires are limited to what was asked - there is no opportunity to explore new issues as they emerge.

- The *process* by which the questionnaire is administered also introduces inaccuracies. Interviewers in the South are more usually men than women. The presence of a clipboard,

pen, smart clothing, etc. will further separate the interviewer from the interviewee, creating feelings of intimidation in the latter. If foreigners are involved in questionnaire design and implementation, then translation is inevitable, a further potential source of misunderstanding (Gill, 1993).

- *The 'conspiracy of courtesy'* (Gill, 1993). Rural populations of developing countries tend to be warm and welcoming towards strangers. The stranger is looked on as a guest, and the duties of the host are often regarded as sacrosanct. Not understanding the real purpose of the survey, the respondents, where not apprehensive about the use that will be made of the information, try to please their guest by giving what is assumed to be the required answer (IIED, n.d.). Furthermore, what the interviewers write down may be influenced by what they know their superiors hope to find (Chambers, 1997).

- *Size and complexity.* When complex issues are under investigation, a great deal of information is required if the study is to be sufficiently comprehensive to be useful. The size increases when a multidisciplinary team is required and all the team members have their own questions. The result is usually a long and cumbersome questionnaire, containing many sensitive questions that are difficult to ask. Even without the sensitivity issue, sheer length alone will cause respondent fatigue and a tailing off of interest (IIED, n.d.).

- *Poor feedback and lack of transparency.* One of the major drawbacks of the questionnaire survey is the lack of feedback. A stranger arrives in a village or neighbourhood, and asks if he or she can ask a few questions. The respondent, out of courtesy, agrees to be interviewed. Little effort is made to develop rapport, or even explain fully the purpose of the exercise (IIED, n.d.). The enumerator, being simply a data-gatherer, has no way of knowing - and no responsibility to know - whether the answers being given are correct or whether they make sense to the broader framework of the survey. The interview complete, the enumerator departs and is probably never seen again (Gill, 1993).

At best, then, the structured survey produces accurate answers to prearranged questions. At worst it simply serves to confirm all of the biases of both the survey designers and the field enumerators (IIED, n.d.).

Box 2.3 The fallibility of questionnaires

"Exhausted researchers...stare at print-outs and tables. Under pressure for 'findings', they take figures as facts. They have neither time nor inclination to reflect that these are aggregates of what has emerged from fallible programming of fallible punching of fallible coding of responses which are what investigators wrote down as their interpretation of their instructions as to how they were to write down what they believed respondents said to them, which was only what respondents were prepared to say to them in reply to the investigator's rendering of their understanding of a question and the respondent's understanding of the way they asked it; always assuming that an interview took place at all and that the answers were not more congenially compiled under a tree, or in a teashop or bar, without the tiresome complication of a respondent"

Source: Chambers, 1983

Since participatory research has partly developed as a reaction to these survey-related biases, the methods and approaches are designed to overcome them:

- The emphasis on visual rather than verbal, and on relaxed rapport and transparency help to overcome the biases often caused by intimidation. One of the central features of PRA is the use of diagramming and visual sharing. In contrast with questionnaires, when local people are involved in PRA they do not have a sense that information is being handed over and taken away. Instead, by visually sharing a map, model or diagram, those who are present - insiders and outsiders alike - can contribute by seeing, pointing to, debating, discussing, modifying and refining conceptual diagrams or representations. Control over the creation and analysis of the maps, models or diagrams is shared. For example, in participatory mapping, villagers draw or model their village and its resources, often on the ground using local materials such as seeds, leaves and stones. Everyone can see what is being 'said' because it is there on the ground for all to see. This also has the advantage of creating information which literate and non-literate people alike can understand and contribute to (Chambers, 1992).

- As questionnaires and many conventional methods rely on absolute measurements, any inaccuracies derived from the survey stage will be magnified during the analysis. Analyses based on incorrect data will still give a misleading impression of accuracy. For these reasons, wrong data are worse than no data (Gill, 1993; see Box 2.3). Often, though, all that is needed for practical purposes is relative values (Chambers, 1992). Comparing can be quicker. Relative values are less sensitive, especially when discussing income and wealth. They are easier to use for seasonal and historical analyses: giving relative comparisons of, say quantities of fruits harvested in different months is easier to judge, less prone to error, and less worrying to give than absolute figures.

- The diagramming and other techniques are often conducted with different groups of people, and semi-structured interviews with individuals complement these group-based discussions. This mix of individual and collective focus allows for different perspectives to be revealed. However, if the focus is only on collective discussions, at it often is, it also means that data generated often represents an aggregate opinion (or that of the person with the loudest voice!), and cannot be used in economic models that require disaggregated data.

- Semi-structured interviews are often considered the core of good participatory research (Grandstaff and Grandstaff, 1987). In reaction to the rigidity of questionnaires, they follow a mental or written checklist of key issues, but are open-ended, allowing new lines of questioning and topics to be pursued.

- Data and perceptions are verified through triangulation, which allows an issue to be explored using different methods, each exploration building a more comprehensive understanding of complex local realities. Similarly, by using a single method with several different groups (men, women, children, etc.), the different perspectives surrounding a particular issue can be revealed. Trustworthiness of data is strengthened through community verification of the findings.

In Section 5 we discuss questionnaires in more detail, and suggest some ways forward based on complementary approaches.

2.3 Valuing Wild Resources Through Participatory Research

The assumptions central to participatory methodologies, described above, are particularly relevant for a local valuation of 'hidden' wild resources. The following have particular resonance when exploring wild resource use:

1. Knowledge is culturally and socially constructed. Therefore, there are inevitably multiple views of a particular situation and no single version of reality;

2. Resources are valued by different people at different times for a variety of reasons. Economic value must be understood in the context of wider normative values about resource use which are subject to change;

3. Resource use is continuously being (re)negotiated among many different people and groups. Such decisions must be analysed based on an understanding of existing patterns of power and control;

4. For the outside researchers and planners to understand local level resource use means exploring the local situation with local women and men, and developing a joint understanding of different perspectives;

5. The principle of 'optimal ignorance', of accepting that one cannot know everything and still make a positive difference, allows not only a greater role for researchers who do not yet know the new research site, but also creates a greater role for local people who may find it difficult to express values in absolute terms. As the focus is on information that is 'good enough', relative representations of value become much more meaningful and, therefore, acceptable as research inputs (Shanley *et al.*, 1997).

Some examples of how participatory methods can contribute to this understanding include:

- Social mapping and wealth ranking,[6] which can identify diverse socio-economic groups within a community, enabling data collection to focus on specific groups and thus understand how wealth and social aspects affect people's dependence on the hidden harvest;
- Seasonal calendars and timelines, which can be used to understand how the use and importance of wild resources varies over time;
- Maps, models and transects, which can be used to identify the location of wild resource harvesting areas. When created with elders, these can help understand historical changes in resource status;
- Matrix scoring and ranking techniques, which help to elicit the relative values of wild resources. These reveal not only how valuable different species are to different people but also how they may be important, including non-financial values and their relative importance as compared to other non-wild resources and activities;
- Product flow diagrams and tenure maps, which can be used to understand how wild resources and access to them are controlled, and to clarify who is and is not involved in their harvesting and management.

Using any or all of these methods with different groups (the worse-off and best-off, women, elders, children) will reveal the diversity and convergence of perspectives which surround wild resources and their uses. Section 4 of this paper gives more detailed examples of these methods.

[6] The term 'wealth'-ranking is misleading in the sense that discussions do not look at absolute financial incomes or assets. Instead, local criteria for well-being are elicited and relative rankings of people/households are made by local people, based on a specific criterion or the overall situation (depending on the objectives).

2.4 Limitations Of Participatory Approaches For Local-Level Valuation

Participatory approaches, with their emphasis on seeking diversity, qualitative insights and local detail have much to contribute to an understanding of local values of wild resources. However, these tenets also give rise to several limitations, especially when attempting to produce information to influence policy decisions.

2.4.1 Policy Use and Micro-macro Linkages

Detailed case studies, based on richly detailed qualitative data at the micro-level, may be interesting but are rarely accessible to decision-makers acting at a wider scale. Thus, while findings from participatory research may be more 'realistic', they may not be useful. Policy makers tend to want simple, generalised statements, not lengthy village-specific narratives that are not analysed in terms of policy implications. In general, the impact of PRA alone on influencing macro-level policies has been limited. However, the use of PRA findings as 'case studies' to enrich policy analysis are increasingly proving to be effective (cf *PLA Notes* 27). This type of qualitative analysis gives a human face to general statements and statistics, and it can demonstrate the diversity of local situations which policy should be able to take into account (Hinchcliffe, 1995; Thompson *et al.*, 1996). Micro-studies can transform policy thinking by challenging the underlying assumptions and presenting new perspectives, thus shifting the boundaries of the debates.

Nevertheless the bridge between the micro-study and more macro-policy making is perhaps the most difficult challenge of all. It requires a recognition that detail and difference matter, and that broad-brush policies often do not deliver the promised benefits. But it also requires better understanding of disciplinary languages and concepts, and an appreciation of aims. New methodologies and forms of communication are essential to combine the best of both approaches.

2.4.2 Quantification

The difficulty of quantification using participatory research techniques is closely linked to the issues raised above. As a key contribution of participatory methodologies lies in revealing and bringing together a greater diversity of perspectives, this often leads to complex, context-specific, and contradictory information. The focus is on perceptions of reality and local conditions. This means that quantification of 'facts' about local conditions tends to be difficult, if not impossible, and extrapolation or generalisation inadvisable. The use of groups to discuss issues, and the emphasis on relative, rather than absolute, values contribute to this limitation of participatory approaches in revealing useful quantitative information.

However, the *Hidden Harvest* and other studies that seek to combine complementary methodologies (cf. *PLA Notes* 28, 1997; Turton *et al.*, 1997; Norgaard, 1989) are rapidly challenging this common situation by generating considerable amounts of quantitative data in participatory processes that involve stakeholders in new ways. However, this use of participatory research is still relatively undeveloped and is rarely as systematic as a survey. This does not mean that the data generated is inaccurate, or a poorer reflection of reality (see below). However, it does mean that some people will be less willing to accept it than that generated through more conventional approaches.

2.4.3 Perceptions of Trustworthiness

It is common for researchers using participatory approaches to be asked *"But how does it compare with the real data"?* (Gill, 1991). The assumption often is that participatory methods are a short-cut approach to research, leading to unrigorous and inaccurate findings. But as Robert Chambers has recently reiterated (Chambers, 1997), the purpose of rigour is no more than to assure quality, seeking a close correspondence between data and physical and social reality, and minimising personal judgement. Traditionally, rigour is linked with measurements, statistical tests and replicability. These are often necessarily reductionist, however, as in order to be counted, the real situation has to be broken into parts. This does not work well in the social sciences as the simplifications which result, even when the measurements are accurate, miss or represent much of the complexity, diversity and dynamism of the system (Chambers, 1997). The way that trustworthiness is judged partly depends on who the information is for. For a farmer, the opinion of a neighbour may be infinitely more trustworthy than a statistically valid economic analysis. If it is for policy-makers, information must be accurate enough to be reasonably certain about the impacts of policies, which does not necessarily mean running the full gauntlet of statistical validity.

As with all research techniques, appropriate cross-checking of information, the recognition of biases and review of the information by peer groups are all essential in establishing the trustworthiness of information derived from participatory research (Lincoln and Guba, 1985; Pretty, 1994). Rigour is also assured through the quality of the interaction between outsiders and the community, the quality of outsider observation, and the quality of judgement (Chambers, 1997). When these activities are conducted consistently, participatory research provides high quality information and a cost-effective approach to local level assessments.

As with all research methodologies, however, the 'rubbish-in, rubbish-out' theory holds true. 'Bad' participatory research can produce findings as misleading as 'bad' questionnaires. One pitfall to avoid is excessive reliance on and mechanical application of the methods, and forgetting the importance of open-ended and probing discussion (Guijt and Cornwall, 1995). For example, diagramming is not a neutral medium. Diagrams are presented to and interpreted by the viewer, and meaning will be distorted in the translation from spoken words to pictures to written words. They can make for a more stimulating and in-depth discussion but do not replace it (Cornwall *et al.*, 1994). An over-reliance on information generated by large groups is also a problem: the size of the group influences who will speak and what will be said (Pottier and Orone, 1995; Mosse, 1995; Hinton, 1995). Information derived from group exercises needs to be cross-checked in individual interviews. Therefore, good facilitation is essential.

The apparent ease with which information can be gathered using participatory methods belies the more complex political and social context in which such interactions take place (Cornwall *et al.*, 1994). There is sometimes a naive assumption that by using participatory approaches, everything said by local people will be true and accurate. Yet external researchers can never present themselves to the community as neutral. Invariably people will modify answers to reflect the expectations they have of the external organisation, their perception of the research objectives, who else is present, and so on (Cornwall *et al.*, 1994). Furthermore, it is as well to be aware that there are limits to local knowledge, calling for a more *"discriminating attitude towards information gathered from communities using rapid methods"* (Shanley *et al.*, 1997).

2.4.4 Dependence on facilitation skills

There is much that passes as participatory research or action-oriented learning that is simply poor research or incompetent community development work. Much of this is caused by inadequate facilitation. The strong focus of participatory methodologies on group-based

interactions and unstructured discussions means that the facilitation skills of the researcher or extension agent are put to the test much more than in the administration of a questionnaire survey. The dependence on good quality facilitation for trustworthy and representative findings means that, in the absence of good facilitators, the methodology is unlikely to be fruitful. A good facilitator is one who will ensure that as many voices as possible are heard in a group setting, that marginalised people and groups are included, that lines of discussion are exhausted without exhausting the group, that final findings do indeed represent consensus or majority opinions, that sources of biases in information are noted, and so on. Clearly, this is asking a lot of any one person, and explains the increasingly strong focus on behaviour and communication skills in training on PRA and similar approaches (Mallik *et al.*, 1996; Absalom *et al.*, 1995; Guijt and Cornwall, 1995). It also explains the suspicion of the accuracy of findings that comes from critics of participatory research and development.

2.5 Conclusion

Criticism of participatory approaches has been growing as there is now sufficient experience on which to reflect. It should be remembered that, when compared with economics, it is a relatively recent methodological phenomenon with a series of 'childhood diseases' that need to be overcome. Many of the concerns voiced relate to trustworthiness and the dependence on excellent facilitation, and can be attributed to unrealistic methodological claims.

Nevertheless, participatory approaches clearly offer a powerful set of methods for understanding the complexities of wild resource use at a local level, for identifying changes over time and for understanding how values differ according to social status, gender, access conditions and so forth. The limitations of the approach, especially when trying to inform policy, highlight the importance of the search for complementarities in other disciplines. The next chapter explores the strengths offered by economics in this respect, as well as its limitations.

3. ECONOMIC APPROACHES FOR VALUING THE HIDDEN HARVEST

The role of economics in natural resource management has become increasingly important over the last decade. This follows recognition that the failure to account for the economic costs of environmental change leads to destructive policies, in particular inappropriate natural resource management policies. The major focus of recent interest in environmental economics has, therefore, been seeking methodologies to include a more comprehensive range of costs and benefits in economic analyses (cf Pearce *et al.* 1989).

Economic assessments are important for several reasons, not least because they dominate policy analysis. Economic analysis can help to describe the motivations of individuals. Looking at the costs and benefits as perceived by different social and economic groups can shed light on how they will respond to certain policies and programmes. Weighing up the costs of certain interventions against the benefits provides decision makers with an economic rationale for investing in certain options for environmental improvement or preventing environmental destruction.

The process of aggregation and standardisation inherent in most economic analyses provides ideal outputs for a policy planner or decision-maker. With valuation studies, the implications of different options are set out in a single, well-known currency, money, facilitating a comparison of their relative merits.

As an understanding of the underpinnings of both traditions is necessary, this chapter discusses first the general methodology and assumptions of economics and how economists approach empirical work. This is followed by a discussion of how mainstream economics approaches the subject of wild resource use, including an examination of valuation techniques and assessment frameworks. Lastly, this section identifies some limitations in the economic approach that are relevant to a *Hidden Harvest* context. This then provides a basis for examining ways to combine economics and participatory techniques, the subject of the remaining sections.

3.1 Methodology and Key Assumptions

Economic valuation techniques are rooted in neo-classical economics and its assumptions. The most fundamental of these is that resource use decisions are determined by the self-interested behaviour of individuals or groups of individuals, such as households and companies. Economic values are ultimately determined through a market process in which people or groups can express their preferences for different goods and services (cf Krugman 1995). These values are usually expressed in the outcomes of exchange (the price), ideally in the context of a perfectly competitive market, where many small buyers and sellers interact with the benefit of free flow of information. If all buyers and sellers have the same power and status in the market, and have access to the same information, then no single group or person can influence the market outcome in their favour (see 4.8 for more on this).

Where markets do not exist, such as for certain environmental goods or services (for example a medicinal herb that everyone in a given village collects and uses), environmental economics still assumes that the existence of individual's or groups' preferences for such goods or services means that economic values also exist. Though not measurable directly via existing market prices, these can be revealed through the use of 'constructed' or 'imputed' market techniques (see below).

Mainstream neo-classical economics does not address directly the social, political, institutional and cultural factors that influence economic behaviour. Where external factors may interfere explicitly with the functioning, or even existence, of markets, the resulting diversions from the model of perfect competition are viewed as market imperfections or distortions.[7]

Economic models tend not to examine the nature of decision-making but concentrate on the relationships between inputs and outputs. In order to highlight the relevant issues of complex systems, these models must be highly simplified and reductionist in nature. Mainstream economists tend to use models expressed in quantitative mathematical terms. The advantage of formalised models is that they offer a simplified representation of reality. Mathematical models also lend themselves more readily to producing predictions that can potentially be tested by empirical data.

3.2 Data Needs and Collection Methods

As with many social sciences, the theoretical models of economics define the data needs. In the areas of environment and development, two main sources of data are used: aggregate statistics and questionnaire-based surveys.

The preference of economists for questionnaire-based surveys as opposed to other means of collecting quantitative primary data (e.g. participant observation) is largely an historical accident (Lipton 1992). Indeed, economists have been relatively uninterested in the choice of data collection methods, displaying a clear preference to leave this area to other disciplines (e.g. sociology) and where possible, to work with secondary data. However, more recently, the growth of interest in contingent valuation surveys (see Box 3.1) has increased the attention economists devote to how information is elicited (Mitchell and Carson, 1989; Arrow *et al.*, 1993).

3.3 Classifying The Values Derived From Wild Resources

A major starting point for understanding the economic importance of the hidden harvest is clarifying the different ways in which these wild resources provide value. Environmental economics has provided a useful classification system.

The economic benefits of wild resources derive largely from their value as a consumption good, i.e. the *direct use* that people make of them as a source of nutrition and a means of subsistence. However, because many wild resources do not enter into trade but are consumed directly by the people who collect them, and also because they rarely come under effective ownership or management, their true economic significance is often ignored.

Besides their direct use value and like many other renewable natural resources (e.g. forests, wetlands, biodiversity), certain wild resources have important *indirect* or *non-use values* (see Table 3.1).[8] For example, some species of animals including bats, birds and bees play an important role in plant reproduction. This is an example of an indirect use value. Other plants and animals are prized for their rarity by conservationists, an illustration of a non-use value. In rural subsistence situations, wild resources and natural habitat often have important cultural values, another example of a non-

[7] Institutional economics, on the other hand, seeks in part to investigate how consumer preferences are influenced by many factors and may evolve over time (Jacobs, 1994).

[8] Non-use values can also be thought of as non-consumptive use values (Lampietti and Dixon, 1995).

use value. These other values are frequently neglected by those involved directly in the production and consumption of wild foods, or by government agencies charged with the management of wild food resources.

Table 3.1 Economic Values of Wild Resources

Use Values		Non-Use Values
Direct	**Indirect**	**Existence/Cultural**
Wild plants and animals *directly consumed* or marketed Examples: • food • medicine • construction materials *Non-consumptive* benefits of resources Examples: • shade from trees • use of forested area as burial ground • use of wild species for improving domesticated varieties	Species or system which supports other economic activities Examples: • role of forested areas in protecting watersheds by regulating flooding • nutrient cycling in agricultural lands promoted by forest or wild areas • pollination of crops provided by wild species of birds or bees	Species or system which is valued for its own right without reference to an economic use Examples: • cultural appreciation and heritage • beauty • motivation to bequest resources to future generations (including a wide range of resources i.e. biological diversity)

* Note that direct and indirect use values alike can have an option value associated with them. This option value is the amount someone is willing to pay to maintain the option of future use of those resources regardless of whether the resources are currently used. This may be represented as a separate category of use value (see Barbier, 1991). Here, it has not been included as it is highly unlikely that this value could be reliably estimated for wild resources in rural livelihoods. It should be pointed out that the inclusion of existence value in this paper does not mean that it is any easier to estimate or that it can be expressed reliably in monetary terms. However, from a conceptual point of view, existence values are usually considered to be far more significant than option values.

Source: adapted from Barbier, 1991.

This classification of types of economic values of environmental resources was developed in Western industrialised countries where environmental economics has concentrated on trying to value indirect and non-use values. In a *Hidden Harvest* context, valuation tends to focus more on direct use benefits (particularly those directly consumed or marketed) as these are often the most tangible and immediately relevant in rural livelihood strategies of the South. This is not to say that direct use values are more important than indirect or non-use values. But estimation of direct use values is more straightforward and in general, there is less controversy in reducing direct use benefits of foods and medicines to monetary terms than in doing the same with non-use values, or 'cultural capital'.[9] The extra information they provide can make a significant contribution with limited efforts. For their part, estimation of indirect use values generally requires significant amounts of detailed data on physical/ecological characteristics; thus they

[9] Although estimation of direct use values is not necessarily easy due to data limitations.

have rarely been directly assessed. As will be seen in Chapter 4, however, potential exists for looking at such values in relative terms, using local people's knowledge.

3.4 Approaches to Valuation

There is a range of economic approaches for estimating, in monetary terms, the different types of values derived from wild resources (Box 3.1).

3.4.1 Marketed Products

Net economic value is the basic concept of value generally used by economists for natural resources. Net economic value is calculated as revenue minus harvesting, processing and transport costs, including non-financial costs such as own labour (see Box 3.1).[10] Depending on information needs, net economic value can be expressed as an aggregate or an average figure. The concept can also be readily integrated into economic assessment frameworks such as cost-benefit analysis (Section 3.5).

Estimating net economic value per unit, for example per wild pig or per bottle of medicinal oil, requires two types of information: *prices* (in local markets) and *costs* per unit. Extending this to aggregate values also requires information on *quantities*: the amount harvested per unit of time. Often when collecting such information, a researcher gathers prices, costs and quantities for certain individuals, households or other groups and uses this to calculate the net economic value for that individual, household or group, as well as the value per unit harvested. This information can then be combined with, for example, the number of 'similar' harvesters in the village, to determine the aggregate net economic value at the village level. Thus, there are different levels at which values may be calculated or aggregated. Economics tends to be more interested in aggregating to ever higher levels (such as the value at the national level). But to understand local livelihood options and decisions, it is usually necessary to examine how these values vary among different groups (for example, men versus women).

Net *economic* value is expressed in monetary terms, although the price and cost information used in calculating it may not be initially available in these terms. The inclusion of non-financial costs and indeed the application of the net economic value to some resources that may not have market prices is what distinguishes it from the more restrictive concept of *financial* value. Thus, although net economic value is expressed in monetary terms for convenience and comparison, such a value does not usually represent a 'real' financial payment.

Calculating costs

Costs for harvesting, processing and transporting wild resources are typically of two types: capital (eg. tools) and labour. For capital inputs such as tools, the portion of their purchase cost attributable to harvesting, processing or transporting the product can be estimated using a simple depreciation approach based on information about the expected life of such a product and how often it is used (or how many units of the products it contributes to harvesting or processing). For example, in the Hadeija-Nguru wetlands in Nigeria, *yaadia* (*Leptadenia hastata*) leaves and fruit are harvested with an axe and are carried home in a sack (Figure 3.1). The axe might last five years, and may be used to cut several thousand fruits and leaves in this time. It will cost a certain amount to purchase/replace the blade. The sack might last only a month or two, but may cost next to nothing to replace. Both the leaves and the fruit can be

[10] Most wild resources are subjected to some degree of processing before being traded, and the inputs to this process form the major part of input costs. Often labour will be the main input to both harvesting and processing.

Box 3.1 Net economic value and relevant valuation techniques

Gross and net economic value can be calculated per unit of resource or over a period of time. Returns to labour is a related concept used to examine incentives regarding resource use and management or when valuing labour time is too difficult. These concepts can be defined as follows:

$$\text{Gross economic value per unit of resource (\$ / unit of resource)} = \frac{\textit{Price} \text{ per unit of product}}{\text{Amount of resource per unit of product}}$$

$$\text{Net economic value per unit of resource (\$ / unit of resource)} = \frac{(\textit{Price} \text{ per unit of product}) - (\textit{Cost} \text{ of harvesting, processing \& transport per unit of product})}{\text{Amount of resource per unit of product}}$$

$$\text{Net economic value per period of time (\$ / day, season, year, etc.)} = (\textit{Net economic value} \text{ per unit of resource}) \times (\textit{Quantity} \text{ harvested})$$

$$\text{Gross returns to labour (\$ / hour, day, etc.)} = \frac{\textit{Price} \text{ per unit of product}}{\text{Amount of labour time (or effort) per unit of product}}$$

$$\text{Net returns to labour (\$ / hour, day, etc.)} = \frac{(\textit{Price} \text{ per unit of product}) - (\textit{Costs} \text{ of harvesting, processing \& transport per unit of product } \textit{except labour costs})}{\text{(Amount of labour per unit of product)}}$$

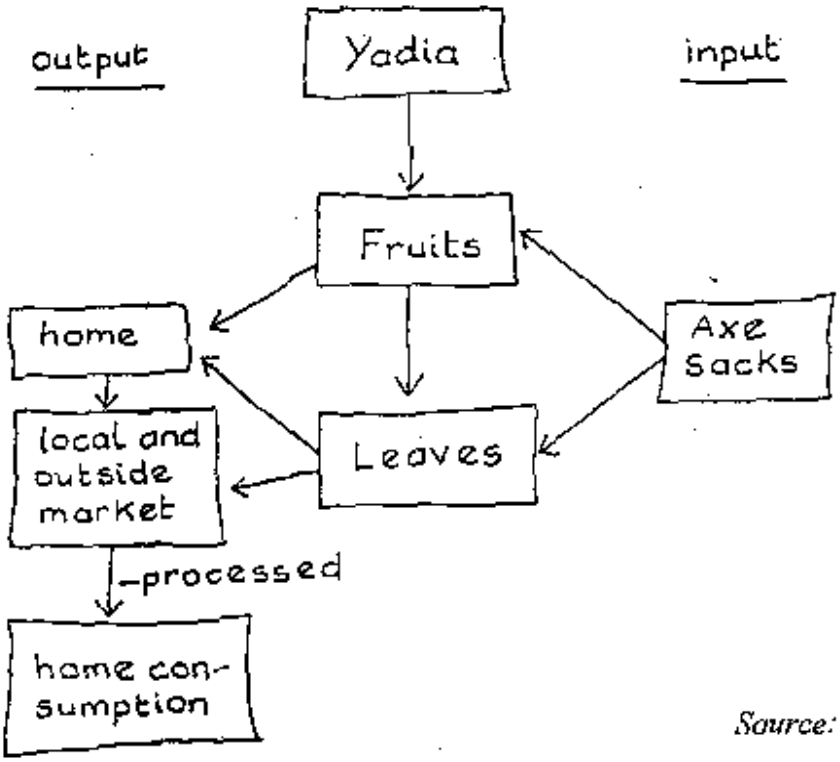
Note that the product and resource can be the same, as in wild fruit which is both. This box highlights the fact that the form (or units of measurement) in which a wild resource is marketed or consumed can be quite different from that in which it is harvested. For example, a wild animal might be hunted when in fact, its skin is what is sold, or vines might be cut and the basket from which they are woven is sold. The gross or net economic value can be calculated per unit of product simply by dividing by amount of resource per unit of product.

Valuation methods have been developed in environmental and resource economics for situations where the market price is not always available:

Related Goods:	- Price of equivalent *substitute* used (eg. domesticated goat instead of wild goat) - or equivalent of *barter* good used
Opportunity Cost:	- use costs as proxy for 'price minus costs' (usually mainly labour)
Contingent Valuation:	- ask for 'willingness-to-pay'; theoretically expect it to be equivalent to net economic value ('price minus cost')

sold at markets - transport to and from market will cost a certain amount, and market taxes may well be levied.

Figure 3.1 Processing *Yaadia* Leaves



Source: IIED/HNWCP 1997

In many cases though, most costs are in the form of labour spent by one or more individuals working for themselves. Economists have typically estimated the value of this time using local wage rates, for example for agricultural work. These may be adjusted by some arbitrary percentage amount to reflect the varying effort of different individuals, such as children versus adults, or the varying opportunity cost of labour depending on the season. However, this issue of determining a reliable local wage rate has several empirical problems, and suggestions for improving on these estimates are discussed in Chapter 4.

Net Returns to Labour

In some cases where labour is such an important component of the costs, eg. nut collection which only involves walking to the site and gathering them from the forest floor, economists choose to avoid the difficult task of assigning a value to this labour. An alternative approach is to calculate the *net returns to labour* which is the net revenue (revenue less non-labour input costs) per unit of labour time (Box 3.1). Thus, this is expressed as a monetary amount per hour or day worked. While not representing the value of the resource itself, it indicates the returns to an individual of devoting their time to a wild resource-based activity. Net returns to labour provide some indication of the incentives which people have to engage in harvesting and processing natural resources and can be compared to other opportunities.

3.4.2 Non-marketed Products

Economists encounter greater difficulty when assessing values for non-marketed resources or products. Indeed, determining monetary values for non-marketed resources has been a main

concern of neo-classical environmental economics. Where prices are unavailable, the alternative is to look for marketed *substitutes* for the resource in question or for *barter* exchanges involving the resource or its processed product (Box 3.1). For example, one wild pig might be traded for five medium size clay cooking pots. If the wild pig does not have a market value, but the pots do, then the value of the wild pig is easily estimated. Market values for these substitute goods or barter equivalents can be used to approximate roughly the implicit price (or 'gross', as opposed to net value) of the wild resource. Such estimates should be assigned an appropriate degree of uncertainty or confidence to avoid appearing overly precise. Using substitute or barter goods to estimate market values are methods that are often included under the terms, *surrogate market valuation* (Dixon *et al.*, 1994) or *related goods approaches* (IIED, forthcoming).

Opportunity Cost Valuation

Where reasonable data can be collected on the costs of harvesting, processing and transport, but reliable information on market value for a resource or a substitute is not available, some economists have used the total costs incurred from harvest to sale as an indication of the value of the resource. This approach is known as *opportunity cost valuation* (Box 3.1).

As there is practically no way of assigning a range of uncertainty or confidence interval to estimates obtained through cost valuation, such an approach would usually be a last measure. For example, consider first that economic theory indicates that the gross value of the resource will exceed the total cost of providing it, but not by how much.[11] But the 'implicit' (unmeasurable) market value might be greater than the cost by just a small amount in which case the net economic value (price less cost) may only be a small fraction of the costs. On the other hand, if the implicit market value greatly exceeds the costs, then the net value will be much larger relative to costs. Thus, it is safer to use a cost-based approach to estimate a gross market value or to assign a wide range of uncertainty (two to three orders of magnitude) if the resulting amount is being used as proxy for net economic value.

3.4.3 Indirect Use and Non-Use Values

As discussed above, wild resources or their habitats are often important for reasons other than their direct consumption or sale. While most of this section has discussed issues related to the estimation of direct use values, wild resources and habitats often have many indirect use and non-use values.

The main economic technique for assessing indirect values is the 'production function', or 'change in productivity' approach, which determines the physical or ecological relationship between certain resources or environmental functions and some economic activity. For example, in a situation where a natural forest regulates the hydrology for an adjacent field of crops, this indirect value of the wild area could be assessed by the decline in agricultural production that would arise if the forest was to disappear and lead to increased flooding and crop damage. Individual species may also have indirect use value, a classic example being the role of wild bees in pollinating domesticated crops. Of course, such relationships are very difficult to estimate empirically and the empirical studies that do exist often make very simple assumptions.

For non-use values, economics has developed the somewhat controversial technique of contingent valuation (Mitchell and Carson, 1989; Arrow *et al.*, 1993; Whittington, 1996). The

[11] Models in natural resource economics do indeed predict the path that this net amount (economic value) will take over time. But these theories are not very applicable where markets are poorly developed (which is why a price was not available in the first place).

contingent valuation method (CVM) involves the use of very complicated and carefully-structured questionnaires to ask individuals how much they are willing to pay for the maintenance of some benefits, such as a wildlife sanctuary nearby or continuing to receive drinking water from the clear mountain stream instead of the town treatment plant. While CVM can be applied to just about any type of value, its hypothetical nature has made it just about the only technique for environmental values, including non-use benefits of resources, such as cultural values. CVM has been applied in a limited number of rural subsistence situations (e.g. Kramer *et al.*, 1994; Gwaai Working Group, 1997). Such surveys assessed the total value of a resource or area (i.e. direct use plus indirect use plus non-use values), since it is difficult to separate these components reliably in such a complicated survey for communities not accustomed to the type of hypothetical and commercialised scenario used. It has been suggested that in subsistence situations it is better to ask people their willingness to accept compensation for the loss of a resource, instead of their willingness to pay for its maintenance (Gwaai Working Group, 1997).

Economists are often accused of exaggerating the relevance and reliability of CVM-based findings, and trying to place a monetary value on public goods that can not be valued in economic or utilitarian terms (Sagoff, 1988; Common, 1995). The extent to which communities can be asked to assess their cultural capital in monetary terms is highly questionable, particularly in less commercialised areas. Although respondents, when asked, might be able to express a numerical value, it is not clear whether the thought processes at work are actually those that economics assumes. For reasons such as this, CVM use in Latin America, Africa, and Asia has tended to concentrate on very tangible direct use benefits such as water provision and sanitation. In these cases, CVM is used more as a market survey instrument to assess whether potential infrastructural investments are warranted and will be successful (Whittington, 1996).

3.5 Economic Assessment Frameworks

As well as simply illustrating their importance, 'calculated' values of wild resources can also be incorporated into a variety of economic assessment frameworks for evaluating projects or policies. The most common of these is *cost-benefit analysis* (CBA) which is often used to assess the attractiveness, or not, of investing in a proposed project, such as the fencing off or regulating of access to a common property woodland. CBA involves a simple sequence of procedures (see Box 3.2). CBA has its origins in industrial investments when purely financial costs and benefits were examined. The development of the technique for public sector investments led to a number of refinements to the technique for social issues, such as policy distortions or distributional issues (see Chapter 4).

In CBA, the expected costs and benefits of a project are estimated over the defined lifetime of a project, or some appropriate time horizon.[12] Much can be learnt about a project from this step. Using the technique of discounting[13], this stream of costs and benefits are added up over the time horizon and combined to yield one figure on which the project's merits can be assessed. Such figures are usually expressed in terms of the following criteria: net present value (NPV), internal rate of return (IRR), and benefit-cost ratio.

[12] See Gittinger, 1982; Dasgupta *et al.*, 1972 and Little and Mirlees, 1974 for manuals on CBA.
[13] Discounting is discussed further in section 4.5.

Box 3.2 Cost-benefit analysis procedure

- The establishment of *decision criteria* by which to judge alternative options (eg. NPV, IRR).
- The *identification of costs and benefits*.
- The *quantification* of costs and benefits.
- The *valuation* of costs and benefits
- Setting an appropriate *time horizon* (usually life time of expected benefits of the project, eg. 50 years for a dam before it is expected to have filled with sediment)
- *Discounting* using real private or social rates of discount to estimate today's value of a future cost-benefit stream.
- Identification of variables with high *uncertainty* and the use of *sensitivity analysis* to show how different assumptions influence outcomes.
- Drawing *investment or policy* conclusions.

Source: Bojo *et al.* (1990)

Despite its widespread use, CBA has many limitations:

- It tends to emphasise only those elements of a project that can be quantified, meaning that certain important factors may well be omitted from the analysis. Environmental impacts are most likely to be overlooked as they are much less readily quantifiable than other aspects.
- The procedures of CBA tend to stress how information is organised and not the general quality of that quantitative information, which is often quite suspect.
- Qualitative trade-offs between different costs and benefits, which may be key to people's decisions (such as the important social value of group hunting despite being able to buy animal meat on local markets), may also be difficult to capture in the aggregate nature of most analysis.
- The selective use of costs, benefits and choice of discount rates may act as a legitimating 'cover' for a particular position, including possibly a decision that has already been made. Manipulation of figures, hiding of assumptions and the blinding by numbers are all potential abuses of economic analysis.

Thus, while economists emphasise the consistency of CBA procedures as one of its main attractions, it is important to remember that informed decision-making on a project cannot be reduced to just one criteria or number. CBA must be used together with non-monetary and qualitative information.

Such a framework is suited for assessing relatively small-scale projects. For larger interventions, other assessment frameworks are available, including 'input-output analysis', 'linear programming', and 'macroeconomic modelling'. Such tools are very technical but can, in principle, incorporate the economics of the hidden harvest, particularly using value estimates from micro-level studies. As these approaches are larger-scale, they are not the best starting point for linking PRA and economics.

Assessment frameworks such as CBA focus on evaluating the general public or social impacts of projects. But economics also deals with the behaviour of individuals and organisations, such as private firms, community groups, and households. Many assessment frameworks, including CBA, are often adapted to help understand the incentives that influence individual decisions, such as in rural livelihood strategies. Understanding the decision-making options of the 'managers' and 'harvesters' of wild foods is especially important in situations where a public authority seeks to influence the actions of these people, eg. by closing off forest areas, placing a species on the endangered list, or taxing wild harvests. From an economic perspective, there may be a basis for such interventions where there are substantial distortions in incentives, often resulting from the problematic management of wild resources. This is often the case with wild resources due to their 'hidden' nature.

3.6 Limitations of the Economic Approach for Local-level Valuation

The relative simplicity of economic models partly explains their appeal for policy makers and decision makers. Economics presents its analysis and information in a concise form that promotes the comparability of very different situations. But as economists recognise, there are several limitations to the approaches discussed above. These are often particularly apparent in a Southern, rural context, which involves different cultural situations and less commercialisation of economic activity than in the industrialised West where the models were developed.

3.6.1 Concepts and Terms

Economic analysis of rural issues in a Southern context is based on concepts, terms and units imported from Western experience. This issue is critical as these definitions structure the way research is carried out, determine the questions that are asked in the field and in a survey and, necessarily, characterise the results that are reached. The concepts and terms are part of everyday discussion. Yet different researchers, depending on their research tradition, define or interpret them in different ways.

Jodha (1986) provides a useful analysis of this issue based on his experience of working on longitudinal village economics studies in India (see Table 3.2). Each of the listed concepts or terms is conventionally interpreted by economists in a particular way. Certain aspects are included according to the type of models that guide the discipline. But certain aspects are also missed: data is not collected, questions are missed from the questionnaire schedule and the modelling analysis excludes such issues. If these aspects were trivial this would not matter. It is accepted that we cannot know everything and that interpretation is a matter of abstracting and analysing. However, if the definition of concepts and terms excludes information that is critical for our understanding of farming systems and livelihoods, then there is cause for concern. For nearly every concept in Table 3.2, critical aspects are generally missed by a conventional economic perspective.

Two examples of different perspectives on concepts and terms illustrate this point. First is the concept of household, which has been strongly debated (e.g. Guyer and Peters, 1987; Kabeer and Joekes, 1991). While it provides a useful framework for analysis, the household unit also hides key elements of economic behaviour and decision-making. Many researchers have highlighted the importance of intra- and inter-household relations in economic production activities. This challenges those traditional economic models based on the concept of the household. While more recent work in economics has looked at intra-household decision-

making and its effect on household behaviour, economists tend to rely primarily on household level models (Dasgupta, 1993).

Table 3.2 Definition of terms and concepts in agricultural economics highlighting aspects and included and missed (adapted from Jodha, 1986).

Concept/Term	Aspects included	Aspects missed
Household	Unit of production, consumption	Intra- and inter- household interactions
Household income	Major flows of cash and kind	Low value self-provisioning sources, yet regular and important
Yield	Output from main field in main harvest period	Between season harvests; harvests from other sites
Farm production	Major production activities	Intermediate activities, such as processing
Food consumption	Major recorded items: meals	Seasonal variations; snacks
Resource endowments	Private assets and production factors	Access to communal resources (labour, land etc.)
Labour	Person-hours or days, sometimes differentiated by age/sex	Variation in work intensity; differences between individuals
Capital formation	Major asset acquisition	Small assets acquired, borrowed, loaned.
Asset depreciation	Book-keeping value	Continued usability and recyclability
Efficiency	Single objective: production	Range of other, multiple objectives
Units	Conventional units	Local units

The second concept that illustrates the problem of narrow definitions is that of yield. Yield appears to be an uncomplicated term, defined as output per unit area. But, as anyone knows who has tried to carry out total yield estimates in the field, things are more complicated. Harvests do not happen at one time. Instead opportunistic harvesting of early crops occurs. Fields may appear as a pure mono-crop but intercrops may be concealed along field edges or in wetter areas. Weeds or other leafy vegetables may be harvested alongside the main crops, and often by different people at different times. Inclusion of the 'hidden harvest' makes definition of the apparently simple term 'yield' even more complex.

3.6.2 Economic rationality

Conventional economics is dominated by a series of assumptions, including that of market competition and efficiency (Jacobs, 1994). These assumptions may be so unrealistic as to omit key aspects of reality. For example, economic analyses often ignore the important role that indigenous institutions play in defining the nature and extent of activities to be undertaken by various groups within a community, such as harvesting certain types of resources. Another example concerns the assumption that households are driven largely by profit and welfare maximisation. This assumption does not always recognise sufficiently other, equally rational motives, such as maximising the likelihood of survival (Ellis, 1992). The bias towards theorising, at the expense of empirical work, means that economists frequently neglect to test the nature of hidden harvest decision-making adequately (Blaug, 1980).

3.6.3 Reductionism

Economics uses narrow or simple units and levels of analysis in order to examine issues on a wider scale. But such simple, reductionist analyses can be misleading, particularly where wild resources are concerned. Wild resource use is highly complex, with immense spatial and temporal variability. As mentioned above, it involves myriad interactions of institutional factors and social relations. Key issues can easily be left out in models developed in other countries and for other situations. Unless a differentiated analysis is carried out, it is difficult to highlight the fluctuating value of resources according to season, or according to different viewpoints. For instance, in drought periods the value of wild foods may increase significantly as compared with other periods, particularly for poor households. What is their value then, and how can this be incorporated into long-term planning?

Unfortunately, economics also tends to ignore aspects of spatial variability. Much economic analysis of wild resources has concentrated on deriving values on a per hectare basis in order to compare the relative values of the range of products derived from areas such as natural forest (Lampietti and Dixon, 1995). But this approach ignores large differences between areas on both a micro and macro scale. Pursuing an average per hectare value for wild resources incorrectly assumes that wildlands are uniform, and thus can be sub-divided for micro-research and extrapolation of findings. Also values that only occur for larger scale areas, such as hydrological regulation, may well be ignored if the research unit of a hidden harvest area is too small.

Similarly, different groups enjoy various type of benefits provided by wild resources at different times. But such variations will be lost in one aggregate figure of 'what the hidden harvest is worth'. These assessments must be situated within a wider understanding of total value derived from more qualitative understandings of local perceptions and relative rankings of different benefits, or types of values and perceptions of different groups (see Chapter 4).

3.6.4 Distribution and equity

Neo-classical economics has long concentrated on the objective of efficiency in resource allocation and neglected equity concerns. The use of a single currency unit and the reductionist approach means that costs and benefits felt by different groups are regularly aggregated into one net figure without considering differing levels of income, wealth and opportunity. For example, in calculating a net present value (NPV) in a CBA of a proposed agricultural development project, the monetary gains enjoyed by male farmers in a village would be reduced by the loss to poorer women who could no longer harvest wild foods from lands that have been converted to intensive cultivation.[14] The implicit ethical or value assumption is that one dollar of gain to the men is equal to one dollar of loss for the women. Thus, serious distributional concerns can become hidden under the elevated goal of efficiency. While economists have attempted to include distributional issues in the evaluation of policy alternatives (ie. weighting), this has been the exception and not the rule in empirical applications.

3.6.5 Quantification and monetisation

Economics focuses on the concept of relative value, often assuming that everything can be priced. However, many people feel strongly that some resources, or the functions performed by those resources, cannot be given a price tag. For example, certain species might play an essential role in ceremonies and will be irreplaceable. In other cases, if the value is too difficult

[14] Or worse, traditionally this cost might not even be valued, thus inflating the net benefit of the project.

or costly to estimate reliably, as with many ecological functions, then this important economic role may subsequently be lost in the analysis.

This highlights the tendency of economists to place too much emphasis on a resource's quantitative value. On the one hand, simply knowing the economic value should not be considered an endpoint. To understand the role of a resource in local livelihoods requires much more information than just its economic value, including at the very least, who benefits most from its availability and how it is linked to other production activities. On the other hand, if it is not possible to estimate the value in quantitative or monetary terms, that does not mean that nothing is known about the economic role of the resource. In some situations, estimating the actual value may not be necessary for the needs of policy or decision-makers.

3.6.6 Poor Data

Even if assumptions are relatively realistic, the emphasis on quantification means that data used is often of limited quality. Data for economic analyses are frequently derived from interview-based questionnaires. These commonly contain many non-sampling or measurement errors which are subsequently ignored in any sophisticated statistical analysis that is undertaken (Gill, 1993, and see Section 2.2.1). Unfortunately, too few economists have chided their colleagues for their lack of attention to the quality of data (Leontieff, 1971; Hill, 1986). And while random sampling techniques may be appropriate for statistical analysis, they also may miss out on particular individuals in a community who play a key role in some economic activity. Economists have been chastised by respected authorities within the discipline for not devoting enough energy to empirical analysis.[15] Thus economists have been accused of neglecting to produce testable predictions from their theories (Blaug 1980) and of not devoting sufficient concern to data collection (Mayer 1980) or to the quality of the data used (Leontieff 1971).

Despite these limitations, economics has an important role to play in understanding and influencing decisions concerning the hidden harvest. As mentioned at the outset, economics provides a powerful body of theory and evidence for explaining and predicting human behaviour. This section has concentrated on a number of limitations or problems facing economics in an area where it has a weaker track record: the behaviour of relatively natural resource-dependent communities in the South. Economics has generated useful insights in this area but still has considerable potential to address current limitations. Many of these issues could be tackled simply by economists working by themselves within their existing frameworks. However, this paper seeks to explore how these limitations can be reduced or overcome by combining economic with participatory approaches, in particular PRA.[16] Thus, Chapters 4 and 5 discuss the potential complementarity between economics and PRA in terms of many of these limitations.

[15] Empirical: resting on trial or experiment; known only from direct experience (Chambers Dictionary).

[16] Although combining of methodological traditions can be even more fruitful if economists are willing to think creatively and innovatively about some of their own preconceptions and assumptions that are usually rooted in a northern cultural and social context.

4. METHODOLOGICAL COMPLEMENTARITIES: LEARNING FROM THE HIDDEN HARVEST CASE STUDIES

4.1 Introduction

The preceding chapters have discussed the general perspectives of participatory approaches and economics and their approach to wild foods separately. The five *Hidden Harvest* case studies conducted to date (in Botswana, Zimbabwe, Brazil, Nigeria and Papua New Guinea - see Appendix 1) have provided numerous examples of participatory methods and economics working together to understand local-level perceptions of wild resource value.

This section draws on these case studies, and other similar research, to give examples of how economics and participatory research can be used together. The two methodologies were combined in different ways, often with economics helping to structure the valuation question and the data needs for answering it, and participatory research helping answer it, and moving beyond a narrow sense of value. The examples given below help us understand how using this approach, value can be differentiated according to:

- distribution and equity;
- space;
- time (seasonality, historical trends, sustainability);
- risk, uncertainty and preference
- indirect and non-use values;
- institutional contexts; and
- marketing relations.

4.2 Distribution and Equity: Understanding Differentiation within Communities

There is no such thing as an homogenous community. Great diversity in wealth, ability, need, age, and power exists in every rural population. Individual people's social characteristics influence the degree to which they value and depend on wild resources and areas, so understanding such differentiation within communities is essential. This issue presents a clear area of complementarity between economics and PRA.

Economics often concentrates on efficiency issues at the cost of equity concerns. Nonetheless, economic analysis can help identify who is benefiting from certain resources, and the incentives facing different groups. But economics is not very helpful for identifying the relevant groups within communities. When economists do include distributional issues in their empirical analysis, they typically look at the household as the basic decision-making unit, emphasising inter-household differences and ignoring strong intra-household differences, such as those caused by gender or age. This bias partly reflects the dominance of surveys designed to elicit information from households.

Participatory research can be very helpful for understanding key differences within communities. *Well-being ranking* techniques (cf. RRA Notes 15) are a more subjective way of

assessing socio-economic diversity according to local criteria.[17] This technique can be the basis for sampling households from different socio-economic groups for further discussions or even interviewing, as happened in the *Hidden Harvest* assessment in northern Nigeria (Box 4.1).

Other PRA techniques, such as tenure maps and conflict analysis using Venn diagrams, also help reveal where differences lie. More generally, the PRA approach, which strongly emphasises the importance of good communication skills, helps practitioners or researchers to become aware quickly of how communities may view themselves and what sub-groups or particular interest groups are identified.

In many cases, intra-household differences may be even more prominent than differences between households. PRA helps understand the role of gender as a key axis of social difference. *Hidden Harvest* case studies have shown that gender greatly determines an individual's dependence on wild resources and, therefore, incentives for their management. Women in Muruteuazinho (Brazil), more so than men, are key users and processors of wild plants with medicinal value (Guijt, n.d.). In Botswana, women collect palm leaves to weave baskets and brew beer from wild fruit to generate income (Bishop and Scoones, 1994). In Nigeria, women rely on soil resources such as clay and potash to earn an income (IIED/HNWCP, 1997). Research must focus on women and men as distinct groups of resource users. Without a gender-differentiated valuation study, policies may be identified that will have adverse effects for those who have been ignored by the study.

The diversity pursued by PRA is not easily compatible with the reductionist tradition of economics to summarise and simplify. When trying to understand the value of wild resources, economic contributions must recognise that 'one number' (such as net economic value per hectare) will never tell the whole story. It is crucial that differences between groups and individuals be examined. On the other hand, PRA must also recognise that for information to be practical and accessible to policy or decision makers, it is necessary to concentrate on only the most salient or important differences.

It is impossible to offer a single framework for analysing the distributional and equity issues in wild resource use. The variability of differences between communities and situations means that assessments must identify the relevant groups each time. Moreover, while some PRA techniques, such as well-being ranking, are specifically designed to examine differences within communities, other important distributional information will come up during a PRA process and cannot be reliably predicted in advance.

4.3 Spatial Aspects of Value

The occurrence of wild plants and animals is clearly site-specific. Understanding the spread of wild resources can help to assess the economic value of certain sites and the management priority that people might attach to them. Thus, the variation of quality and quantity of wild resources in an area must be understood if the value of these resources is to be aggregated over wider areas. How this value varies from one land type to another across the community's landscape may strongly influence people's resource management decisions.

The main spatial preoccupation of neo-classical resource economics has been on the distance between a resource and where it is to be marketed or consumed. The greater this distance, the lower the economic value of each unit of resource is likely to be, primarily because of increasing

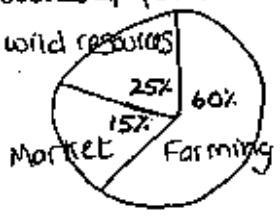
[17] A very similar technique was used by Hill (1970) in her economic and anthropological research in West Africa.

Box 4.1 Sources of food and income in Margadu Zaila Ward

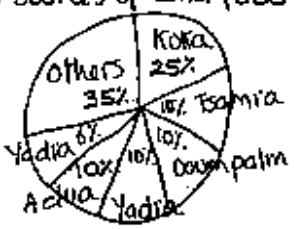
As relative well-being or wealth is a fairly sensitive topic for discussion, the research team waited until they had built some rapport and trust with the villagers. Representatives were selected from each well-being group (from worse-off to better-off) to explore how well-being influenced people's dependence on wild resources. One technique was to ask different people to use local shells to create piles to represent their different sources of food. If they mentioned wild foods, they were then asked to do the same exercise again, this time to show the species of wild food on which they relied. The proportions were converted into the pie charts below. These show that the lower and middle income groups alike depend on wild resources for a significant proportion of their annual food, especially the doum palm (*Hyphaene thebaica*). The poorest household relied on the greatest diversity of wild food sources, whilst the richest household did not rely on wild resources at all, either for income or for food.

'Poor' household

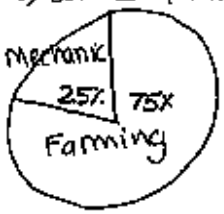
g) Sources of food



h) Sources of wild food

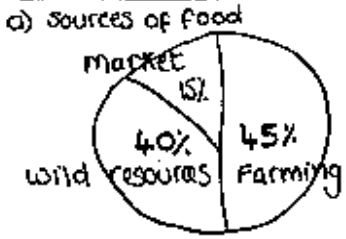


i) Sources of income

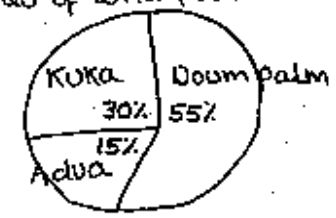


'Rich' household

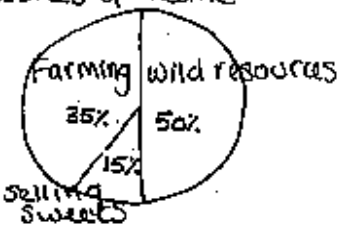
a) Sources of food



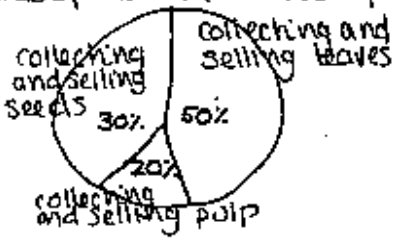
b) Sources of wild food



c) Sources of income



d) Sources of income from doum palm



'Richest' household

e) Sources of income

f) Sources of food

Source: IIED/HNWCP 1997

costs of transportation. But mainstream economics has devoted little effort to examining how economic landscapes are created, ie. how certain economic activities come to be located in one place and not another (Krugman, 1995).[18] Instead, economists have proposed that different activities or land-based production systems will tend to be located where they lead to the generation of the greatest economic return given physical constraints. It is recognised that market 'imperfections' and social processes will interfere with this allocation but economists usually argue that such an approach should be pursued in public decision-making to promote economic efficiency. Indeed, this is the rationale behind undertaking a cost-benefit analysis of development initiatives such as agricultural and forestry products, to see if they yield the greatest value for the area of land under consideration.

Yet economists require some understanding of spatial variation and of the geographically appropriate units of measurement if aggregation of values to a larger scale is to be achieved at all.[19] As the location of wild resources affects their value, the incentives to manage these resources will also be influenced by spatial issues. In addition to issues of location, other spatial aspects, such as the relative diffuseness characterising resource distribution, will affect how easy it is for communities to maintain control over resources in the face of economic and social change (e.g. migrations and population growth).

PRA offers several techniques for investigating this issue. For example, resource maps and transects can help explore the spatial occurrence of wild resources. These tools can also be used to investigate economic differences in the use or importance of these resources that arise because of spatial differences (Box 4.2).

In Muruteuazinho, Brazil, farmers identified eight different types of land, including four stages of shrub land and two types of forest (Guijt, n.d.). Each type of shrub land is characterised by differing levels of occurrence of key wild resources, and therefore, is perceived to have different values. Some plots are considered virtually worthless from a wild resource point of view. The lower the perceived value, the lower the incentives to manage those lands.

In Mare village, Papua New Guinea, groups discussing firewood used flow diagrams and pie diagrams to understand how much wood was collected from each of the four land use types. This led to further discussions about time spent collecting, other costs incurred, frequency of visits, and size of each headload.

Simple mapping exercises can be useful for exploring how the supply of wild resources to local markets varies due to differences in ecology and land-use, as well as variations in transport infrastructure and other economic conditions. Understanding this spatial patterning helps reveal the key factors influencing marketing possibilities (Scoones, forthcoming). In a study in the Zvishavane region of southern Zimbabwe, differences in transport costs, price levels and market location were mapped in a number of individual exercises with producers and traders in different market centres

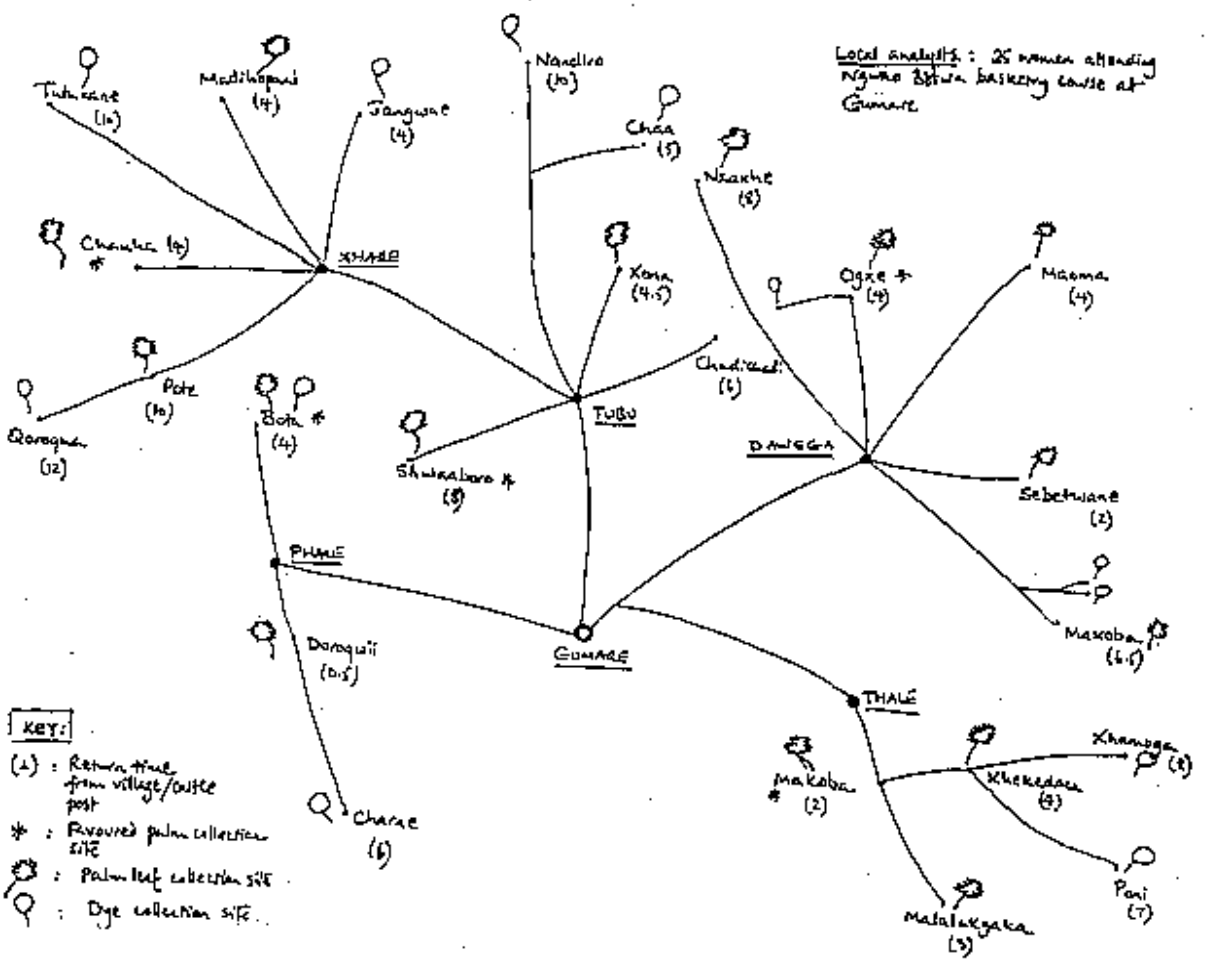
[18] The lack of work of this area by academic neo-classical economists has been explained by Krugman, an eminent mainstream economist, as a result of the formidable mathematics necessary to formalise models in this area which have only recently become somewhat tractable (Krugman, 1995).

[19] Care must be exercised though to ensure that this aggregation does not lead to the use of measures such as the average value of wild resources per hectare where the unit of land being referred to is not defined. Otherwise, situations arise in which the value of wild resources is averaged over large areas where they are not even being produced and this might be compared to alternative production systems (e.g. monocropping agriculture) without recognising the variable nature and potential of land, even within a given locality. Information on price differences at the key market centres were related to local differences in supply and demand. For instance, the high availability of indigenous fruits in rural areas means that markets are virtually non-existent and prices almost zero. But with increased distance from the supply centres prices increase reflecting both increased demand and higher transport costs.

(Gumbo, *et al.*, 1989). Figure 4.1 shows the final map, which was compiled from all these individual exercises. Information on price differences at the key market centres were related to local differences in supply and demand. For instance, the high availability of indigenous fruits in rural areas means that markets are virtually non-existent and prices almost zero. But with increased distance from the supply centres prices increase reflecting both increased demand and higher transport costs.

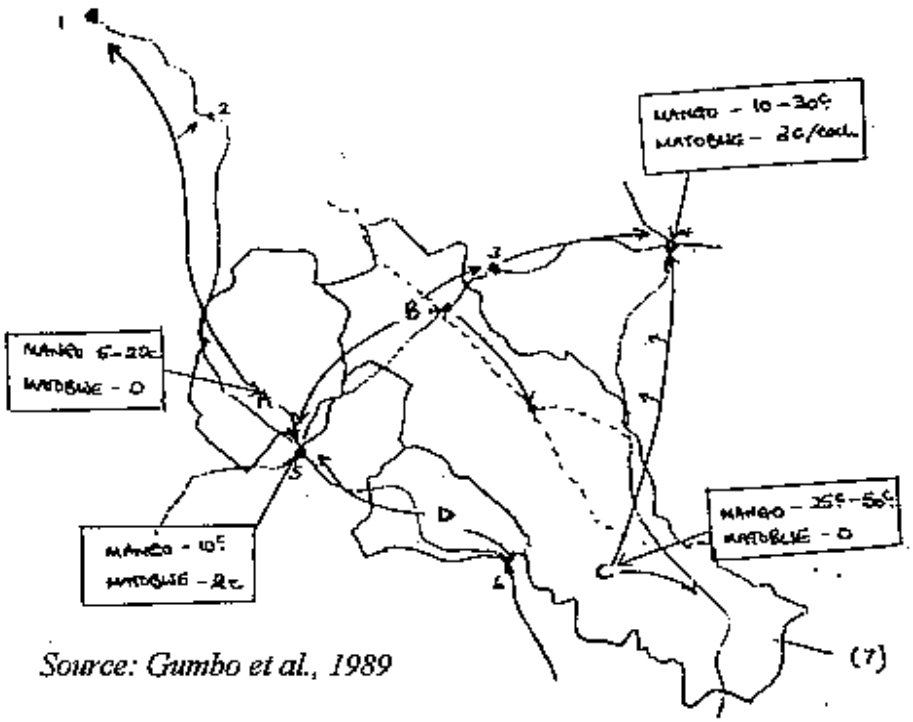
Box 4.2 Map of palm and dye collection sites around Gumare

In Botswana, a map drawn by women shows the walking times involved in harvesting palm leaves and bark and root dyes from different sites. This information explains how the returns to labour (the largest input involved in harvesting this resource) varies from site and site and how the incentives to harvest alternative sites will therefore also be different. The women also identified other criteria by which they judge sites including availability of the trees, quality of the resource, and dangers of travel. Some of these criteria were then used in a matrix ranking to show how the women make trade-offs between spatial criteria and other characteristics when deciding what site best serves their needs.



Source: Bishop and Scoones, 1994

Figure 4.1 Fruit marketing map for Zvishavane/Chivi areas, Zimbabwe, showing production and marketing areas and price levels



Towns	Project Areas
1. Gweru	A. Runde
2. Shurugwi	B. Chivi North
3. Mashava	C. Chivi South
4. Masvingo	D. Mazvihwa
5. Zvishavane	
6. Buchwa	
(7) Chiredzi	

Marketed Fruit Trees	
Orange	Mango
Guava	Peach
Avocado	Lemon
Apple	Mulberry
Mutobwe	
Mutamba	
Musuma	
Makoyo	
Dzvirimombe	
Munyii	
Muthuku	
Mukwakwa	
Muchakata	
Musumi	
Dhorafia	

Source: Gumbo et al., 1989

Scale: 1:1,000,000

4.4 Time

How values of wild resources change during the year, and from year to year, and how these changes can be compared, are questions that allow for considerable methodological complementarity between economics and participatory research. This section discusses seasonality, risk, uncertainty and time preference, and historical trends.

4.4.1 Seasonality

The availability of wild resources is often highly seasonal, coincident with patterns of plant growth, such as tree fruiting seasons. The value of products to local communities will thus vary over the year, as will their prices and supplies where the goods are traded. Despite such variation, quantitative economic analysis tends to look at average or aggregate values over an entire year, partly because this is the time period most commonly used for organising production data and in assessment techniques, such as cost-benefit analysis. Of course, this practice also reflects the reductionist goal of simplifying and aggregating.

But where people are constrained by access to credit markets or living at subsistence levels, the economic importance of certain wild resources may have less to do with their market or economic value and be determined more by when they are available in relation to other sources of income or food. For example, when cash levels need replenishment in the village of Jacarequara, in the Brazilian Amazon, farmers harvest the *malva* (*Urena lobata*) that they allow to grow wild on some of their lands and process it to extract its fibre (Guijt, n.d.). Although of very low market value, it is a dependable, year-round source of cash. Policies that influence malva market prices or create other, more reliable, income sources would influence the extent to which farmers would allow the shrub to grow wild.

For reasons such as this, PRA places a great deal of emphasis on the seasonal nature of livelihood strategies. PRA uses seasonal calendars to explore the fluctuating use and availability of and dependencies on natural resources over the year. These techniques can be used to directly explore a number of seasonal aspects of wild resource use including:

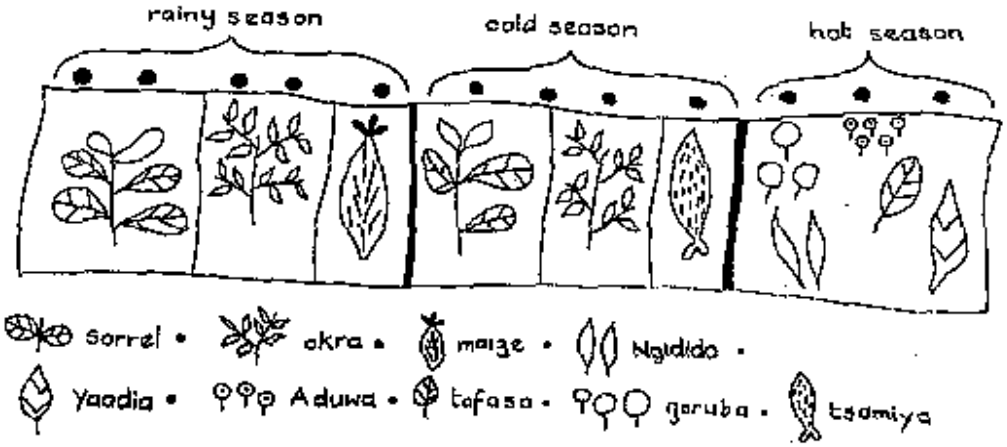
- relative quantities harvested
- absolute or relative product prices
- the relationship between various economic activities, e.g. harvesting wild resources, agricultural tasks, off-farm employment, etc. (see Box 4.3)

In Mare village, Papua New Guinea, calendars created to understand seasonality in animal hunting and consumption, revealed much quantitative data. This included: number of animals caught per trip, frequency of trips, size of animals, market differences in prices, travel times, how many and which inputs were used in which season at what cost, etc.

Assessing the seasonal variations in the value of labour is one area of considerable complementarity between economics and PRA. As mentioned in Chapter 3, a major difficulty in determining the net economic value of various wild resources arises from the fact that people's own labour is often the main input into harvesting and processing such products. What price to put on this labour has long been a thorny issue for economics with the usual practice being to assume some proportion of the agricultural wage rate (from as close as possible) based on some simple subjective judgements. A major difficulty with this approach, of course, is that the relative value of someone's time and effort depends on the availability of

Box 4.3 Seasonal sources of food, Nigeria

In Nigeria, a combination of semi-structured interviews and seasonal calendars was used with separate groups of men and women to investigate the seasonal use of wild tree products. The calendar below was drawn by a group of old women. It shows how they rely entirely on wild foods (*yaadia, aduwa, tafasa, ngidido*, and *goruba*) during the hot season. Approaching the rains and the rainy season itself are the hardest times of year for men and women alike. Food stocks are low and farming has high labour demands. The calendar also shows how the seasonal availability of wild food sources complements that of cultivated foods (okra and maize).



Source: IIED/HNWCP, 1997

alternative work possibilities which can vary considerably throughout the year. For example, in agricultural communities, the planting and harvesting seasons tend to be some of the busiest in the year, when people work very long hours and often hire others to assist them with these tasks. Between such seasons, while other important tasks need to be done, many individuals

may find they are not under such time pressure. Seasonal calendars are often used to explore different demands on people's time throughout the year. Through such PRA techniques, these relative changes could potentially be quantified and possibly 'anchored' with absolute values (such as agricultural wage rates). Other factors to take into consideration include the amount of effort involved, as opposed to simply time, and what type of people are involved (children, adults, elders, women, men, etc.). This approach could provide a major breakthrough in estimating the economic benefits derived from wild resources.

4.4.2 Historical Trends

Any understanding of the value of wild resources requires some information on their availability and importance over time. As mentioned above, the supply of these resources often fluctuates from year to year for a variety of reasons. Thus, one year's harvest will not be representative of what happens on average, while the average may conceal repeated movements between very low and high amounts.

Economics looks at changes over time in various ways. As discussed above, a common procedure is simply to sum up a stream of costs or benefits over time using a discount rate. An alternative is to use an expected value, based on historical or conjectural data on the extent of variability of a certain amount, such as tree fruiting, together with probabilities of various outcomes. In some cases, economists may also conduct more sophisticated quantitative analyses, that simulate repeatedly an analysis by varying the uncertain factor.

All of these methods require data on how certain values have changed in recent times as well as what future expectations are. For historical data, economists often rely on government statistics. But these are rarely available for wild resource use. Another common source for local-level historical data is household surveys in which respondents may be asked for quantitative information on factors such as harvests and prices in previous years. But research has shown that people's ability to recall accurately this type of information is often limited, although this may not be apparent to the researcher.

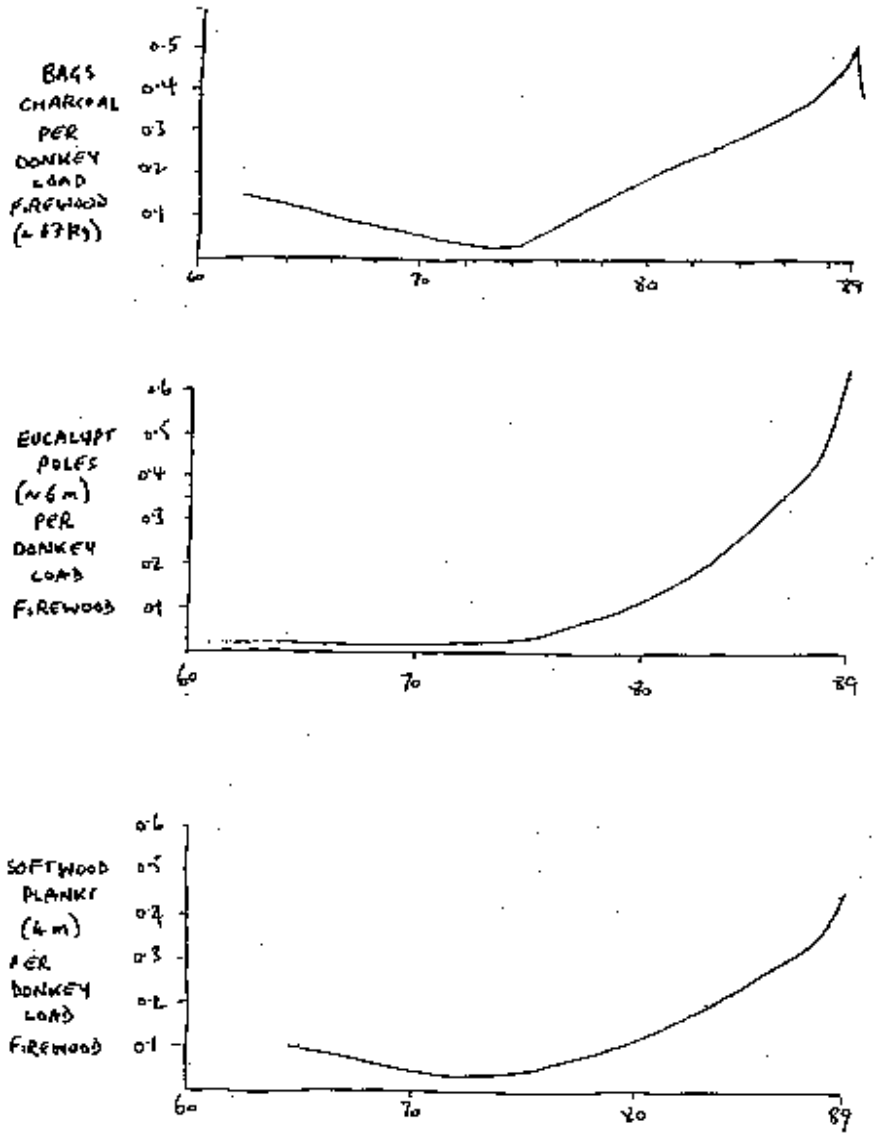
Assessing historical trends and fluctuations is an area where considerable complementarity can be found between PRA and economics. Participatory techniques such as trend analysis (Box 4.4), historical mapping, transects and interviews with community elders can all help understand changes in resource use and associated economic conditions. The emphasis of such techniques on collective discussion and visual communication promotes greater input from a range of community actors, with opportunities for people to discuss and reach agreement on recent changes in local conditions. These techniques tend to emphasise relative changes and usually provide no more than general estimates but have potential for generating more quantitative data, where needed.

4.4.3 Sustainability

The discussion from the previous section can be extended to exploring sustainability issues. Economics usually relies on the natural sciences for information about sustainable harvest levels and the population dynamics of wild resources. Bio-economic models can be used to determine the 'optimal' rate of harvest of a renewable resource, as a function of the natural rate of growth, production costs and prices, the probability of exogenous shocks (e.g. the risk of a price change or disease outbreak) and, crucially, the discount rate (Clark, 1990). The use of mathematical bio-economic models is quite difficult with many wild resources, which typically form part of a complex system of natural dynamics. Such models are most likely to be useful in analysing the hunting and

Box 4.4 Analysing price trends of tree products in Blue Nile Province, Sudan

In Sudan, trend analysis was used with local informants to establish the basic trajectory of key trends affecting non-timber tree product markets. The figure below shows the price trends of three tree products produced in a village in Blue Nile Province south of Khartoum, Sudan. The prices are expressed in terms of donkey loads of firewood, a locally available commodity. The diagram reveals that the relative value of local wood products has consistently increased over time. This has led to a greater reliance on external markets. According to local informants, the scarcity of local tree products had increased significantly since the 1960s due to land clearance around the village. The opportunities for trade in wood products increased in recent years as a result of improvements in roads and the availability of eucalyptus poles from irrigated plantations around Khartoum.



Source: Pretty and Scoones, 1989, cited in Scoones, forthcoming

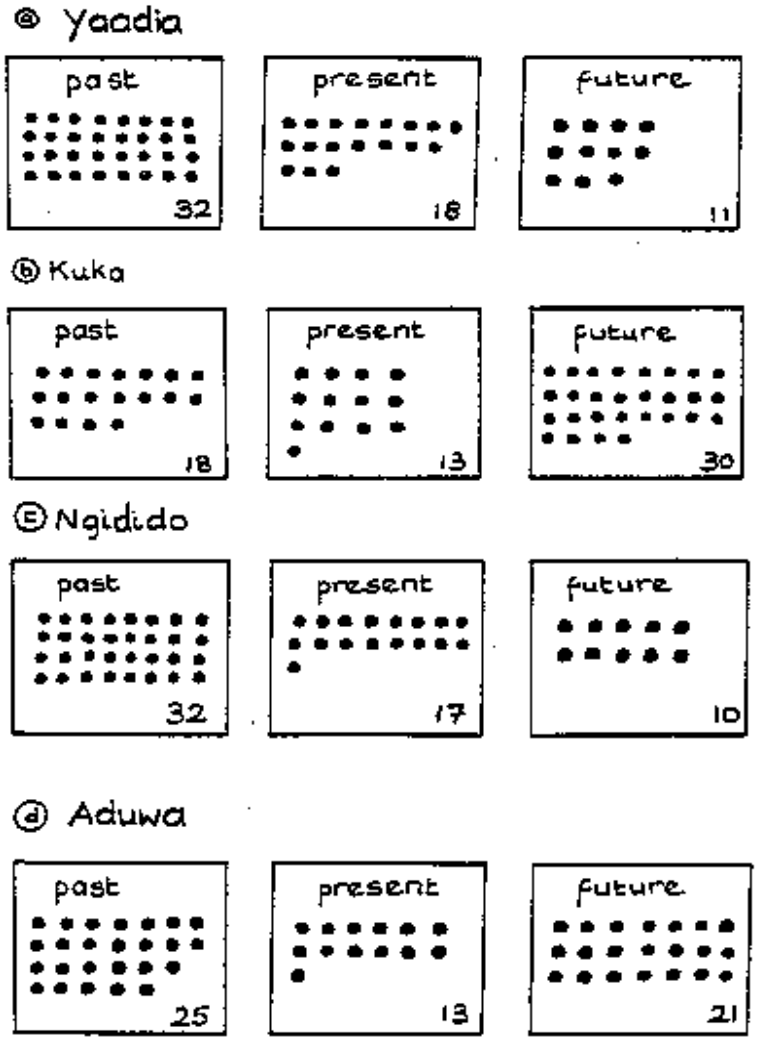
trapping of animal species, due to their simpler population dynamics in comparison to wild plant species. Nonetheless, meaningful application of bio-economic modelling requires considerable data on species populations and harvests over time which are frequently not available (Shanley *et al.*, 1997). Thus, this type of technique is best used in the context of a broader study combining a number of approaches, including biological monitoring.

PRA can also assist in assessing sustainability by exploring what communities know about the changing state of their natural resources (Box 4.5). Techniques for looking at longer-term trends in resource harvesting and availability also provide information on the sustainability of the hidden

harvest. Ideally a thorough assessment of sustainability will be based on a combination of these and ecological assessment techniques such as photo analysis, vegetation quadrats and transects, and production/consumption analysis.

Box 4.5 Assessing sustainability of wild food use, Nigeria

In Nigeria, a group of young men drew an historical matrix for four wild foods (leaves or fruits) harvested from trees. The matrix showed that the density of *yaadia* (*Leptadenia hastata*/*Leptadania lancifolia*) stands around the village had decreased in recent years and the men felt that this trend would continue as the village continued to expand. As the men view *yaadia* as an inferior food, they were not concerned about this decrease. On the other hand, *kuka* (*Adansonia digitata*) and *aduwa* (*Balanites aegyptiaca*) trees used to be more abundant in the past but the men expected these to become more available in the future. As with *yaadia*, these trees had been cleared in the past to allow for growth of the village. But the men felt that the economic value of these trees had increased recently (possibly due to growing scarcity) and the community was now more aware of the ecological values of *kuka* and *aduwa*. These trees were consequently being promoted in the forest reserve through re-planting and selective cutting. Although these young men did not attach much economic importance to either *ngidido* (*Crateva adansonii*) or *yaadia*, the assessment revealed that it was mainly women and children who collected and processed these foods. This highlights the need to recognise the differences within the community, including the need to seek out different perspectives rather than to look for average values.



Source: IIED/HNWCP 1997

4.5 Risk, Uncertainty and Time Preference

People's livelihood activities, including their use of wild resources, are strongly affected by their perceptions about the future. Future economic conditions are influenced by past experiences and current socio-economic circumstances. For instance, producers who have experienced highly unpredictable markets in the past may be more cautious about investing in risky options where returns are realised only in the longer term. Similarly, producers with few assets may not be able to afford to take risks and so may opt for safer, immediate returns, even when these are lower (Box 4.6). For example, a farmer in Queensland would like to invest in improving the natural woodlands he selectively logs for timber by more careful tree selection and harvesting techniques. However, he does not know how low or high log prices will be so he is unwilling to make that investment (Guijt and Race, forthcoming). He opts for low investment, with low but reliable output.

Partly as a result of uncertainty regarding future circumstances such as weather patterns, market conditions and resource availability, most people prefer to receive a benefit today rather than tomorrow. The natural tendency is therefore to *discount* future costs and benefits, relative to the present. This is tempered somewhat by an expectation (or hope) of a long and prosperous life for ourselves, our children and society as a whole. Thus, when comparing costs and benefits over time, economists use some percentage rate for discounting.

All resources or assets that last more than a day, renewable and non-renewable, are affected by the fact that people trade-off the present against the future. Wild resources are no exception. As with any valuable resource, people weigh the benefit of current consumption against the loss of potential future consumption. Since wild resources are biological resources, and hence renewable, this trade-off is complicated by anticipated growth and reproduction. Moreover, the availability of wild food resources may fluctuate substantially, depending on climate and other factors. Wide variation in the availability of wild foods can reduce incentives to invest in their management.

Box 4.6 Risk and uncertainty, time preference and natural resources

Risk implies that the relative probability of alternative outcomes is known. *Uncertainty* means that expected outcomes are totally obscure. Markets cannot allocate resources efficiently between the present and the future if there are no means to hedge against risk, or where there is a high degree of uncertainty (which cannot be hedged). Households and private firms in developing countries face many risks and considerable uncertainty about market trends and future government policy. Moreover, many developing countries lack markets and institutions in which producers can hedge or pool risk. Producers of non-traded goods and small-scale operators are particularly susceptible. Unlike larger firms, which may have access to commercial insurance or even futures markets, most small-scale producers cannot easily protect themselves against the risk of fluctuating prices, drought or other exogenous shocks. These and other factors lead producers in a market economy to discount at a high rate the potential future returns from conservation or improvement of natural resources. They will tend to consume resources relatively rapidly and make few long-term investments. From society's perspective, the resulting environmental degradation will be excessive. This is because society as a whole can pool risk across a range of activities and regions and will therefore 'prefer' a higher level of conservation and investment. Uncertainty and risk thus drive a wedge between private and social rates of time preference.

Thus an understanding of the time preferences of users is an important part of analysing the use of wild resources. However, empirical measurement of the rate of discount applied by resource users is not straight-forward (Markandya and Pearce, 1987). Where commercial ventures are concerned, it is conventional to use the opportunity cost of capital, i.e. the prevailing rate of interest charged by private lenders for similar activities. For public investments a lower 'social' rate of discount is often used, but this also is often based on the cost of funds.

Such approaches may not be appropriate though for understanding the behaviour of subsistence users of wild resources. Lack of access to formal credit sources frequently forces rural producers in developing countries to borrow in informal markets, where interest rates are often very high. These high rates may not accurately reflect the real time preference of rural producers. Time preferences are also influenced by such factors as age, degree of food security, poverty, etc. However, it may be possible to derive the implicit rate of discount of rural producers by looking at actual investments of labour and money, for instance in livestock or agricultural equipment, and estimating the rate of return obtained from these 'real' assets. This rate of return may be considered an approximation of the opportunity cost of capital to producers[20].

While helpful, these economic approaches clearly have their limitations. Calculating a real rate of return on assets or investments already made is not a straightforward task with problems of data availability, measurement of non-priced inputs, and linkages with other economic activities, to name a few. Furthermore, the standard technique of discounting is highly simplistic in that one rate is used for all types of costs and benefits and over all time periods. More likely, people, particularly in more subsistence-oriented economies, have separate discount rates for different costs or benefits, or between different points in time. Thus, producers are likely to discount potential benefits from a wild resource characterised by extreme unpredictability in its availability, such as large game animals, far more than more secure benefits from a resource such as tree fruits.[21] Similarly, people may not apply the same annual discount rate to potential benefits over an immediate one-year horizon as they do to benefits in the next one-year period.

Thus economics has tended to take a very simple approach to time preference and discounting. The discounting practices commonly used were developed in the context of investment projects in Western countries. Potential exists for enriching this understanding in a hidden harvest context with the use of PRA techniques to explore how people view risk and uncertainty (Box 4.7). Investigating risk perceptions and people's time preference rates is a critical factor in understanding people's choices between livelihood alternatives.

Another option is to explore perceptions of risk using exercises such as ranking and scoring. For instance, when ranking or scoring options such as alternatives to wild resources, the 'fear of the unknown' or the 'dread factor' may result in a lower rank or score for an item or option that is unfamiliar. Discussions about these scores could potentially reveal much about people's perceptions of uncertainty and risk.

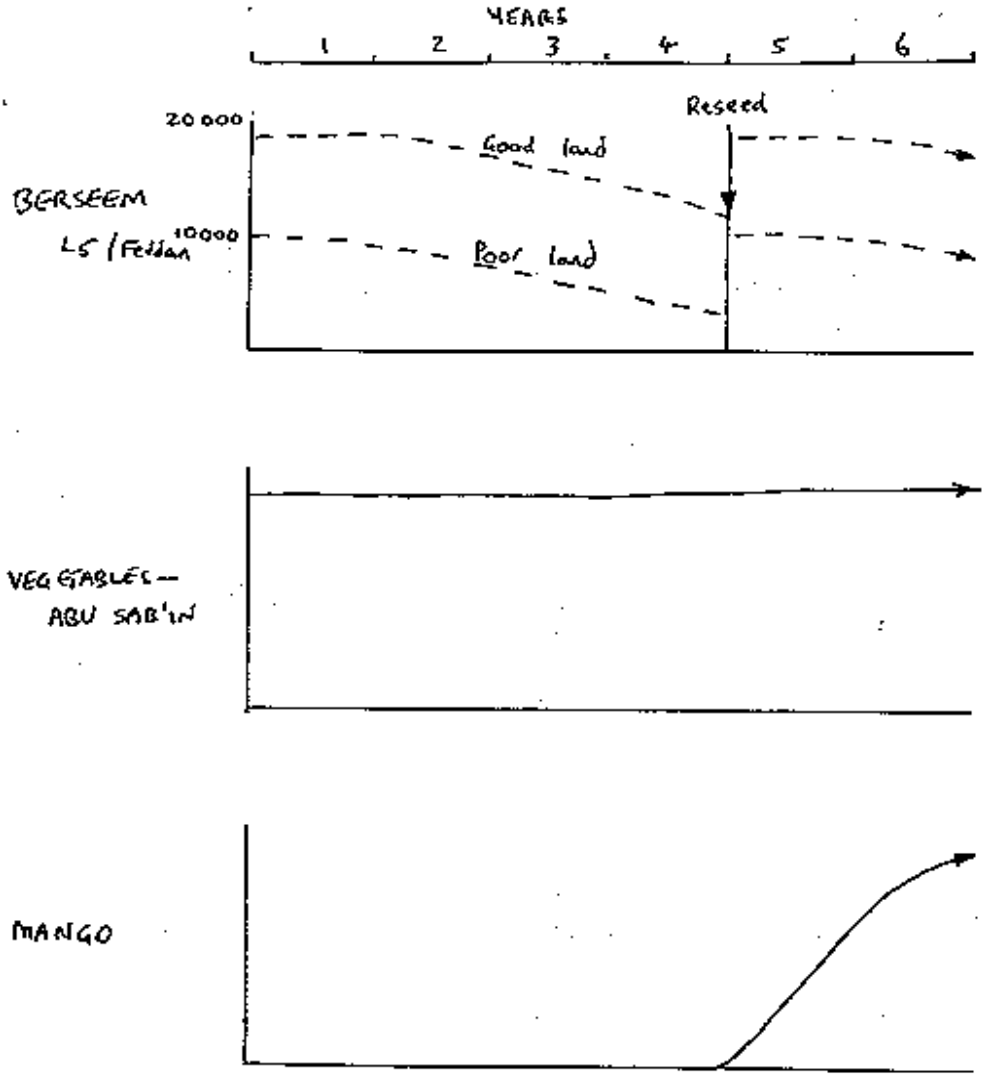
4.6 Indirect and Non-use Values of Wild Resources

Indirect and non-use benefits, such as spiritual, cultural and existence values, remain a methodological challenge. There is no consensus on how to deal with this set of values and how policy-makers can be convinced of their importance for local livelihoods. Trying to compare non-use values with use values in monetary terms is an endeavour probably best left to the context of richer industrialised countries for the time being (Section 3.4.3). Nonetheless,

[20] This is still not time preference *per se*, which may vary depending on the type of investment concerned, e.g. children's education versus a new fishing boat. Presumably, the discount rate used to evaluate investments in the management of wild resources would be comparable to those used to assess other agricultural investments.
[21] The uncertainty surrounding the availability of resources, such as wild animals, may be related not only to natural factors, but also to the management situation and the extent of control exercised by communities.

Box 4.7 Trend lines of relative net returns to different cropping options over time

PRA techniques can be used to generate debate on the issues of risk and time preference. For instance, during a study on incentives for tree management in the Sudan it was found that poorer people living in Faki hashim near Khartoum were reluctant to invest in mango growing despite the fact that it had potentially high returns from an historically stable market (Pretty and Scoones 1989). Such farmers preferred to grow berseem, a four-year return alfalfa-like perennial, fodder sorghum (abu sab'in) or vegetables as returns were more immediate, if not as high over the long term. Simple trend lines of relative net returns to land of different cropping options were constructed with farmers in order to generate discussion about choices.



Informants explained that environmental, economic and tenurial uncertainty influenced their decisions. For instance, farmers had experienced serious droughts and sudden movement of the course of the river that wiped out new orchards. The instability of the national economic climate also influenced farmers' decisions as they explained how planting mangoes now might not result in good returns as markets could suddenly collapse. Tenurial insecurity was another factor influencing decisions. Land fragmentation, pressures to sell land to speculators and poverty all combined to reduce the incentives to invest in tree planting.

Source: Pretty and Scoones, 1989, cited in Scoones forthcoming

a range of participatory methods can enrich this part of the economic analysis. PRA can be used to emphasise the whole range of benefits provided by resources and the environment, rather than only those that can be captured in monetary terms. Such techniques can at least be used to identify relevant indirect and non-use benefits.

Indirect use values might be examined in a qualitative manner using techniques such as flow diagrams. Rural people may have a particular advantage in analysing such indirect effects, through their long and intimate familiarity with the landscape and resources that surround them. In some cases, it might be possible for communities to undertake some quantitative analysis on a relative basis, for example, to examine the likely size or importance of indirect values in relation to production flows (Box 4.8).

Box 4.8 Assessing indirect and non-use values through role plays and ranking, Zimbabwe

In Zimbabwe, role plays helped elicit the beliefs and values associated with wild resources. Groups of villagers prepared short plays in which they acted out the roles of the different people within the village who have a specific interest in wild resources. The plays were designed to demonstrate the value of the woodland to these different people. The plays revealed a large number of criteria, many of which cannot be translated into financial values, and which included water retention, aesthetics, camouflage, prevention of soil erosion, windbreaks and so on. Three groups (men, women and boys) were then asked to give a score to these criteria by allocating 100 beans among all the criteria according to their importance. This provoked much debate about the relative importance of different values and a greater elaboration of their meanings. The non-market values of water retention, rainmaking, inheritance value, aesthetics and the prevention of soil erosion received a high score from all the groups. The importance of woodland in providing water resources and rainfall was particularly highlighted, especially in the light of a recent drought. The women noted that without rainfall other products such as wood and fruits cannot be produced. For this reason they ranked water retention and rainmaking highest of all.

Values	Women	Men	Boys	Total score
Water retention	8*	12	11	31
Rainmaking ceremonies	15	8	5	28
Poles	10	8	7	25
Inheritance	7	11	6	24
Aesthetics	7	10	7	24
Preventing soil erosion	7	7	8	22
Grazing	6	5	8	19
Firewood	4	4	8	16
Fruits	3	3	7	13
Camouflage/cover	6	6	2	13
Fibre	4	3	5	12
Wind breaks	4	3	5	12
Shade	4	5	3	12
Sacred places	5	4	3	12
Crafts	3	3	5	11
Medicines	4	4	3	11
Fencing	4	1	5	10
Seasonal indicator	2	3	1	6
Whips	2	0	1	3
TOTALS	104	100	100	304

* Figures represent number of beans allocated

Source: Hot Springs Working Group 1995; Campbell et al., 1997

The relative importance of a range of values might be explored using the contingent ranking technique. In their valuation of multi-purpose tree resources in Zimbabwe, Campbell *et al.* (1991) asked smallholder farmers to rank and score ten categories of commodities obtained from trees. These non-monetary preferences were 'anchored' by simultaneously asking respondents to score a hand-pump borehole and a well-known type of pit latrine. Respondents

were then asked how much they would pay for the borehole and the pit latrine in order to provide an 'anchor' for inferring the value of the forest products and services.[22] The results indicate that direct inputs to households scored the highest, with production inputs and tree-related services following roughly in that order. This was done with individual respondents but could also be attempted with focus groups.

On the first day of fieldwork in Mare village, Papua New Guinea, four separate maps were made with different groups to elicit a long list of forest functions and products. The research team compiled the information into 13 different functions. For each function, where relevant, the different products that had been mentioned by the villagers were listed, eg. under 'animal foods': pigs, fish, prawns, etc. In a second series of discussions, mixed groups were asked to rank each function on a scale of 1 to 30, using stones. This step revealed that complex functions, notably environmental protection, water, and land boundaries, were most valued. As these could not be computed, other than through this type of relative ranking, the remaining fieldwork focused on the three top functions for which direct use values could be calculated: construction materials, firewood, and animal foods. By implication, the value of the wild areas would be many times more than the combined monetary values of the top three direct use values that we calculated.

4.7 Institutional Context of Resource Use

The use of wild resources and wild areas is often determined by traditional or government rules and regulations which define access and harvest rates. Understanding this can help to assess the potential success of resource management options. For example, insecurity about access results in reluctance to participate seriously in long term resource management plans and can stimulate opportunistic harvesting to make up for possible future loss of access to the resources in question. Furthermore, understanding traditional tenure agreements can help to ensure that policies which stimulate an increase in resource use do not exceed sustainable extraction rates. For example, where local people take responsibility for the protection and management of wild resource sites, they may receive access to forest products with clear limits on harvest rates.

Neo-classical economics tends to look at rules governing resource use from a static perspective and asks few questions about how such rules have come about or how they will react in changing social and economic circumstances.[23] Thus, resource economics uses a simple typology of resource management regimes which includes open access, common property and private property, and seeks to analyse the incentives facing users or managers

under each system and the likely outcomes (Clark, 1990).[24] This approach produces powerful insights into resource management and is most applicable to relatively simple resource systems. For example, the theory predicts that a renewable resource under open access will be exploited beyond sustainable limits and may even become locally extinct.

However, rural situations involving wild resources may involve tenure systems that incorporate features of each of the three systems and in many parts of the world these institutions have

[22] A similar technique was used by Emerton and Mogaka during a participatory environmental valuation of forest resources in the Aberdares, Kenya (Emerton and Mogaka, 1996).

[23] Newer currents in economics, such as the new institutional economics, do look at the efficiency rationale for the existence of many of these institutions from the perspective of transactions costs. This work has largely been limited to the case of private corporations.

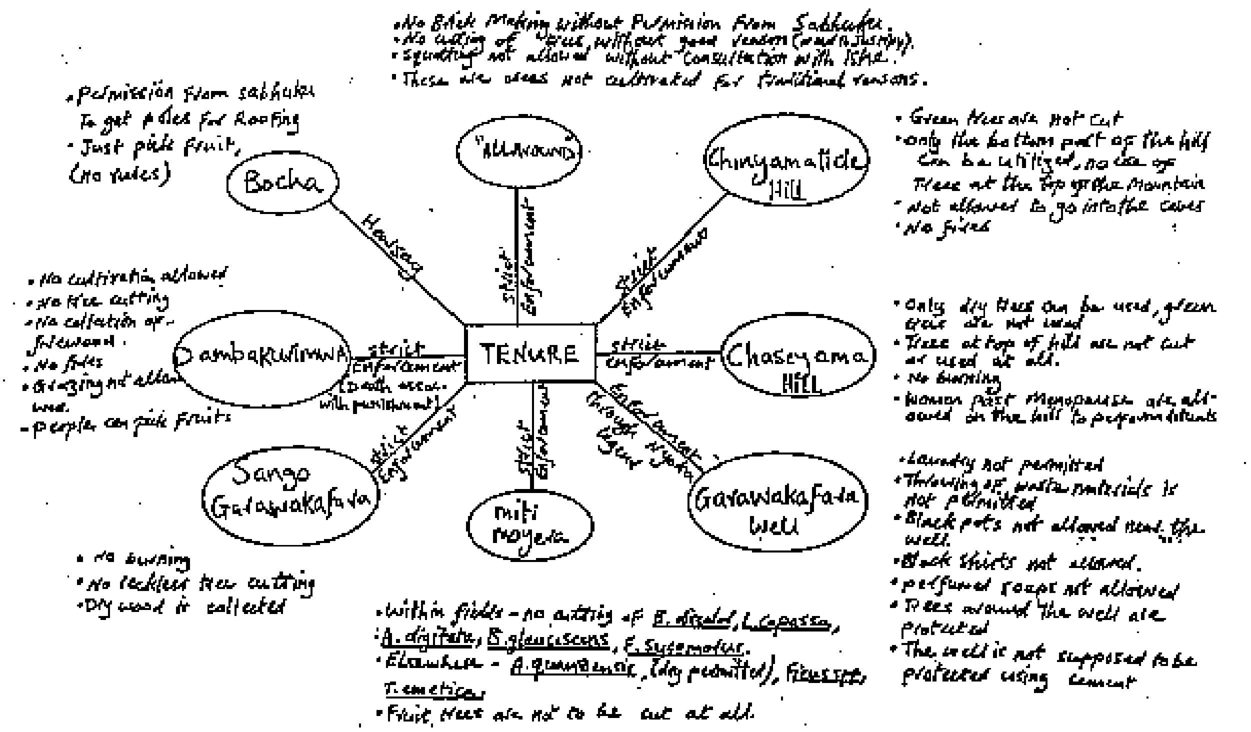
[24] Game theory has also been used to investigate the interactions between two competing resource users (see, for example, Levhari and Mirman 1980).

come under pressure from economic and social change. Thus an analysis richer in local detail is usually required.

A number of participatory techniques can be used to understand resource tenure and how it is changing. For example, maps can be used to identify resources and their associated rules and restrictions governing use (Box 4.9). Venn diagrams are used to define the various stakeholders in a community and the relationships between them.

Box 4.9 Mapping tenure and access rights, Zimbabwe

In Zimbabwe, a village resource map was followed by discussions about tenure and the development of a tenure map. From the resource map, the villagers made a list of the local wild resource collecting sites. These were written on pieces of paper and organised on the ground according to geographic location. For each of these 'resource units', villagers listed the specific tenurial conditions, restrictions and taboos associated with each site. Different social groups were taken through the exercise separately to add to and verify the information shown. The degree of enforcement of each of these rules in each of the areas was also marked on the diagram. The resulting tenure diagram shows the wealth of information that this approach elicited, not only in relation to traditional rules but also about hitherto hidden values of certain wild species. For example, it revealed that villagers are forbidden from cutting some tree species because of the role they play in raising the water table.



Source: Hot Springs Working Group, 1995

4.8 Marketing and Market Transactions

To calculate the financial returns to people from any wild product sales, information is needed on all stages and costs per stage in the harvesting, processing and marketing of that resource. But marketing and the use of wild resources is often a highly complex activity, influenced by personal relationships, gender, ethnicity, and political power. It is important to understand how local markets for wild products may not conform to the ideal of perfect competition, as this is likely to affect the exchange values observed. Furthermore, this knowledge is crucial for the design of any strategies to promote the conservation of biodiversity through enhanced marketing and value-added of wild products. Marketing and market transactions can be effectively researched by combining participatory techniques with economic thinking.

Economics has provided a framework for understanding the factors operating within markets which can affect prices. The model of perfect competition is usually used to understand these factors. In this view, relatively efficient markets are characterised by a situation in which there are many buyers and sellers, none of whom has the relative size, status or any special information that would allow them to influence market transactions, notably price, for their own interest. In this case the market price of a wild product should more or less represent the marginal economic value. While this approach is widely applicable to many markets, there are often cases where markets are dominated by a limited group of sellers or buyers or where conditions such as status and access to information are not equal.

In these situations, one or more market players can influence market transactions in their favour. Thus the observed market price of a wild product will not necessarily represent its marginal economic value as is determined in a model of pure competition. Instead, sellers with monopoly power will be able to demand an additional amount in the price of their good, known as a monopoly rent. This is clearly to the disadvantage of the buyer, who is often an end-product consumer of, for example a basket made from forest vines or medicinal oils. Thus, it is important to identify situations where market power is exercised. This is typically determined by looking at the proportion of a market that is controlled by a single actor or a group of actors suspected to be acting in concert.

As the observed price in the market deviates from the true economic value, this amount should be taken into account in deriving the economic value of a wild product traded in such a market. But it is usually not possible to estimate empirically how much an observed price differs from what it would be in a competitive market. This is especially the case in rural markets for things like products derived from wild resources. Thus, an empirical economist will typically have to be content with simply indicating that the observed price is an overestimate of economic value and that the corresponding net economic value would also be overestimated.[25]

PRA techniques can help in understanding market concentration. Venn diagrams can identify various groups of actors in the market. Interviewing these diagrams, as well as flow diagrams of a product marketing chain, can assess the extent to which these groups might dominate transactions. The market share controlled by such groups could be estimated using techniques such as pie diagrams or pile-of-stones. Flow diagrams of producers, traders and consumers along a marketing chain can analyse issues such as trading margins, information flows and market segmentation. By looking at these issues from a variety of perspectives, an understanding of market characteristics and dynamics can be developed, including an assessment of the extent to which the market is competitive.

Economics has tended to emphasise market concentration issues, while working with a model of a utility-maximising household or profit-maximising enterprise. But in many situations, social interactions may considerably influence the process of exchange.[26] In these circumstances, policy interventions based only on an individual profit-maximising model may not achieve their desired objective. To deal with this, the new institutional economics emphasises the importance of social relationships and information exchange in analysing

[25] Or underestimated, in the case of market power lying in the hands of buyers, which may often arise if, for example, many harvesters are selling their products to a small number of traders.

[26] The traditional economic view has been to depict the competitive market as an institution that develops with capitalism and industrialisation in a process in which social relationships gradually have less of an influence on market actors (Polanyi, 1957). Anthropologists have pointed out though that social norms and relationships still have a considerable effect on market actors in industrialised countries (Hamilton, 1991).

transaction costs during marketing (Bardhan, 1989; North, 1990). Sociological studies increasingly focus on actor and network analysis when examining market exchange processes (Long and Long, 1992).

PRA techniques such as network diagramming and chain interviewing are well-suited to examine these issues. The first of these can illustrate the relationships between individuals that influence economic practices. Network diagramming can trace the flow of information about prices and the availability of goods as well as the interactions between buyers and sellers. Linkages can be sought between these patterns and factors such as kinship connections, residence patterns, gender differences or ethnic origins. In terms of policy relevance, this analysis may reveal in what ways markets are segmented or differentiated, influencing for example the extent to which economic signals might be acted upon (Scoones, forthcoming).

Where markets are influenced by key individuals, case studies can help illustrate their role in wild resource use, processing and marketing. In this case, purposive sampling to ensure that such people are included in an analysis has a distinct advantage over random sampling techniques. Key individuals may be identified by flow or network diagramming or through a process of chain interviewing where people are traced along a chain of connections suggested by successive informants. Detailed case studies can examine the importance of power and status in market transactions and can explore the historical changes in economic activities and markets by reference to the memories of key individuals. In-depth interviews and participant observation can help to explore the social interactions between harvesters, traders and buyers of wild products. These methods will help point out the ways in which transactions in wild products do not fit the simple economic market models, information that can be critically important in predicting the response of actors to possible policy or project interventions. For instance, a system of licences or permits for hunting wild animals may have consequences somewhat different from those intended, where social practices such as hunters' guilds or the cultural rituals play an important role in restricting hunting.

In the Zimbabwe and Papua New Guinea *Hidden Harvest* case studies, a number of artisans and craft-persons were identified on the village household maps during the initial mapping exercise. These people were then interviewed separately. The interviews explored product collection, processing and marketing with the aim of identifying the costs and returns at each stage in the process. Assessments of market demand, market competition and pricing strategies were also attempted. In each case, interviews were informal and structured around a check-list of questions developed by the research group beforehand.

4.9 Conclusion

This chapter has provided a taste of the ways in which economics has contributed to understanding wild resource use and value through providing frameworks and models to explain patterns and behaviour. It has also explored how participatory research can add value to this by offering a more differentiated analysis of resource use. More detailed examples can be found in the *Hidden Harvest* case study reports (see Appendix 1). This final section now looks, in general terms, at ways in which the two approaches might be combined to bring about a methodological complementarity.

5. LINKING METHODOLOGICAL TRADITIONS IN A HIDDEN HARVEST ASSESSMENT

The previous chapter has given many examples of where PRA and economics have been used to assess wild resource use and value. In this chapter we discuss how the complementary benefits of the two traditions can be combined to make a more interesting, relevant and useful methodology for looking at previously unvalued aspects of the natural landscape, and thus support complex policy decisions.

5.1 Scope For Combining Economics And Participatory Research

It is important to remember that PRA and economics are certainly not comparable fields of knowledge or approaches. In the simplest terms, economics is an academic discipline of the social sciences. As a research programme, it consists of an evolving body of theories broadly about how humans behave and interact. As practised, economics emphasises theoretical pursuits at the expense of empirical corroboration (Blaug 1980). On the other hand, PRA does not carry the same history of an institutionalised discipline or body of theories but has grown out of a variety of perspectives and backgrounds. In many ways, it has drawn on some academic disciplines, such as social anthropology, but it does not aim to theorise conceptually about society. Instead, PRA is an approach to research and planning that emphasises local empowerment and action.

The nature of the hidden harvest makes it an appropriate area for economics and PRA to learn from each other's strengths and weaknesses. Economics emphasises reductionist models of behaviour that are very accessible to policy makers and those in power. But such simplistic ways of thinking, when combined with a weaker empirical basis, often misrepresent the complex reality of the world, potentially in dangerous ways. PRA, with its concentration on local perceptions and analysis, allows a much greater understanding of a given situation. But the level of detail and the variety of perspectives encountered makes it difficult to use such information for decision making on a wider scale.

To a certain extent, this discussion portrays two philosophical and methodological extremes: the approach of economics and that of PRA. The different philosophical backgrounds result in alternative perspectives on the nature of enquiry and how its validity is judged. Indeed, these differences are often central to disagreements between social researchers, including economists. In some respects, these differences are somewhat irreconcilable drawing on incompatible views on the nature and philosophy of enquiry and science. This paper does not seek to compare the two, but instead to build bridges between the two disciplines, in the search for better ways to value natural resources.

Despite such philosophical differences, there are many practical instances where either economics or PRA already has elements of the other's approach or methods. Many economists who undertake significant amounts of field work for national or international agencies recognise the limitations of their models for understanding all the livelihood choices made by rural communities. They may try to incorporate the perspectives of other disciplines and are not always sworn to the use of questionnaire-based surveys or government statistics. On the other hand, participatory research is often undertaken where researchers are using their own external, conceptual frameworks to understand local situations. Many PRA practitioners

understand the value of generalisation in terms of aiding decision making by government officials away in some distant office. One aim of this paper is to promote the further building of bridges between these extremes.[27]

5.2 Strategies for Combining PRA and Economics

The Hidden Harvest case studies to date examples of how PRA and economics have been used together to answer specific valuation questions. In these examples, the two methodological traditions were combined in different ways, and these can be categorised into four strategies (Guijt, 1997):

1. *Improving questionnaires*: participatory methods can be used to describe the research context, which is needed to help identify relevant economic research questions and to design more appropriate questionnaire surveys

2. *Verifying questionnaires*: the economic values derived from questionnaire surveys can be verified, or ground-truthed using participatory research methods;

3. *Replacing questionnaires and systematising participatory research*: economic models can outline the research questions and participatory research techniques can be used to find the information needed, instead of through the use of questionnaires;

4. *Looking beyond conventional value*: participatory methods can also help to challenge existing discipline-specific assumptions by seeking diverse local interpretations of value, notably indirect use values and non-use values;

The first three of these four strategies are essentially approaches to using participatory techniques to produce information for economic analysis. In the case of the first two, the use of questionnaire surveys is still pursued while in the third, these are replaced by participatory techniques. In all three cases, the main contribution of participatory methods is to improve the empirical aspects of economics. The context for such approaches is clearly an extractive one in which researchers are looking for ways to gather information for their own purposes. Under the fourth strategy, the models and concepts of economics are refined using insights from participatory research, thus implying a slightly higher degree of participation on the part of communities.

These strategies are not mutually exclusive and there can be elements of more than one in a given assessment. But they do represent different types and levels of contributions from PRA and economics respectively. The approaches of improving or verifying questionnaires should be the easiest for practitioners of either PRA or economics to tackle since these strategies concentrate primarily on empirical issues. On the other hand, the third and fourth strategies require a greater shift in thinking in order to incorporate some philosophical elements of PRA into economic analysis.

5.2.1 Improving Questionnaires

Economic research can use information which is provided by initial participatory research on relevant local issues, social groups and institutions to re-examine key questions that merit more attention. Conventionally, these questions are defined by a researcher who is rather removed

[27] Similar aims have been pursued for more cross-over between the fields of economics and social anthropology (see Buckley and Chapman, 1996; Hamilton, 1991).

from the community. Through an initial appraisal based on participatory methods, however, the researcher can develop in a short period of time, a much better understanding of the many issues related to resource use. For instance, the most important wild resources in a community are best identified by the community themselves. Furthermore, it may be difficult to define appropriate terms or categories for resources or units without local participation. This process should lead to the design and implementation of a more accurate questionnaire survey.

This approach has been used in *Hidden Harvest* case studies in both Zimbabwe and Brazil. In Zimbabwe (Hot Springs Working Group, 1995) a list of marketed products from woodlands were identified by the research team using a variety of participatory techniques including flow diagrams, maps and other interviews. A survey of households was then carried out to determine the amounts of these products used on an annual basis. The sample for this survey was determined from the PRA technique of household well-being ranking.

Another possibility is to incorporate diagrammatic techniques into surveys of households or individuals to assess the same quantitative information that would traditionally be put simply as a question. Thus, in the Nigerian assessment (IIED/HNWCP, 1997), a sample of individuals was interviewed on their use of wild foods. Respondents were asked to identify the approximate proportions of their diets accounted for by wild foods using the pile of stones technique. This form of diagrammatic or 'visual questionnaire' can lead to a better understanding of the question by interviewees and does not intimidate them to the same extent as a point-blank question about the proportion of income or food attributed to different sources. The combination of time to revise responses and the graphic way in which the response is given will likely result in better responses (or lower degrees of error). Because of the time involved, it may not be possible to undertake such surveys with large random samples of informants. An alternative would be a smaller sample drawn randomly from various groups to highlight variation between and hopefully within these groups.

Improving questionnaires through an initial participatory appraisal is growing in popularity, and has recently been used for a number of applications, not just valuation studies. Examples include work done in Mauritania to understand local people's risk management strategies (Davis, 1997). RRA techniques - Venn diagrams and historical matrices - were used to build an understanding of indigenous taxonomies of exchange and productive activities. This helped in designing a household survey which was able to more appropriately explore risk management strategies and change over time. A similar approach was taken by Gammage (1997) to explore mangrove management in El Salvador. Others have used wealth ranking techniques to ensure that a representative sample of households are selected for a survey (Turton *et al.*, 1997).

5.2.2 Verifying Questionnaires

The second strategy, of using participatory research methods to verify the results of questionnaire surveys, is similar in that questionnaires are still used. In this case though, the PRA principle of triangulation[28] (Section 2.2.1) is used to provide another means of assessing the results of a questionnaire. As mentioned in Section 3, economists make frequent use of questionnaire-surveys but there are no standardised procedures for establishing whether any significant measurement error is involved. Comparing the results with those of a participatory assessment would provide one means for doing this.

[28] Cross-checking using different methods, information sources, disciplinary insights, and informants in a range of locations.

This procedure has not been tried in a *Hidden Harvest* study but other researchers have compared the use of questionnaires and participatory research techniques (see Section 2.2.1). Leach and Kamangira (1997) used participatory research to help understand the results produced by questionnaires. Their aim was to investigate farmers' adoption and non-adoption of sustainable farming practices in Malawi. The questionnaires allowed the project to collect statistically reliable data on adoption rates, and the PRA techniques allowed a more informal discussion with farmers about their opinions of the farming recommendations. They found that the approach generated a range of information that would not have been discovered if a combination of techniques had not been used.

5.2.3 Replacing Questionnaires and Systematising Participatory Research

The third strategy for combining PRA and economics in local-level assessments is to forgo the use of questionnaires for gathering information, including quantitative data. As mentioned in Section 3, economists have come to rely primarily on questionnaire surveys largely by historical accident and there is plenty of scope for using other approaches to collecting data. Quantitative, as well as qualitative information can arise from the use of participatory techniques. Some techniques, such as proportional piling, or pie diagrams directly provide quantitative estimates. But in many cases, the potential for generating quantitative data lies in 'discussing' or 'interviewing the diagram'. This means that a diagram resulting from the use of a participatory technique, such as flow charts, seasonal calendars or maps, will be used as a basis for asking a group of people more specific questions about quantities, frequencies or prices.

The key issue to be considered in the decision to use participatory techniques instead of surveys concerns the degree of precision required in the data. The main purpose behind surveys is to sample a sufficient number of units within a population to ensure that adequate variability of certain types of information is obtained. This then allows one to claim fairly tight confidence intervals for estimates of variables. Economists also like surveys because they provide data sets large enough to be amenable to statistical techniques of inference and hypothesis testing. Where it has been pre-determined that such analysis is necessary, then replacing questionnaires with participatory techniques is not possible (although either of the two strategies above could be followed to either improve or verify the survey). In many cases though, the type of information that is required is simply general estimates of quantities and values. Where this is the case, there is plenty of scope for addressing these needs with participatory surveys.

Many devoted users of questionnaire surveys may be reluctant to recognise the validity of information generated by participatory techniques. What this really reduces to though are prior (sometimes implicit) beliefs about the degree of measurement error in participatory techniques relative to surveys (see Section 2.2.1). For many issues under investigation, it is not practically possible to corroborate these beliefs as the underlying variables may not be independently observable. Studies have indicated though that well-designed and executed questionnaire surveys and participatory techniques produce similar results (Gill, 1993; Chambers, 1992; Inglis, 1990, 1991; Bernadas, 1991; Rocheleau *et al.*, 1989, 1997).

A helpful development in the use of any form of information gathering for social research would be the regular assigning of confidence levels to estimates obtained (Box 5.1). In sustainable agriculture monitoring work in Brazil (Guijt *et al.*, 1997), each indicator and method were assessed in terms of six criteria, one of which was the reliability of information given. As opinions varied considerably, this allowed for fruitful discussion about how to improve the quality of the information. This would clearly identify the degree of precision

attached to a quantitative estimate no matter how it was produced. Similarly, studies should specify needs in terms of precision or confidence intervals at the same time as they identify their data needs.

Box 5.1 Verifying Data in Papua New Guinea

In Papua New Guinea, once the key products were chosen on which to focus, one team compiled a long list of all the variables that they would need to collect to calculate values. Next to each variable (eg. cost for taxi to take wild pig to market), there were three columns, enough space to write the answer to that variable from three separate sources. This helped remind the field team that each bit of information they learnt about through the PRA exercises had to be checked and could not be accepted at face value:

Item	Date of interview	No. people/active participants	No. men/women	No. key resource users
Price of wild resources A				
Source 1		5/2	5/0	1
Source 2		1	0/1	1
Source 3		etc.	etc.	etc.
Distance to resource A				
Source 1				
Source 2				
Source 3				
Time to harvest resource A				

Source: Grieg-Gran, et al., forthcoming

Using participatory techniques instead of questionnaire surveys to gather necessary quantitative information has been done in a variety of *Hidden Harvest* studies. For example, the assessment of the economic importance of wild resources in the Hadejia-Nguru wetlands of northern Nigeria (IIED/HNWCP, 1997) used participatory techniques to estimate the proportion of income and food derived from wild resources for various groups of people. In this case, the main technique used was the pile of stones method (see Section 4).

5.2.4 Looking Beyond Conventional Values

The three strategies described above essentially entail improvements to empirical economics through the use of participatory techniques for generating information. In the last strategy identified for combining the methodological traditions of PRA and economics in a *Hidden Harvest* assessment, the potential for refining the concepts and models of economics is addressed. The use of participatory methods can help challenge existing or pre-conceived assumptions in economics. Perhaps the greatest potential lies in the interpretation and assessment of various values for wild resources, including indirect use values and non-use values.

Environmental economics, as discussed in Section 3, considers environmental and natural resources to have two types of economic value arising from their associated use and non-use benefits. The use benefits can further be broken down into direct and indirect use values (see Table 3.1). The direct use values are much easier to deal with, being typically more tangible and thus easier to assess and measure. But the indirect use and non-use benefits of wild

resources are more difficult to evaluate, particularly in quantitative terms. Environmental economics has developed a suite of techniques for assessing such values but almost all of these methods are really only applicable in a highly commercialised environment.[29] Assuming that individuals in a rural context in the South consider the indirect use or non-use benefits of environmental resources in the same terms as they might consider tradable commodities is quite questionable.

Participatory techniques offer a means for exploring how people consider such values and whether they view them as being commensurate with more conventional economic values. For example, the case study in Zimbabwe used role plays to investigate non-use values of forest woodland. The results of this activity were presented together with the more quantitative information on the economic value of woodland (see Box 4.8). But this is just the beginning, as there is potential to use participatory techniques to delve more deeply into the concept of value as applied to natural resources.

It is also important to highlight at this stage that there is a danger that by focusing on valuation studies, the temptation is to convert everything to financial terms. Is this playing into the hands of policy-makers who we perceive as tending to look for the dollar bottom-line when making decisions? It would be more difficult, but perhaps more honest, to emphasise the importance of those values which cannot be monetised - the cultural/spiritual values, the aesthetic values and so on. And this is what has been attempted in this paper through describing the contribution participatory research can play in this respect. But the challenge remains: how can we convince policy-makers of the importance of these values which simply cannot be expressed in financial terms?

5.3 Economic Questions and Participatory Techniques

The variety of options for linking economic and participatory approaches indicate that there is no single, fixed research procedure for undertaking a hidden harvest assessment. Three of the four strategies above consist essentially of some combination of empirical research techniques including conventional surveys and participatory techniques. To various extents, these strategies involve the use of the latter to examine economic questions. In particular, the strategies of verifying or replacing questionnaire surveys use participatory techniques to generate quantitative or qualitative information that can be used in economic analysis.

The potential for applying participatory tools to investigate economic issues surrounding wild resource use is summarised in Table 5.1. The first column of this table is a series of basic questions regarding the importance of wild resources. This list, which has developed out of experience to date in *Hidden Harvest* case studies, is a fairly comprehensive starting point. Some questions may be more relevant than others, as assessments invariably differ due to the aims of the assessment, the extent of existing knowledge, and the local context (including resources, markets and resource management structures and mechanisms). Despite such local differences, the first two questions are likely to be the starting point in each case: knowing which resources exist and assessing the extent to which they are used. How these questions are investigated can also vary according to the factors identified above. Beyond the first two questions, the sequence and choice of subsequent questions will certainly vary.

[29] Although even this applicability remains a major point of disagreement among those interested in the economics of the environment (as opposed to 'environmental economics'; see for example, Sagoff, 1988; Common, 1995; Jacobs, 1994).

The second column of Table 5.1 elaborates, from an economic perspective, on the basic questions. This is the type of information that might be needed to undertake an analysis of these wild resource issues using economic models or concepts. Thus this second column defines more specifically how an empirical economist might start to approach the basic questions in the first column.

The third and fourth columns present possible methodologies for generating information specified in the second column. As noted elsewhere in this paper, conventional economic practice is to look for secondary data, and if primary data is required, then questionnaire/household surveys can be used. As such surveys can be applied to almost all the questions in the table, they are not listed. Instead the third column provides some possible participatory techniques while the fourth column suggests some other approaches, most of which may be thought of as geographical or ecological research techniques.

It is important to note that Table 5.1 is not meant to be a complete list of possible research techniques. Most of the participatory and other approaches listed have been tried in one or more of the *Hidden Harvest* assessments completed to date, or in similar work undertaken by others. But it is expected that a necessary and important element of this research initiative is an on-going process of experimentation and innovation. Furthermore, the inherent flexibility of the *Hidden Harvest* approach means that both the sequence and choice of techniques will vary and it is not realistic or useful to establish a fixed set of combinations.

The fourth strategy of improving economics involves revising the economic perspective on these questions (the second column of Table 5.1) based on the results of participatory research. More generally, incorporating a more pluralistic and participatory perspective in economics would imply that there is not a single economic perspective on these questions appropriate in every context. Rather how the relevant economic concepts and models are defined may change depending on the circumstances. At the simplest level though, this would entail not predetermining the specific questions defined under the second column before undertaking an assessment. This is certainly the most ambitious and unconventional aspect of the *Hidden Harvest* methodological experiment. It cannot proceed unless economists are willing to be more flexible in their methodological approach, but examples of empirical research that undertake such a crossover between economic and anthropological perspectives do exist even in the academic literature (cf Hill, 1970).

To some extent though, there will always be a difference in approach that cannot be completely reconciled, only used side-by-side. Economics implies certain ways of viewing what drives human behaviour. Such a perspective can still be applied in a fairly flexible manner but is always part of the intellectual baggage brought by an external researcher. Participatory approaches can broaden and improve this perspective and can provide alternative data collection techniques. But many proponents of the philosophy of participatory research would probably argue that a key aspect of the approach is to dispense with external world views as much as possible when learning from a community. Such methodological challenges to the *Hidden Harvest* approach are examined in the final section.

Table 5.1 Answering Economic Questions with Participatory Techniques

Question to be answered	Economic Perspective/Issues	Information Methodologies	
		Participatory Techniques	Other Approaches (other than questionnaire/household surveys)
1. What resources are there and where are they?	• Inventory of resources in quantitative, physical terms, differentiated by location	• Participatory mapping • Transects • Mobility maps	• Aerial photographs • Ecological/resource inventories • Yield measurements
2. Why are they important and what benefits do they provide?	• Uses made of resources	• Relative ranking • Matrix scoring • Role plays • Pie diagrams	
3. When are they used/available?	• Months/seasons in which harvested • Complementarity with other economic activities	• Seasonal calendars • Daily and seasonal labour and activity calendars • Product flow diagrams (?)	• Phenological studies • Biomass calculations
4. Who uses them?	• Which groups of individuals by gender and household socio-economic group	• Well-being (wealth) ranking • Social maps	
5. How are they used?	• What are the stages of harvesting, processing and selling? • Who is involved at various stages?	• Product flow diagrams • Chain interviewing	
6. Who controls these stages?	• How many people or groups are involved? • Do they exercise control i.e. market concentration • What are the rules and rights governing use and how do these translate into practice?	• Tenure/social maps • Venn diagrams • Network diagrams • Case studies	
7. What are they worth in monetary terms?	• What is monetary value per time period per harvester (by type) and for the community? • What is value of equivalent substitute or barter good?	• Product story • Product transect • Substitute ranking	
8. What is the relative importance of their indirect use or non-use values?	• How do these values compare to other tangible goods i.e. in relative terms, how important are they? • What production activities depend on their existence and to what extent?	• Role plays • Ranking and scoring matrices	• Ecological studies of physical relationships between production systems • Contingent valuation surveys
9. How sustainable is resource use?	• How quantities are changing over time? • How do these compare to natural productivity?	• Historical maps, transects and matrices • Trend ranking and analysis • Critical events analysis	• Ecological models of populations

6. CHALLENGES FOR THE FUTURE

While the examples given in the preceding sections provide many useful suggestions for ways that valuation studies can become more grounded in local perspectives and realities, there remains a number of unresolved methodological and ethical issues regarding the approach.

6.1 How Participatory is Participatory?

'Participation' has become a buzz word of the development debate, and the term crops up throughout this paper. Yet the term itself is confusing and has many different interpretations (Cornwall, 1996; Pretty, 1995; Stiefel and Wolfe, 1994; Adnan *et al.*, 1992; Hart, 1992; Arnstein 1969). It is important to dissect what form of participation is both desirable and feasible for different activities. Cornwall (1996) offers a typology of different types of participation, ranging from cooption where local people are involved as token representatives with no real input or power in an externally defined project; to collective action where local people set their own agenda based on their priorities (Table 6.1).

Table 6.1. Participatory Methods: means to what ends?

Mode of participation	Involvement of local people	Relationship of research and action to local people
Co-option	Token; representatives are chosen, but no real input or power	on
Compliance	Tasks are assigned, with incentives; outsiders decide agenda and direct the process	for
Consultation	Local opinions asked, outsiders analyse and decide on a course of action	for/with
Co-operation	Local people work together with outsiders to determine priorities, responsibility remains with outsiders for directing the process	with
Co-learning	Local people and outsiders share their knowledge to create new understanding, and work together to form action plans, with outsider facilitation	with/by
Collective action	Local people set their own agenda and mobilise to carry it out in the absence of outside initiators and facilitators	by

Collegial action and co-learning are participatory ideals that are often advocated but seldom achieved. It requires long-term interactions, the building of confidence and trust and organisational and institutional set-ups that allow collegial interactions to thrive. The experience of community development projects from around the world has shown that this populist dream requires much effort and commitment, much struggle and negotiation, and a continual alertness to processes of exclusion and marginalisation (Scoones and Thompson, 1994).

Most research activities (in contrast to action-oriented community development work) find the constraints to achieving fully collegial relationships overwhelming. We have already described how the *Hidden Harvest* case studies have tended to use the more extractive approach of RRA, using participatory methods to gather information. Most participatory research tends to be consultative in style. For some this presents a fundamental contradiction. But it may also represent a pragmatic compromise and a realistic recognition of a variety of professional and institutional constraints (ie. most research organisations are unable to work in anything but a consultative manner during certain periods of their existence) (cf Whiteside, 1997). If we accept that participation (in terms of local people's involvement in research and development activities) is beneficial and superior to simply contractual arrangements or no local involvement at all, then there is nothing fundamentally wrong with a consultative arrangement as an initial starting point. Indeed this may, in time, lead to more collegial interactions with selected communities, groups or individuals.

However, participatory methods (even when used for research) imply certain obligations, and researchers must be aware of the following:

- Active involvement of people in research and analysis means that all participants should have ownership of the results. This implies a requirement for effective and timely feedback, the sharing of reports and the recognition of contributions.

- The use of interactive, participatory research methods may generate enthusiasm and excitement and raise expectations (Edwards, 1995; Schreckenberg, 1995). This implies that plans for follow-up must always be part of research activities. Rooting research work within local structures, seeking alliances with development actors on the ground and finding a means to pursue findings all require prior planning and a commitment that stretches both before and beyond the research study.

- Open and frank discussions about resource use can raise latent resource-related conflicts that then need to be addressed. Do researchers have the skills to deal with some of these conflicts (Appleton, 1995; Shah and Kaul Shah, 1997; Schreckenberg, 1997)?

- Finally, active local involvement in research has costs as well as the well recognised benefits. These costs include the real costs of time out of busy lives and material costs in terms of accommodation and food provided, as well as the potential costs political and social disputes generated by the intervention of a new set of actors. Researchers must recognise these costs and compensate in locally appropriate ways.

It is essential to identify what form of participation is both desirable and feasible for the different actors in each research stage and activity. This will depend largely on the objectives of the research. These objectives, in turn, will have many implications for the research design. If it is to be a data gathering exercise, then rapidity will probably win over pursuit of local analytical processes. If it is to be an exercise leading to local action, then building local analysis and competence will need to be prioritised over quick research outcomes.

6.2 Confidentiality

Careful consideration of the confidentiality of information is of particular importance in the context of research into wild resources. As the gathering and consumption of many wild resources is illegal, exposing these activities poses a potential risk for resource users.

Furthermore, biodiversity prospecting and the trend towards patenting intellectual property rights over genetic resources, mean that rural communities will be suspicious of outsiders expressing an interest in their wild assets. Publishing reports which outline the potential value or usefulness of wild products may encourage biodiversity prospectors to exploit the resource. A financial analysis of how resources contribute to local people's income can also encourage taxation of these once hidden assets.

Careful thought must therefore be given to how final research results are to be used and disseminated, emphasising transparency about research objectives throughout the study. This should ideally be discussed with those who are providing the information, the wild resource harvesters, processors, and users, and not decided on behalf of them.

6.3 Trade-offs of Training

All the *Hidden Harvest* case studies have been conducted following, and as part of, a training workshop. This has been inevitable, as there are very few researchers who have combined training in, and experience with, participatory research and economics. The training was important for building the capacity of professionals working in the case study areas in the use of participatory valuation techniques. However, key lessons arose from this dual approach of research combined with training.

For example, as achieving the training objective achieved a fair amount of learning-by-doing, a certain degree of error was helpful, and indeed inevitable, to the learning process. The research objective, however, required a balance between the benefits of learning from mistakes and the research imperative to undertake the highest quality investigation possible within the time constraints of the studies (IIED and HNWCP, 1997). In addition, in the initial stages when trainees are building their confidence in village-based fieldwork, communications can become strained between the team and the community. The delay which this entails should be incorporated into workshop planning.

6.4 Contributing to Policy Change

The question that has driven the *Hidden Harvest* studies is how a better valuation of wild resources can influence policy. Aside from the dilemmas raised in section 2.5.1, a further dilemma has been that in fact, none of the *Hidden Harvest* case studies actually set off at the outset to tackle a specific policy problem, other than to make visible the various values of wild resources. Whilst their findings have been revealing in many other ways, to make the work more locally relevant the policy issues that need to be resolved must be identified before the fieldwork. It is also important to identify who will be the beneficiary of policy change and who needs to be influenced for change to occur. These factors will help define the most appropriate methodology to be used, and the emphasis of the study (Coates pers. comm, quoted in Hinchcliffe, 1995). For example, a policy issue might relate to a specific resource, such as the prohibiting of the harvest of an endangered vine or the hunting of a rare bird. This would mean assessing the value of that one resource. On the other hand, the policy issue might concern a threatened landscape (for example, a woodland) or an ecological niche (eg. spraying of field margins). This would call for a total resource valuation of that landscape or habitat.

There are a number of situations where the *Hidden Harvest* approach described here might be applicable in contributing to more appropriate policy formulation (Guijt, 1997):

- to address and challenge a particular natural resource, land use or market policy that may threaten wild resources and wilderness areas;

- to conduct an environmental impact assessment of a planned development, such as plans to convert a local wilderness area to agriculture, focusing on the potential loss of value;

- to understand the costs and benefits of different development options, such as cultivating wild plants as opposed to opportunistic gathering;

- to seek improvements in local institutions that manage resources, such as resource sharing or community management schemes;

- to identify better markets and resource management options for wild resources and their (by)products;

- to investigate people's livelihood strategies, and how these determine the constraints and options for ensuring the sustainability of wild resources.

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7. APPENDIX 1: OTHER *HIDDEN HARVEST* PUBLICATIONS

The *Hidden Harvest* project is co-ordinated by the Sustainable Agriculture Programme of IIED, in collaboration with the Environmental Economics Programme. The project aims to develop approaches to local level economic assessment, using a combination of Participatory Rural Appraisal (PRA) and economic concepts. Case studies make use of various elements of these techniques to examine the importance of wild resources for local people's livelihoods.

Publications to date include:

The Hidden Harvest: Wild Foods and Agricultural Systems: A Literature Review and Annotated Bibliography.
Scoones, I., Melnyk, M., and Pretty, J.N. (1992).

Beer and Baskets: The Economics of Women's Livelihoods in Ngamiland, Botswana.
Bishop, J. and Scoones, I. (eds.). (1994). Sustainable Agriculture Programme Research Series, Vol. 3, No. 1.

Local-Level Economic Valuation of Savanna Woodland Resources: Village Cases from Zimbabwe. The Hot Springs Working Group. (1995). Sustainable Agriculture Programme Research Series, Vol. 3, No. 2.

The Hidden Harvest: The value of wild resources in agricultural systems. A project summary.
Guijt, I., Hinchcliffe, F. and Melnyk, M. (1995).

Local level assessment of the economic importance of wild resources in the Hadejia-Nguru wetlands, Nigeria.
IIED/HNWCP. (1997). Sustainable Agriculture Programme Research Series, Vol.3, No. 3.

Forthcoming reports:

Local level assessment of the economic importance of wild resources in Papua New Guinea
Grieg-Gran, M., Guijt, I. and Peutalo, B.

Participatory Valuation of Wild Resources: An overview of the Hidden Harvest methodology
Sustainable Agriculture Programme

These publications can be purchased from:

The Bookshop, IIED, 3 Endsleigh Street
London, WC1H 0DD
UK

Tel: +44 171 388 2117; Fax: +44 171 388 2826
E-Mail: bookshop@iied.org

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Sustainable Agriculture
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The Sustainable Agriculture Programme

The Sustainable Agriculture Programme of IIED promotes and supports the development of socially and environmentally aware agriculture through research, training, networking and information dissemination.

The Programme emphasises close collaboration and consultation with a wide range of institutions in the South. Collaborative research projects are aimed at identifying the constraints and potentials of the livelihood strategies of the Third World poor who are affected by ecological, economic and social change. These initiatives focus on participatory approaches to planning and development; resource conserving technologies and practices; collective approaches to resource management; the value of wild foods and resources; and policies that work for sustainable agriculture.

The refinement and application of participatory methodologies for learning and action is an area of special emphasis. The programme supports the exchange of field experiences through a range of formal and informal publications, including *PLA Notes (Notes on Participatory Learning and Action* – formerly *RRA Notes*) and the *Gatekeeper Series*. It receives funding from the Swedish International Development Cooperation Authority, the British Department for International Development, the Danish International Development Agency, and other diverse sources.

International Institute for
Environment and Development
3 Endsleigh Street
London
WC1H 0DD

Tel: (+44 171) 388 2117
Fax: (+44 171) 388 2826
E-mail: sustag@iied.org
Internet: http://www.oneworld.org/iied

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