Numbers of Forest Dependent People

A Feasibility Study

For DFID's Forestry Research Programme

by Calibre Consultants

and

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Contents

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1 Introduction

1.1 Terms of reference

We were invited by John Palmer, Manager of DFID's Forestry Research Programme (FRP) at Natural Resources International, to devise a proposal for a Feasibility Study on Numbers of Forest Dependent People. The terms of reference (TOR) for this study (see Appendix 10) consist of our proposal and associated correspondence with John Palmer.

The Objectives outlined in the TOR fall into two main categories:

1. To assess whether existing sources of information on numbers of forest dependent people (FDP) are sufficient to allow numbers of FDP to be estimated using reliable economic modelling and/or statistical techniques.

2. If such information was not available, to suggest alternative methodologies for constructing reasonable estimates of numbers of FDP.

As a result of the interviews carried out for the study and on the basis of the material collected, we have concluded that there are currently no reliable regional or global sources of data on FDP. Some information exists in the form of localised case studies and raw data from national household surveys (see Chapter 2). However, differing approaches to the collection of information make such studies hard to compare at regional or international level.

We have, therefore, concentrated on the second part of the study, that of suggesting alternative methodologies (see Chapter 4). In doing so, we have taken into account three considerations:

- Is there a demand for collecting information on numbers of FDP?

- Can we propose a consistent, globally applicable approach to data collection which would appeal to governments, international agencies and non-governmental organisations (NGOs)?

- How can we minimise the cost of the proposed methodologies?

1.2 Objectives and motivation

Although part of the reason for the lack of existing numbers on FDP is undoubtedly the problem of measurement (see Chapter 2), a key problem in the past has been lack of motivation to collect data on FDP. Existing methods of collecting data by national governments and international agencies were established several decades ago when forests, people and poverty were not policy priorities. Forestry Commissions have been the poor relations of Agriculture Ministries (or small departments within them) in most countries, while forest activities have traditionally been grouped together in the ISIC 1-digit level category 'Agriculture, Forestry and Fishing' in FAO and ILO publications.

Most of the experts we talked to - particularly in the public sector - took for granted the lack of figures on forest-related economic activities and people and seemed unconvinced of a need for them. There appeared to be a consensus that it was impossible and undesirable to collect quantitative information, which might be used for 'the wrong purposes'. The exception was among those involved in community forestry, project-oriented NGOs and those who have adopted DFID's emphasis on Sustainable Livelihoods and poverty alleviation. For these groups, the people-forest relationship is key and establishing the numbers involved is seen as a useful tool for understanding groups of potential beneficiaries and setting priorities.

There is a reasonable concern that the numbers game could oversimplify what is a undoubtedly a complex issue. For foresters, the importance of forest conservation cannot be reduced to the forest's 'utility' for human beings, let alone only those who have only direct dependence on it. Even those who recognise the people-forest relationship doubt the feasibility or desirability of measuring it (see Chapter 3). Yet fear of the possible misuse of numbers should not prevent us from collecting useful information. The important thing is to make sure that the right questions are asked, useful information collected and the resulting figures interpreted properly.

As the old sectoral approaches give way to the Sustainable Livelihoods Approach, organisations such as DFID, FAO and CIFOR will demand figures which take into account numbers of people, particularly poor people, who depend on forests for their livelihoods. These people have been largely ignored in the past, and nobody has

made it a priority to collect information concerning them. In order to measure the impact of poverty-reduction efforts we must begin to do so. In our view, it would make sense to do so from a broad livelihoods perspective.

1.3 A consistent approach to data collection

The question posed above - can we propose a consistent, globally applicable approach to data collection? - is one to which we believe that we can give a positive answer. In Chapter 4 and the accompanying appendices (1-7), we set out a range of options which could be used separately or in combination to collect information on numbers of FDP. We expect that each of them, if used consistently in different countries, would generate relevant information about FDP.

It might be difficult for governments, international agencies and non-governmental organisations to agree on which approach was best, as this would depend on their policy objectives and the funding which they can make available. However, even if two or three approaches were taken forward simultaneously by different organisations, this would reduce the huge variability between methods currently in use and introduce the possibility of standardisation at regional or global level.

1.4 Limiting the costs

The methods proposed in Chapter 4 and Appendices 1-7 range from the low-cost key informant interview to the high-cost specialised survey or participatory research exercise. One way of limiting the costs would be to 'piggy-back' data collection efforts onto existing surveys or participatory research projects. Another is to make better use of data which already collected, for instance by household surveys. However, it is important to note that there is a trade-off between cost and reliability, and that the low-cost options do not automatically represent 'value for money'.

1.5 Geographical coverage

We originally envisaged that this study would look at sources of information and methodologies for forests (mainly tropical) in developing countries. DFID's FRP noted that the countries of particular interest were those in DFID forestry partner countries, which are listed in the FRP briefing notes for project proposers. These are:

- Africa: Cameroon, Ghana, Malawi, Nigeria, South Africa, Uganda and Zimbabwe
- Asia: India and Nepal
- Latin America: Belize, Bolivia, Brazil, Eastern Caribbean States, Guyana, Mexico

The WCMC has kindly provided a set of forest cover maps for these countries, which are referred to in Appendix 2. We have tried to draw the examples in this report from these countries wherever possible, but often the choice has been dictated by the examples given in interviews and the material collected.

1.6 Interviews and other exchanges

This project generated a lot of interest and we were able to interview most of the people we wished to meet; their names are listed in the Acknowledgements. Many of those interviewed dedicated considerable time to discussing definitional questions and sources of information, and also donated materials to our collection (see Appendix 9). In addition, we e-mailed over 50 contacts including DFID forestry advisers, academics, members of international organisations and NGOs, and we received valuable contributions by e-mail and fax from many of them.

The only key organisation which did not respond was the World Commission on Forests and Sustainable Development, which had generated some of the impetus for this project with the controversial figures for numbers of FDP quoted in its 1997 report "Our Forests, Our Future" (WCFSD, 1999). As a result, we regret that we were unable to clarify where the WCFSD obtained its figures from (see Chapter 2).

2 Existing sources of information

2.1 Guesstimates

Under our Terms of Reference for this project we were required to examine existing sources of information on numbers of FDP. We began by probing the sources of global or regional estimates currently in circulation and concluded that they were all 'guesstimates'. According to Byron and Arnold (1997), "estimates of the numbers of people involved range from perhaps 1 million to 250 million (Pimental *et al*. 1997), to over 500 million (Lynch and Talbot 1992), to over 1 billion (WCFSD 1997)".

Estimates quoted in recent publications include:

> Altogether, some 350 million of the world's poorest people depend almost entirely for their subsistence and survival needs on forests. A further 1 billion poor people - about 20% of the world's population - depend on remnant woodlands, on homestead tree gardens, and on agro-forestry systems for their essential fuelwood, food and fodder needs (WCFSD, 1999).
>
> About 200-300 million of the rural poor who depend heavily on forest lands are landless shifting cultivators (WCFSD, 1999).
>
> Indigenous peoples and other communities living in forests and depending on them for subsistence number some 60 million people worldwide (WCFSD, 1999).
>
> In India, some 275 million landless people and small farmers benefit from gathering resources they find within adjacent forests (WCFSD, 1999).
>
> Out of about 300 million people (or 60 million households) estimated to live below the 'poverty line' in rural India, around 200 million of these people are partially or wholly dependent on forest resources for their livelihoods. (Khare *et al*, 2000).
>
> The rural population of Asia and the Pacific is 2.13 billion (67 percent), with urban population totalling about 1.06 billion (33 percent). The number of people directly dependent on forest resources totals around 0.43 billion in the region (13 percent). It is not possible to reliably ascertain how many other people fall into the categories "people who live outside but near forests" and "people engaged in forest-based commercial activities", but it is likely that these are at present the largest single categories (FAO, 1998a).

We have not managed to obtain any response from WCFSD about the sources of the numbers quoted in their report, despite applications to WCFSD representatives.

The FAO figure of 0.43 billion people directly dependent on the forest in Asia-Pacific appears to be a crude average of the figures shown in the middle column of Table 1, which is shown as Table 6.1 in the FAO (1998) report:

Table 1: "Guesstimate" of numbers of forest-dependent people in selected countries in Asia-Pacific

Country	People directly dependent on forest resources (millions)	People living on land classified as public forest (millions)
India	275	100
Indonesia	80-95	40-65
Nepal	18	8.5
Philippines	25-30	24
Sri Lanka	2-4	??
Thailand	20-25	14-16

Source: FAO, 1998, based on Lynch and Talbot (1995).

It is characteristic of the global or regional estimates of FDP currently in circulation that sources are not provided, or, where sources are shown they are 'guesstimates'. According to several of our interviewees, their origin is usually a back-of-the-envelope calculation based on numbers of people living in rural areas and an assumption of their degree of dependence on forest products. Thus, for example, a figure of 2 billion people dependent on wood for energy in developing countries was developed by a World Bank economist in the 1970s on the basis that all rural populations are dependent to some extent on fuelwood for cooking. A similar approach is reflected in the assumptions used in FAO (1985): "Around 1980, FAO estimated that about 2 billion people (or 3/4 of the population of developing countries at that time) depended on biomass for their daily energy consumption".

2.2 Our initial hypothesis

Under our Terms of Reference, we set out to probe existing sources of data on the basis of the following questions:

a) Is the data available from existing sources sufficient to allow reasonable estimates of numbers *employed* in forestry to be made on the basis of extrapolation using reliable economic modelling/statistical techniques?

b) Is the data available from existing sources sufficient to allow reasonable estimates of numbers whose *livelihoods are otherwise associated* with forestry to be made on the basis of extrapolation using such techniques?

The question was divided into (a) and (b) in this manner because our initial hypothesis was that information about formal sector employment would be better

than information covering people who obtain subsistence livelihoods from the forest. We also thought it likely that data on (a) would be easier to capture, while data on (b) would be both less accessible and less reliable.

However, as a result of the interviews carried out for this study and examination of a variety of sources in the materials collected, we have had to conclude that there are *no reliable regional or international sources of data on FDP*, even for part (a). We believe that there are some national data sources, most of which are in the form of raw data. Although a full exploration of these sources was beyond the scope of this study, we will refer to them again in Chapter 4 and Appendix 3.

We believe that the lack of global or regional-level information is owing partly to the lack of motivation discussed in Chapter 1 and partly to difficulties of measurement. We explore this latter aspect in the following five sections, in which we review sources of information which we have explored during this study but found to be of limited or no use for the purposes of estimating numbers of FDP.

2.3 Sources of information on forestry and wood industry employees

Forest-related employment in the formal sector is measured by recording the numbers of employees of registered enterprises. These can be broken down into:

a) the forestry workforce itself, comprising harvesting, silviculture and transport; and

b) those working in wood-related industries.

The study identified three sources of such information:

i The **ITTO** ran an annual survey of its members until 1995, covering numbers of enterprises and employees in the following categories: logging, sawmills, veneer mills, plywood mills and others. In 1995 it showed 3.6 million employees world-wide (see Table 2: Forest Industry Structure in ITTO Producer Countries in 1995). This survey was used by the WRI (1999) for its Data Table 11.1: "Forest Cover and Change, and Forest Industry Structure, 1980-95". However, it ended in 1995 due to poor responses from members to the ITTO's requests for data.

Table 2

ii Jill Bowling of the International Federation of Building and Wood Workers (**IFBWW**) kindly provided this study with a copy of the federation's world-wide membership figures. However, she pointed out that these figures are unreliable for developing countries and only cover affiliated union membership. Additionally, it would not be possible to determine how many of the "building and wood workers" work with wood.

iii **UNIDO**'s Industrial Statistics Database (INDSTAT) contains figures on employment in wood industries. It has ISIC 3-digit level data for:

331 Wood products, except furniture

332 Furniture, except metal

341 Paper and paper products

These are further broken down at the ISIC 4-digit level. However, some sources at the ILO are sceptical about the reliability of the UNIDO figures.

Assessment

Employment statistics measuring formal sector (mostly full-time) jobs tend to severely underestimate forest-related job creation. This is because:

- Forestry employment even in the 'formal' sector is often part-time and seasonal, using floating workers under increasingly informal arrangements. For instance, forestry companies in the Amazon are increasingly conducting their logging operations through 'independent' contractors, rather then taking on employees with the obligations and responsibilities which employment entails. Thus numbers of employees in forestry appear to have fallen in recent years.

- Formal sector employment is generally agreed to be a very small proportion of total forest-related employment in developing countries. All the experts we interviewed agreed that the forest-based informal sector is far more important than the formal sector, but by definition, it is not included in official statistics.

- Non-wood forest products are seldom included in official employment statistics, although some (patchy) production and trade data do exist.

We do not see the existing forest industry employee figures or the national sources of official data from which they are drawn as reliable or useful sources of information for the purposes of our study. It was suggested to us by Simon Rietbergen (IUCN) that data from World Bank impact assessment and sector review studies might be useful for estimating numbers of FDP, but Peter Dewees (World Bank) did not recommend these as sources for the information we require. Nevertheless, relevant data might be contained in some of these studies, as well as in the ILO's country profiles. Trawling for such figures is beyond the scope of this study.

2.4 Sources of information on small farmers, artisans, processors and traders of forest products

We have discussed the following approaches to obtain information on a variety of informal sector and subsistence users of forest products:

2.4.1 Projections based on production and trade data

We had originally envisaged that attempts might be made to extrapolate numbers of FDP from the value of production or trade in forest products. However, we have concluded that this cannot be done at present because:

- official estimates of production and trade - particularly internal trade - are patchy and unreliable and frequently do not include small enterprises or non-wood forest products (e.g. Broekhoven, 1996); and

- there is insufficient survey evidence on the relationship between production/trade and numbers of people involved in these activities outside the formal sector, except in a few cases (see Section 2.4.3).

2.4.2 Case studies

There are large numbers of case studies and an increasing number of doctoral theses which may contain relevant information on numbers of FDP in specific locations. However, these are localised and based on varying methodologies, which

means that the information they contain - even if it could be collected together - would not be comparable. Many of the case studies we have collected focus on estimating the value of forest products. An example is Bajaj (1998), which sets out to value non-wood forest products in part of Madhya Pradesh. This study contains information about numbers of families engaged in non-wood forest product collection in eight villages surveyed, but the report states that "no statistically valid sampling procedure was practicable and the selection was primarily made on the basis of guidance given by local NGOs and foresters on which were high collection areas". This means that the information is not generalisable.

2.4.3 Industrial censuses/surveys

There are references in the literature to industrial censuses, which may or may not succeed in covering small forest-dependent enterprises. Industrial census techniques are particularly good at capturing well-defined, fully-commercial enterprises when these have been established for a substantial period of time and are known to local authorities. Informal and peripheral small-scale enterprises are very unlikely to be effectively covered in an industrial census.

Under the surveys heading we consider three sets of surveys which contain some information of interest to this study - a) the Michigan State University/Oxford Forestry Institute small enterprise surveys; b) Townson's survey of income-generating activities based on non-timber forest products in Ghana; and c) AIDEnvironment's non-timber forest product valuation surveys. We do not include household surveys, which are examined separately in Chapter 4 and Appendix 3.

a) The Michigan State University/Oxford Forestry Institute small enterprise surveys (Arnold *et al*, 1994) were developed on the basis of earlier survey work by Yacob Fisseha (FAO, 1987) in Jamaica, Honduras, Zambia, Egypt, Sierra Leone and Bangladesh. They looked at employment in small-scale non-farm enterprises (up to 50 employees) in southern and eastern Africa which sold at least half of their output. The activities carried out by the manufacturing enterprises were: sawmilling (ISIC 3311), grass, cane or bamboo work (ISIC 3312), coal/wood processing (ISIC 3313), wood carving (ISIC 3319), carpentry (ISIC 3320), furniture making (ISIC 3321) and other woodworking (ISIC 3322). The studies also included two categories of trade:

vending forest-based products (ISIC 6205) and retailing forest-based products (6230). The study found that: "In the six countries covered in southern and eastern Africa - Botswana, Kenya, Lesotho, Malawi, Swaziland and Zimbabwe - an estimated 763,000 persons are employed in 408,000 small enterprises engaged in activities based on the transformation or commercialization of forest products". Overall, these enterprises accounted for an estimated 16.2% of the total number of small-scale enterprises, ranging from 2% in Botswana and 5.8% in Lesotho through 14.1% in Kenya and Malawi to 20.7% in Zimbabwe and 34.3% in Swaziland. The largest sub-sector was grass, cane and bamboo work and the second largest was woodworking.

However, these enterprises were estimated to employ only 1.6% of the population. The study contains information which could be useful for our purposes, but it suffers (from the perspective of efforts to estimate numbers of FDP) from being restricted to a single group of FDP - artisans and traders of forest products - and from being further restricted by the income requirement (enterprises must sell at least half of their output). Moreover, the results cannot be generalised given the high level of variation between the countries covered in the study.

b) Townson (1995a) conducted a survey of income-generating activities based on non-timber forest products (NTFP) in areas less than 10 km from a forest reserve in southern Ghana. The first stage of the survey - in which a simple census of 4,308 households in 32 enumeration areas was carried out in order to record information on income-generating NTFP-based activities of members of the household - is of particular interest to us (Townson, 1995b). It found that some 20% of the economically active population of the area surveyed obtain income from NTFP activities, principally akpeteshie, bushmeat, firewood, wrapping leaves, medicines and baskets. However, like the Michigan State University/Oxford Forestry Institute study, Townson's work was too restrictive for our purposes, as it excluded both collection by households for their own consumption and timber-based products[1].

c) AIDEnvironment, a Netherlands-based non-profit organisation, has developed a methodology for carrying out standardised NTFP valuation surveys (AIDEnvironment, 1999a). This has been field tested in a 42,000 km^2 area inhabited

[1] The definition of NTFP used in the study included wood products (e.g. for carving and carpentry), but excluded industrial timber such as sawn timber used by furniture factories.

by over 2 million people in Cameroon. According to AIDEnvironment (1999b): "The **direct objective** of the NTFP valuation methodology is to create the possibility for comparison of qualitative and quantitative data on NTFP values at different sites and, more importantly, the extrapolation of isolated pockets of data, gathered in a sound statistical procedure to a larger, regional or national scale". This is a highly complex methodology, requiring hand-held computers and a high level of skill by the survey team and generating a wealth of data. However, the focus is exclusively on prices and valuation of activities; it does not appear to generate estimates of numbers of people involved in these activities.

2.5 Poschen paper

Probably the most comprehensive attempt to estimate forest-based employment in the widest sense (including informal sector activities) has been carried out by Peter Poschen of the ILO's Sectoral Activities Department. In an unpublished paper (no date), he sets out "to give at least a sense of the proportions and of orders of magnitude for the most significant categories". He estimates global forest-based employment in the early 1990s at 45 million (see Table 3). He warns that the numbers "involve some heroic extrapolation" and provides the basic assumptions used "where guesstimates were inevitable". The methods used in his study were:

> Industrial roundwood: Answers from an enquiry sent out by Poschen to government statistics offices in 1997 were supplemented by data from 25 special FAO country missions which collected all available evidence for those countries on employment in forest harvesting in the mid-1980s; the FAO mission data was updated for 1994 using figures on industrial roundwood production from FAO's Forest Products Yearbook and allowing for productivity increases of 2% per year.
>
> Fuelwood: FAO fuelwood harvesting numbers - generally acknowledged to be inaccurate - were used. "The estimate for fuelwood is based on the assumption that in industrialised countries productivity in fuelwood harvesting is about half that in commercial forestry. That leads to an estimate of 300,000 full-time equivalents. In developing countries, fuelwood harvesting is a lot less productive... If we assume 0.5 m^3/workday, the 1,600 million m^3 reported as harvested for fuelwood in developing countries translate into some 13 million full-time equivalent jobs" (Poschen, no date).
>
> Reforestation and silviculture: "Silvicultural work such as reforestation is included in the figures for industrialized countries, but had to be estimated for developing ones... it may be reasonable to assume that silvicultural work represents at least 50% of industrial harvesting work" (Poschen, no date). Hence the figure of 0.8 million.
>
> Mechanical wood industries in the formal sector and pulp and paper manufacturing: these estimates were taken from the UNIDO 1996 Industrial Statistics Database.

Forest-based informal sector industries. This is based on the enterprise surveys carried out by the Liedholm, Fisseha and Mead at Michigan State University and by Arnold at the Oxford Forestry Institute (Arnold *et al*, 1994). "An order of magnitude can be estimated, making assumptions about how many times larger the informal sector is compared to the formal one and about how many full-time equivalents correspond to one job in small-scale enterprises. Available survey data suggest that a multiplier of 10 and a full-time equivalent of 0.5 are realistic. Both estimates are extremely uncertain though" (Poschen, no date).

Table 3: Estimate of global forest-based employment early 1990s

Sub-sector	Region	Type of activity	Full-time equivalents (in million)
Forestry	Industrialized countries	Industry roundwood production	1
		Fuelwood	0.3
	Developing countries	Industry roundwood harvesting	1.9
		Reforestation and silviculture	0.8
		Fuelwood	13.3
Wood industries (formal sector)	Industrialized countries		4.5
	Developing countries		3.3
Forest-based (informal sector)	Developing countries		16
Pulp and paper			4.3
Total			**45**

Source: Poschen (no date).

Assessment

There are several problems with this approach, which Poschen himself recognises: the heroic assumptions, particularly about productivity and multipliers; and the reliance for industrial roundwood production employment data on a combination of responses at-a-distance to the ILO's enquiry questionnaire and expensive one-off FAO country missions. Another problem, from our study's perspective, is the conversion into full-time employment equivalents, when, as Poschen observes:

> The traditional definition of employment as participation in labour markets is not really adequate for capturing the reality of most persons for whom forests are the main source of livelihood. For the majority of these persons, the distinction between wage employment, self-employment and work for subsistence production is not meaningful. There are different ways of making a living that are often interchangeable...These forms of employment may all occur simultaneously, rotate according to the seasons or form a sequence in a person's life (Poschen, no date).

2.6 Other sources

2.6.1 International Forestry Resources and Institutions Program (IFRI)

The IFRI research programme was set up in the mid-1990s and is led by Elinor Ostrom of Indiana University (Ostrom and Wertime, 1995). The programme is

designed to collect information and to build in-country assessment capabilities. It aims to collect comparable quantitative and qualitative information on forest resources, users of the forest and - in particular - institutions and community management (see Table 4). A key concern of the programme is the population-deforestation-management relationship. It involves a lengthy and expensive training process for staff from 'Collaborating Research Centres'. One criticism of the approach is that it is too complex to be carried out by other than highly trained personnel and will be difficult to sustain through building in-country capabilities.

The project has so far collected information on 100+ forest areas in East Africa, Madagascar, the Himalayas, Mexico and Central America, and this information is stored in a database. We have not had access to the IFRI database, but we understand that it includes some information on numbers of forest users in the 100+ sites studied.

Table 4
IFRI Data Collection Forms and Information Collected

IFRI FORM	INFORMATION COLLECTED
Site Overview Form	site overview map, local wage rated, local units of measurement, exchange rates, recent policy changes, interview information
Forest Form	size, ownership, internal differentiation, products harvested, uses of products, master species list, changes in forest area, appraisal of forest condition
Forest Plot Form	tree, shrub, and sapling size, density, and species type within 1, 3, and 10 meter circles for a random sample of plots in each forest, and general indications regarding forest condition
Settlement Form	socio-demographic information, relation to markets and administrative centers, geographic information about the settlement
User Group Form	size, socioeconomic status, attributes of specific forest user groups
Forest User Group Relationship Form	products harvested by user groups from specific forests and their uses
Forest Products Form	details on three most important forest products (as defined by the user group), temporal harvesting patterns, alternative sources and substitutes, harvesting tools and techniques, and harvesting rules
Forest Association Form	institutional information about forest association (if one exists at the site), including association's activities, rules structure, membership, record keeping
Governance Form	information about organizations that make rules regarding a forest(s) but do not use the forest itself, including structure, personnel, resource mobilization, and record keeping
Organizational Inventory and Interorganizational Arrangements Form	information about all organizations (harvesting or not) that relate to a forest, including harvest and governance activities

2.6.2 Deforestation-population projections

We spoke to a number of people at FAO about the relationship between deforestation and population. This subject appears to be hotly debated, with FAO population experts claiming that: "At an elementary level, it is obvious that there must be an inverse correlation between population density and forest cover: as soon as humans build shelters and housing, they need to clear the wooded areas if these are present. If in addition they engage in agricultural activities, they need even more land *per caput*..." (Drigo and Marcoux, no date). Drigo and Marcoux collected population data for the Amazon at the level of the smallest administrative unit (municipio) and used it to model the impact of population on deforestation. However, this generated a counter-argument from the FAO Community Forestry Group, which undertook studies of the relationship between population dynamics and natural resources in forest-dependent communities in Bolivia, Nepal, Thailand and Uganda. They concluded that "A complex relationship exists between population dynamics and community forestry. Increased population does not necessarily mean increased deforestation" (Community Forestry Group, no date). A key variable, in their view, was the level of organisation of communities and how they manage the forest.

Since the jury is clearly still out on the population-deforestation issue, we do not consider it a fruitful avenue to pursue since any estimates generated would be likely to be strongly contested. Moreover, interviewees at FAO were highly sceptical about the possibility of turning deforestation-from-population projections on their heads to project population-from-deforestation.

2.6.3 Studies of indigenous forest dwellers

The Avenir des Peuples des Forêts Tropicales (APFT) is the biggest and most consistent effort to estimate numbers of indigenous people living in forests (Bahuchet, no date). The project has reviewed hundreds of case studies and consulted a large group of experts working in the Amazon and Orinoco basins of equatorial South America, the Malaysian peninsula, the Philippines, Indonesia, Borneo, New Guinea and Central Africa. On the basis of this research, the project estimates that there are 12 million 'indigenous forest peoples' belonging to some 1,400 ethnic groups in the areas covered by the study (see Table 5). However, the

case studies are based on a variety of methodologies rather then a consistent approach and the precision of the estimates is low. Moreover, the APFT's geographical spread (see APFT website listed in Appendix 9) provides only partial coverage of the areas of interest to DFID's FRP, leaving out in particular India and Nepal. According to India-based studies (Khare *et al*, 2000):

> "Indigenous inhabitants, known in India as *adivasis*, constitute about eight per cent of India's population (FSI, 1998), or more than 73 million people. The term *adivasi* is used particularly to refer to those inhabiting the forested regions of central and eastern India. Natural forests are thought to contribute directly to the survival of more than 50 million of the world's poorest tribal people..." (Poffenberger *et al*, 1996)[2].

Table 5: APFT estimates of indigenous forest populations

Forest regions	Total population of countries	Indigenous forest populations	percent[d]	Number of forest ethnic groups
Central Africa	54,000,000	3,000,000	5.5	~150
Amazon[a]	30,400,000	700,000	2.3	234
South America[b]	236,000,000	N/A	0.3	N/A
Philippines	62,400,000	1,600,000	2.6	52
Malaysian peninsula	14,600,000	100,000	0.9	19
Indonesia[c]	170,700,000	4,800,000	2.8	~95
Borneo	12,500,000	950,000	7.6	62
New Guinea	5,400,000	1,000,000	18.5	806
Total	**350,000,000**	**12,150,000**	**3.5**	**~1,418**

Notes: [a] Amazon = total population of forested provinces only (not total country population); [b] South America = total population of countries which include Amazon basin only; [c] Indonesia excludes Irian Jaya, which is included in New Guinea, and Kalimantan, which is included in Borneo; [d] Percentages are shown as they appear in source.

Source: Bahuchet, no date

2.6.4 Mappings

Finally, a source which we were encouraged to explore by several interviewees was that of forest cover maps and matching population estimates. These, it was argued, would give a general idea of numbers of people living in and near forests - although Byron and Arnold (1997) warn that "'Proximity to forests' is not [...] synonymous with

[2] We have not had time to follow up the references quoted here. These are: FSI, 1998: State of the Forest Report 1997, Forest Survey of India, Dehradun; and Poffenberger, M, B McGean and A Khare, 1996: "Communities Sustaining India's Forests in the Twenty-first Century" in Poffenberger and McGean (eds), Village Voices, Forest Choices: Joint Forest Management in India. OUP, New Delhi.

'forest dependence'". Two approaches are of particular interest, although they remain of limited use for our purposes:

1. The WCMC has made comparisons at national level - and in large countries such as India at state level - between its forest cover maps and population and poverty indicators. However, the units used for population are too large to be of use to us in estimating numbers of FDP (see Appendix 2). They only give the relationship between total forest cover in a country or state and total number of inhabitants of that country or state. A similar approach is followed by Population Action International at country-level (Engelman and Outlaw, 1999).

2. Gonzalo Oviedo of the WWF is currently working on 'dot maps' for groups of indigenous people living in the forest. These involve mapping the central location of ethnic groups against maps of forest cover and against the WWF's Global 2000 Ecoregions. Oviedo is working with Manuel Lizarralde (a US-based Venezuelan anthropologist who specialises in mapping indigenous populations) on more detailed maps for South America. These would show demographic information for the ethnic groups identified. This has also been attempted for India by Poffenberger *et al* (1996) in Khare *et al* (2000), see Figure 1. While these efforts are unlikely to yield reliable estimates of numbers, they are a visual aid which could be of use in conveying geo-referenced impressions of magnitude.

3 Definitions

3.1 Establishing categories

A key problem with existing attempts to estimate numbers of FDP at global or national level is that most have tried to do so without first establishing clear definitions of who should be included as 'forest dependent'. As Neil Byron and Mike Arnold argue in their paper for CIFOR "What Futures for the People of the Tropical Forests?", much of the discrepancy between estimates "can be explained by the ambiguity (or complete lack) of definitions" (Byron and Arnold, 1997).

Byron and Arnold establish a 'typology of different kinds of users', but they argue that "attempts to estimate the numbers of people who 'depend' on forest outputs for a specified share of their livelihood inputs" would fail to capture the complexity of the people-forest relationship. However, by establishing a 'typology', they have provided a starting point for those who wish to try to measure this relationship. They have also challenged us to attempt to find ways to capture the complexity of the relationship.

A first step towards measuring the forest-people relationship is to establish clear definitions of categories of forest users. Although any such effort will inevitably generate debate about which definitions are most appropriate, a working definition of user categories for the purposes of information-gathering could be based on the studies by Mike Arnold, Neil Byron, Gill Shepherd and Steve Bass (Byron and Arnold 1997, 1999; Shepherd *et al*,1999). This approach suggests the following four broad categories:

1. People living in the forest such as hunter-gatherers and long-rotational shifting cultivators, who obtain most of their livelihood from the forest

2. Populations of small farmers relying for part of their livelihood on adjacent forest or woodland

3. Traders and processors of forest products and employees in forest industries (i.e. artisans and the landless rural poor)

4. Urban and peri-urban consumers of forest products

User categories 1-3 might be considered 'core population'. User category 4 might or might not be included in a definition of FDP. But this approach is useful *precisely because it allows us to disaggregate* the total forest dependent population into user categories. Thus, each information end-user can build up his/her own figures from the 'building blocks' of information collected. In other words, the same system of information collection will be of use to a variety of different stakeholders.

In their 1999 paper for the World Bank, Shepherd *et al* develop the earlier work by Byron and Arnold (1997) to provide a matrix of the 'Nature of Dependence on Forest' (see Table 6). This relationship is largely defined by FDP use of five categories of forest product - forest foods; forest medicines; wood, fuel; fodder; housing materials and furniture - and partly also by aspects such as soil fertility and religious/cultural values. A definition based mainly on use of forest products is helpful because it should allow us to develop a set of basic indicators to measure forest dependence.

3.2 Dealing with complex relationships

Byron and Arnold's 'typology' approach suggests that - whether or not we are interested in quantitative information - we can pursue the following strategy:

1. Define users (see Section 3.1)
2. Define their relationship to the forest/forest outputs (products)
3. Define the importance of this relationship for their livelihoods
4. Assess the impact of change, including availability of alternatives

However, a number of key problems arise:

- What forest products should be included? (Some items which come from trees may not be considered forest products).
- Can we - and should we - distinguish between peoples' dependence on the forest and their dependence on on-farm tree sources?

		TABLE 6: NATURE OF DEPENDENCE ON FOREST						
MAIN ECONOMIC ACTIVITY	**MAIN LIVELIHOOD SOURCE**	**FOREST FOODS**	**FUEL WOOD**	**FOREST MEDIC-INES**	**HOUSING MATERIALS + FURNITURE**	**FOREST SOIL FERTILITY**	**RELIGIOUS + CULTURAL VALUES**	**FODDER**
1 THOSE WHO LIVE IN FORESTS								
hunters and gatherers	forest products	***	*	***	*** forest-gathered and home-made	*** if cultivating	***	-
farmers practising rotational fallowing ('shifting cultivators')	forest products + forest-based agriculture	***	**	***	*** forest-gathered and home-made	***	***	*** if animals kept
Herders in tropical dry forests (mainly Africa)	forest-fed livestock and agriculture	***	*	*** inc. veterinary	*** forest-gathered and home-made	***	***	***
2 AGRICULTURALISTS DRAWING ON THE FOREST FOR KEY INPUTS								
wealthier farmers	agriculture	** seasonal and specialist	**	**	** some components purchased	**	*	**
poor farmers	agriculture, migrant labouring	*** emergency seasonal and specialist	***	***	*** forest-gathered and home-made	**	**	***
landless families	agricultural or other wage-employment	*** emergency seasonal and specialist	***	***	*** forest-gathered and home-made	-	**?	***
3 THOSE BASING LIVELIHOODS ON COMMERCIAL FOREST PRODUCT ACTIVITIES								
Artisans traders and small enterprise managers	cash incomes	**?	***	**?	Some components purchased	*?	-	-
Employees in forest industries	cash, some agriculture	**?	***	**?	Often forest-gathered and home-made	**?	-	-
4 URBAN DWELLERS								
Wealthier townspeople	cash incomes	some items	No	some items	purchased forest components only	-	-	-
poor townspeople	cash incomes	some items	***	some items	mainly purchased forest components	-	-	-

Shepherd et al, 1999. Based in part upon Byron and Arnold, 1997.

- How do we measure the degree of dependence on the forest, particularly for user categories 2 (where dependence on the forest is partial and often temporary) and 3 and 4 (where an element of choice may exist)?

- How do we assess change over time leading to greater or lesser forest dependence?

- How do we deal with the question of 'negative dependence', i.e. where the relationship with the forest is short-term and destructive?

We will outline these problems in the following sections. It is important to establish our understanding of them and approach to dealing with them before proceeding to explore the options available for estimating numbers of FDP.

3.2.1 Forest products

For the purposes of our study, John Palmer (DFID-FRP) provided us with the following working definition (see Appendix 10): "The dependency includes water, fuelwood, shelter, medicinal plants and culinary herbs, nutritionally important forest fruits and other foods, timber, fodder, dry-season grazing, the broad suite of non-timber forest products (bamboos, rattans, gums, resins, latex, oils, etc)".

It would be premature to decide which products should be included as part of the information collection options which we explore in Chapter 4. However, there are essentially two approaches which could be used for the purpose of estimating numbers of FDP. The first would agree in advance on a list of key products to be used as indicators - using the large number of secondary studies available; researchers would then collect information about people in relation to these product indicators. The second approach would leave the list of 'eligible' products flexible; it would be agreed upon through participatory discussion in the pilot stages of a survey or participatory research exercise using general guidelines about what products are genuinely products of the forest as opposed to orchards, plantations, etc. if required.

3.2.2 Forests and on-farm trees

This is the most serious area of difficulty for estimating numbers of FDP. According to Richard Coe of ICRAF, "the very severe problems of definition (is anyone with a piece of wood in their house dependent on forestry?)" is probably what has discouraged people from undertaking serious studies on forest - or agro-forest - dependence. While it is not difficult to measure people in relation to forest products, it is difficult to distinguish whether these products actually originated in the forest or from on-farm trees. It is particularly difficult in areas where the continuum from dense forest to cultivated agricultural land is a long and/or confused one. For example, Brocklesby and Ambrose-Oji (1997), working on Mount Cameroon, note that:

> "...forest users did not understand the questions we asked concerning 'fallow' and 'forest' .. this term [forest] was interpreted by local people to mean 'black bush', a pidgin concept of dense, undisturbed high forest that is usually relatively distant and infrequently visited ..."

Brocklesby and Ambrose-Oji were "given the impression that use of the forest was limited, both in terms of products collected and traded and products gathered for consumption", whereas this contradicted observed reality. The authors concluded that the particular Upper Village communities studied see a continuum from 'black bush' to intensive permanent cropping, so that the "forest" definition poses challenges to sampling and enumerator training.

A considerable proportion of those we interviewed for this study were of the opinion that the distinction should not matter, partly because there is no distinction between forest and on-farm trees in the utility value to people of the products concerned and partly because much woodland regeneration takes place at farm level. This view is represented by Shepherd *et al* (1999):

> There are many definitions for forest, particularly for donors anxious to intervene in a wide range of types of situation. [...] Here the term includes all types of forest from tropical moist forest to the dry savannah woodlands of much of Africa, and also considers briefly the planting of trees on farms, and the use of degraded common lands, once probably forested, but now covered only with very sparse tree-cover, bushes and grasses. This broad sweep is partly dictated by the resources actually used by the poor, and partly by the importance of trade-offs between different kinds of tree-cover.

The purists, however, strongly disagreed with this view. For those - mainly foresters - for whom conservation of natural forests is the main objective, the distinctions are of paramount importance.

If any organisation wished to pursue any of the options outlined in the next chapter and in appendices 1-7, a decision would have to be taken on which approach to follow. The 'broad sweep' view is more consistent with people-centred, poverty targeting approaches and would present less difficulties to those collecting information on the ground. This is the approach adopted by DFID's Forestry Research Programme (FRP), which defines forest-dependent as "dependent on forests/woodland/tree-derived goods and services" (see Appendix 10). This definition emphasises broad coverage, including reliance on trees in scattered woodlands, on farms and even on urban streets.

If, on the other hand, the 'purist' view were favoured, guidelines on definitions would have to be provided and questions asked would need to be prefaced by elicitation of information on where products come from as well as clarification of the issues. This would not be easy, although it would be more feasible in participatory research exercises than in standard surveys.

3.2.3 Degree of dependence and change

The problem of measuring degrees of dependence initially appears to be a tricky one. DFID's FRP argues that dependent means "needful for sustainable livelihood and not easily substituted by non-forest goods and services except at extra expense". But trying to find out from people how needful forest goods and services are for their livelihoods is a complex task. Questions of the 'a little', 'a lot' kind, or attempts to establish dependence on the forest for 25%, 50% etc. of a person's livelihood, would be very imprecise, while measuring potential substitution by non-forest products would be even more so.

However, we believe that the indicators of 'intensity' of forest resource use explored by Penny Scott (1998) in her PRA work (see Appendix 6) do provide sensible answers about how to measure degree of dependence. Scott's basic indicator of labour used on in-forest activities could be complemented by other indicators to measure specific dependencies e.g. on medicinal plants.

Participatory research techniques are also appropriate for exploring the more complex questions such as temporary dependence (e.g. in a hunger period or an emergency), choice and change over time. Changes over time might also be recorded by regular surveys designed to monitor trends in relation to particular products or activities. However, this would be a costly alternative.

Katherine Warner (FAO Community Forestry), Mike Arnold and others were concerned about romanticising the issue of forest dependence and thereby encouraging communities to retain their dependence on the forest, when in many cases it would be better to help people move away from the forest. This is clearly an important issue for policy-makers, which is difficult to capture. However, participatory techniques examining choice and change over time might attempt to elicit relevant information, particularly if these research exercises were conducted in the broader livelihoods context and/or if they were attached to projects which promote alternative livelihood sources.

3.2.4 Negative dependence

A number of interviewees also pointed out that the relationship with the forest of some users is a destructive one, particularly when long-rotational shifting cultivation systems give way to shorter cycles:

> "there are those who practice sustainable fallowing systems and rotational agriculture in tropical moist or tropical dry forests, returning to fallowed plots after a 5-20 year cycle and allowing the intervening years' fallowing to return nutrients and biomass to the soil", but: "Along the continuum from long-fallow to permanent cultivation [...] we can see a slow shortening of fallows, and the slow introduction of cash crops" (Shepherd *et al*, 1999).

A related problem is that of migrants who move into the forest clearing land for non-sustainable agriculture. Again, these issues might be best captured using participatory techniques and as part of broader community forest projects (see Appendix 7). It would make sense to do so particularly in areas where the problems have already been identified, with the objective of establishing what proportion of the forest dependent population in the area has a relationship of negative dependence.

4 Methodological options

4.1 How do the options work?

In the previous chapters we have shown that there are no reliable figures that can be used and that the task of estimating numbers of FDP is complex. To obtain the numbers that are required, there must be some further work to extract and interpret data from existing sources, to collect new data or both. In this section we outline the options that are available. These options are considered individually in the first seven appendices to this report, which are designed to be read in conjunction with Chapter 4.

The options divide into two main approaches. The first makes more use of existing data or expertise (Options 1-3, see Appendices 1-3) and the second aims to collect new data (Options 4-7, see Appendices 4-7). While existing data are rarely exploited fully, they are always easy to criticise and hence make a case for a new study. A combination of the two approaches might be appropriate (see section 4.2).

In Option 1 we explore key informant interviews. For example, the ODI has a Community Forestry Network with a list of local and national experts who have knowledge about the informal sector and dependence on forests for subsistence. They could be approached from a distance using a written questionnaire or in person (individually or as a group in a brainstorm session), depending on the resources available.

In Option 2, we consider the use of existing maps of forest cover and attempts to match them with detailed information on population to estimate numbers of people who live close to forests. Such results may be of some interest in their own right, but they are likely to be of more use in combination with a series of ground truth studies (Options 4-7).

All the options except Option 2 (matching maps of forest cover with population databases) are 'local', i.e. they would provide information on particular countries or areas within a country. Any regional or global estimates would

follow later from combining the individual in-country estimates. However, we do not see this as a disadvantage.

Option 3 is to make use of raw data from existing household surveys. Henninger (1998) lists numerous censuses and surveys for 1985-1997. These have been conducted in most countries and many probably include at least some information on the use of forest products. For the countries in our brief, making use of this information is likely to require access to the raw data, since in most cases the aspects of interest have not yet been processed.

If we collect our own primary data we have at least three options. The first is to add questions to an established survey system (Option 4). The 'obvious' studies on which to add would appear to be a census or a household survey. This option is so obvious, that we describe in more detail in Appendix 4 why we feel that it has serious weaknesses. This is largely because sampling frames are inappropriate from the FDP perspective and such add-ons could only ask simple questions. The second option is a special-purpose survey, and this is considered in Appendix 5. However, this is an expensive option. The third option is the 'qualitative approach' of participatory studies.

Specialised PRAs are considered in Option 6. We suggest ways of structuring the PRA techniques to collect the information we require and of designing sampling strategies to tackle problems of representativeness, generalisation, comparability and precision which weaken most such exercises. This would be a relatively expensive option, so in Option 7 we consider adding FDP modules onto existing participatory studies. As in Option 6, this would allow us to tease out the complex nature of forest dependence - but the results would not generate estimates of numbers of FDP if the sampling frame were (as is highly likely) inappropriate for our purposes.

In summary, surveys give superficial information on many people, and we need more than superficial information. In contrast, 'traditional' participatory studies give detailed information on a few people, but are usually weak in putting their results into a larger context. A well-structured, representative participatory research exercise has the potential to achieve the breadth and

depth required for our purposes but would probably be the most expensive option.

4.2 Combinations and sequencing

There is scope for participatory work to identify questions or indicators that could later be used in a standard or special household survey. The SSC has adopted this approach for the 1999-2000 Starter Pack Evaluation Programme surveys which it is currently carrying out in Malawi, in which a participatory preliminary phase restricted to a few sites is followed by a main phase survey in a larger number of sites. We anticipate that such studies might be wider than forest dependence, perhaps starting from a broader livelihood systems, food security or poverty perspective.

We could also use several of our options in parallel. For instance, according to Henninger (1998), the World Bank participatory poverty assessment for Tanzania, "employed three methods to collect data: participatory tools [...], key informant interviews [...], and household surveys".

However, we envisage our options as working best as part of a *process*, for example:

- Option 1 and/or Option 2 could form a first stage, creating a sampling frame or baseline which might be followed by Options 4, 5, 6 or 7.
- Option 3 might come after Option 1 and/or 2, and - if successful in obtaining enough data - might obviate the need for other options.

Another example might be that we explore forests and populations from a 'macro', location perspective in Option 2; we understand the nature of forest dependence from Option 6 (which would also permit an estimate of numbers of FDP) or Option 7 and we then discuss with local experts (Option 1) to interpret this information.

4.3 Sampling

There are a variety of sampling strategies that can be chosen to fit the local conditions under which a study is carried out. The use of principles derived

from survey methodology ensures that the results can be generalised from a sample of locations to a broader district, regional or national perspective. (See also the discussion about sampling, generalisation and comparability in Appendix 6).

4.3.1 Sampling frame

To be able to sample, it is necessary to have a sampling frame that covers the population of interest. Finding a suitable sampling frame is the first problem encountered and we believe that a possible solution lies in the use of maps of forest cover. Even though the estimation of numbers of FDP is essentially a population study, we suggest that area-based sampling methodology may be appropriate. In part this is relevant if the sizes and distribution of settlements are different in or near forests than in densely-populated areas. It also has some advantages in cases where up-to-date, reliable population listings are relatively harder to find or less complete for remote or inaccessible areas. One area-based approach, the use of transect samples, already familiar to foresters, might be an option. A transect, maybe starting within the forest edge and extending "outwards" some way beyond it would be a one plausible, practical and reproducible way of enumerating people (those living in the transect) and measuring the extent of their forest dependence. This information could then be combined with forest maps and area population statistics to scale up the findings and to put the results into perspective. The purpose of sampling in this way is to get what can be justified as a reasonably representative "cross-section" of the population: it is not intended to suggest that all or any forms of forest dependency should be expected to differ in a systematic, quantitative way with distance from a forest margin. There is evidence that some forms of forest dependency do not relate to distance from clearly-identifiable forests.

Important features must be accepted as given in the design of a study aimed at producing estimates of numbers on a large geographical scale. The need is to combine results from a number of sample locations, and this means the methodology used must be reasonably well standardised at all locations, at least for that part of the study which yields a local contribution to the overall

estimate of numbers. This is easy to achieve through standard surveys but it is more difficult with PRA based studies. We discuss ways of applying basic sampling principles to PRA studies in Appendix 6.

4.3.2 Stratification and subdivision

Stratification means grouping sampling units in sets that are relatively homogeneous on the basis of relevant criteria with the purpose of improving the efficiency of the sampling design. Being able to stratify depends on getting information about the elements of a population that allows the study team to identify such homogeneous groups. With an area-based sampling frame, strata could be created if there were evidence that particular livelihood strategies, or socio-economic segments, were to be found concentrated in geographically distinct areas e.g. the dependency on trees in forests, scattered woodlands or trees on farms might differ in nature or quantity between settled farmers engaged in rice monoculture, and more mobile pastoralists. The user categories suggested by Shepherd et al (1999) may be difficult to use for stratification purposes since the individuals that fall into each group may in reality be dispersed and intermingled in the same areas. This would make it difficult to identify them in advance in order to form strata.

One main benefit of stratifying is that, where there are distinct concentrations of population members of a given type, appropriate stratification allows the design of efficient sampling schemes which maximise the information that is collected for the resources available. The second main benefit is that a sample specifically chosen to contain proper representation of such strata also facilitates reporting separately and clearly on meaningful subsets, where an overall summary might lump together very dissimilar segments of society.

4.4 Practical issues for primary data collection

The planning process for a data collection study involves systematic consideration of how the study will be set up. There are a number of choices to be made, including number of sites, selection of sites, sampling procedures within sites, mode of management, stakeholder involvement, mode of data

collection and others. This applies to both 'quantitative' and 'qualitative' approaches to data collection.

The first ‘reality check’ is to agree on what constitutes a most favourable setting and to check whether the time and effort involved are worthwhile from the point of view of the cost of the information collection. An example of a ‘most favourable setting’ might be one in which there existed:

(i) reasonably accurate information on the location of appropriately defined ‘forests’ and other geographic information from which to establish and validate what we might describe as access ‘bands’ with differing degrees of access to forest resources;

(ii) the opportunity to use data from a relatively recent census with fairly comprehensive coverage, so that there should be adequate data at the level of enumeration areas which could provide estimates of population in the relevant bands;

(iii) willingness to work with a set of simple forest dependence indicators: this would lead to relatively repeatable results from comparatively small samples;

(iv) the easiest population mix to tackle, requiring smallest sample sizes, would be one with a large preponderance of largely sedentary 'farm' households, i.e. those not engaged in activities such as hunter-gathering, herding or trading other than some produce sales.

(v) no desperately serious problems caused by e.g. pattern of transport and market access, pattern of access to common use resources, ethnic and similar divisions, civil strife, population movements and the like.

(vi) manageable linguistic diversity - in countries like Cameroon, surveying specific forest products in a standardised way at national level would require a multi-lingual lexicon for a wide diversity of products and a range of utilisation strategies.

(vii) no very rapid or abrupt changes in the above.

By describing these settings we do not attempt to be exhaustive or to require that all the conditions must be simultaneously fulfilled. The intention is merely to indicate that careful consideration should be given to the local conditions before embarking on a primary data collection exercise. If, after this, the study team finds that the conditions are not appropriate it may be necessary to accept that the topic may be unresearchable in particular countries or regions by methods which depend on primary data collection.

5 Conclusions and recommendations

We feel that this project has revived an issue which is of importance to donor organisations working in developing countries, and which has clearly excited considerable interest among those working with forest dependent people. In this chapter, we bring together some of the conclusions of our feasibility study and recommend how DFID's FRP might wish to proceed from here.

We have conducted the study within the framework established by Byron and Arnold (1997). Byron and Arnold conclude that:

> Huge numbers of people draw upon forest products, or similar products from tree cover outside forests, to meet part of their subsistence and income needs. However, the importance of this people-forest relationship is not best measured or understood through attempts to estimate the numbers of people who "depend" on forest outputs for a specified share of their livelihood inputs. Even if the data existed on which one could base sound estimates of this sort, and it does not, such a focus would fail to recognise that the importance of many of these product and income flows lies in their timing and quality in terms of the livelihood strategy of the household in question, not in their magnitude". (Byron and Arnold, 1997)

While we are highly indebted to the work of Byron and Arnold, we do not agree with the conclusion that it is not worthwhile estimating numbers of FDP. Indeed, we feel that their categories of FDP and their identification of key elements of the FDP relationship with the forest have both established the framework for estimating numbers of FDP and challenged us to do find a way of doing so. Without clear definitions, this task would be impossible, since any effort at measurement must begin with clarity about what is to be measured.

We concluded in Chapter 2 that there are few existing sources of information on numbers of FDP at global or regional level. In terms of Shepherd *et al*'s categories of FDP (see Section 3.1), we can say that - if you agree with his assumptions - Poschen (no date) might provide an estimate for *part* of user category 3 (processors of forest products and employees in forest industries). A combination of the work of APFT (for South-East Asia, Central Africa and the Amazon basin) and Poffenberger for South Asia might give a rough estimate of numbers of indigenous forest dwellers in the world. The interrogation of raw data from household surveys, with their urban bias, might

produce information about user category 4 (urban and peri-urban consumers of forest products). However, these sources only cover part of our recommendation domain and are particularly unsatisfactory for dealing with the 'core population' in user categories 1-3: i.e. farmers living in and near the forest, artisans, traders and the landless rural poor. Therefore, the only way to generate FDP number estimates is to pursue alternative methodologies for making more use of existing data or expertise or collecting new data.

Of the Methodological Options outlined in Chapter 4 and explored in greater detail in Appendices 1-7, our preferred combination and sequence would be to use Option 2 (matching maps of forest cover with population databases) to establish a sampling frame, and then Option 6 (running specialised PRA exercises) to attempt to capture both simple indicators of forest dependence and some of the more complex aspects of the forest-people relationship. Option 6 would be in the form of a structured set of participatory research exercises in a reasonably representative number of sites.

Second-best options would be Option 7 (adding FDP 'modules' onto existing participatory research) - which might be chosen on cost grounds instead of Option 6; and Option 5 (special purpose surveys) - which would involve the collection of simple indicators of forest dependence for a large sample, but would be unable to capture complex forest-people relationships.

We feel that Option 1 (key informant interviews) is a poorer alternative than Option 2 for producing a rough estimate of numbers of FDP, while those options involving use or adaptation of existing household surveys (3 and 4) would be unlikely to produce the required information on FDP, largely due to the urban bias and emphasis on monetary values of these surveys.

A key question is whether monetary-value or livelihoods indicators are more appropriate for estimating numbers of FDP. We favour the latter. If the livelihoods approach is taken as our framework and if DFID wishes to collect information by commissioning surveys or PRAs, then it might make sense to develop methodologies for collecting information about a variety of livelihood systems simultaneously, not only FDP. This would, of course, present an

even greater challenge for methodology design. However, in the meanwhile it would be possible to make our Option 6 or 7 compatible with a broader livelihood systems information-collection approach by including in PRA exercises general questions about livelihood assets and activities and about coping strategies, rather than exclusively focusing on the forest. The degree of dependence on the forest of a particular group or household could then be estimated in comparison to other sources of livelihood.

We have asked the question whether we can develop sampling strategies which limit costs and ensure generalisable conclusions both from standard surveys ('quantitative' approaches) and from PRA exercises ('qualitative' approaches). We argue that the answer is that this *is* possible, although standard surveys will remain a means of reaching a larger sample for the same cost. There is trade-off between surveys, which can only answer pre-defined and relatively simple questions, and PRAs, which can capture greater complexity. However, we challenge the traditional idea that PRAs cannot produce generalisable results. Representative PRA studies *can* be carried out, with generalisable results. This tips the balance of our overall recommendation for new data collection in favour of Option 6.

Finally, we note that, in our view, the international community should adopt a consistent, globally applicable approach to data collection on FDP and other livelihood systems. If DFID is serious about people-centred, poverty alleviation policies, there is a need to promote the adaptation of the out-moded tools which exist at present for collecting information and monitoring change so that they can meet the demands of the livelihoods perspective. Only then will policy-makers be able to base their decisions on sufficient evidence, and only then will donors be able to target those who deserve our support.

Appendix 1: Option 1 - Key informant interviews

A number of interviewees suggested that a good start would be to attempt to estimate numbers of FDP through key informant interviews in the countries of interest to DFID's FRP. Some felt that more sophisticated approaches would be unlikely to come up with more precise results than could be provided by guesstimates from experts on the ground.

We feel that such an approach would be not be precise enough, since experts in the field may not have access to quantitative research and 'guesstimates' tend to be recycled (some may do, but it would be hard to distinguish which responses were based on good information and which were pure guesswork). Key informant interviews are not a substitute for surveys or other 'ground truth' methods, but they could be used as a 'first stab' at the numbers issue. They could also be used as a means of consulting local experts on the more complex issues explored in Chapter 3 and to help interpret survey results.

There are several possibilities, depending on the key aim of the consultation:

- For information on numbers of employees in forestry and related manufacturing industries in the formal sector, a questionnaire could be sent to National Statistical Offices (the ILO has provided us with a list of addresses for the countries in the FRP brief), Forestry Commissions, private industry associations and via the ILO's Forestry Workforce Network (ILO, 1996). Peter Poschen of the ILO noted that the Forestry Workforce Network is being updated this year, and a new version should be available by the end of 2000. It currently includes 300-350 people in some 65 countries. Poschen recommended including private industry associations as a balance to official sources.

- For information on the informal sector and dependence on forests for subsistence, a questionnaire could be sent to local and national experts using ODI's Community Forestry Network. The IIED also has an informal list of contacts with national experts in a number of countries.

- In-country brainstorm sessions. The FAO's Food Security and Agricultural Projects Analysis Service has used brainstorm sessions with local experts to obtain rough estimates of numbers of people dependent on different livelihood systems and also to determine the approximate geographic locations of groups associated with these different livelihood systems.

- Individual semi-structured interviews with experts in-country.

Long-distance surveys are relatively cheap. However, the response rate from questionnaires sent to public officials, private groups and experts is likely to be low. It may also be difficult to reconcile results if they vary considerably, particularly in questionnaires returned from a distance, although problems arising could be explored in in-country brainstorm sessions.

Brainstorm sessions and/or individual semi-structured interviews with experts in-country provide a richness of analysis which should help to interpret the numbers. They would be more expensive than mailing out a questionnaire, particularly if they involved missions by experienced facilitators or interviewers to a number of countries. The questions asked should attempt to establish numbers of people in different 'categories' as defined in Chapter 3 and to elicit information about degrees of dependence on the forest. Brainstorm sessions or face-to-face interviews could also explore more complex factors such as changes in the people-forest relationship and negative dependence.

Appendix 2: Option 2 - Matching maps of forest cover with population databases

This approach would try to match forest cover maps to population is specific geographical locations using maps of forest cover and other GIS databases which have been developed in the last few years. Clearly, proximity to the forest is not synonymous with forest dependence (see Section 2.6.4). However, this option could give a 'broad-brush idea' of numbers of people - this time in geographical locations defined by their proximity to forest cover, and possibly in relation to infrastructure using GIS Wilderness Indexing.

So far, matching of forest cover maps with population data has only been done at national level or for large sub-national units in very big countries like India. Our suggestions would be to do this at the level of the smallest administrative unit for which population data is available, using census data.

We would recommend using the World Conservation Monitoring Centre (WCMC) forest cover maps which are now available. The WCMC has kindly provided us with maps of forest cover for the countries that fall into the geographical coverage of this study (see Section 1.5), with the exception of some of smaller islands in the Eastern Caribbean. Particularly detailed maps have been provided for Cameroon.

The WCMC points out that the EROS data which forms the core source of information for these maps consists of 256 land use types, some of which are difficult to define accurately, e.g. plantations (as opposed to forests) and areas of sparse tree coverage or parkland. The WCMC is improving the EROS data shown on its maps by cross-checking with national sources, but further ground truthing may be necessary. FAO's Forest Resources Assessment (FRA) team, which has been working closely with the WCMC, is carrying out a series of ground truthing activities as part of FRA 2000 (FAO, 1998b and FAO, 1998c).

The most recent UNEP/GRID database (see UNEP/GRID website) gives population estimates derived from census and other information for all

countries. The 1990 figures for Africa give data at 5 km resolution. We are not sure whether the material from GRID includes raw census data or merely map information on population distribution. If geo-referenced raw census data is not accessible from GRID, some census figures could be accessed in UK university libraries or from local data in individual countries.

Although this option would provide only a very rough estimate for numbers of FDP, its cost should be relatively low. Moreover, it could be used as the basis for a reduced-cost sampling strategy (see Section 4.3.1 and 4.3.2). These estimates could be refined by survey data (see Appendix 5) or the results of structured participatory work (see Appendix 6). This would be similar to - and compatible with - some of the latest poverty mapping approaches. Henninger (1998) describes studies in Burkina Faso and Ecuador that combine survey data with mapped census information to produce poverty indices at a sub-national level.

Appendix 3: Option 3 - Analysis of raw data collected by existing household surveys

Most countries carry out censuses and household surveys[3]. These are expensive exercises. They are done on a regular basis - albeit at long intervals - and would therefore be useful to monitor change. Frequently, the data collected in these exercises is not exploited fully because of budgetary constraints and/or lack of demand. In Africa, it is common for incentives to be paid for collection of data but not for its analysis. It would make sense to examine the questions asked in such surveys (not just the published results) in order to establish the potential for further exploiting the data collected through interrogation of the raw data.

However, there are some serious problems:

- Methodologies, type and quality of data vary considerably between countries, so that comparisons across borders would be difficult.

- Censuses are usually restricted to collecting data on population and housing, and contain little information of relevance to questions about forest dependence, while surveys - which usually ask more detailed questions - have sample sizes which are too small to produce consistent small area estimates.

- Surveys usually include a bias towards urban areas in the sample, as in the case of the Zambia Household Budget Survey (see below). This is likely to mean that the data collected is useful for Shepherd *et al* (1999)'s user category 4 - urban and peri-urban consumers of forest products - but is of less use for user categories 1-3.

- Most household surveys focus on monetary measures (income or consumption), rather than broader welfare indicators such as basic needs or sustainable livelihoods. Monetary measures often fail to capture the

livelihoods of poor, marginal populations such as forest dwellers, subsistence farmers and artisans.

According to Henninger (1998), "only two countries, Tanzania and South Africa, provide access to their survey data. All other countries require special Government permission or have not established a data access policy yet". In the next section we examine the potential of a South Africa LSMS survey, which is available on the Internet, and of the Zambia Household Budget Survey, a copy of which was kindly provided by DFID's statistics office. Zambia is not within the area of geographical coverage of this study, but it is an interesting example. We also include observations from unpublished work by Mike Arnold, which examined the potential of the Ghana LSMS surveys.

South Africa Integrated Household Survey. This was a nationally representative, multi-purpose survey of 9,000 households in 360 clusters, carried out in 1993/94. The main household questionnaire went through 12 drafts, three of which were field-tested. There were 65 pages of questions organised into sections covering the household, food spending and consumption, non-food spending, education, remittances, land access and use, employment, transport, agricultural production, self-employment, income from other sources, quality of life, health and anthropometry. However - probably because South Africa has little forest left (see WCMC forest cover map for South Africa, 2000) - there are few questions which would be likely to generate data of relevance to numbers of FDP.

Nevertheless, the following questions may be of some use for our purposes:

Section 2 Household Services

- main household building materials? possible answers include wood;
- sources of energy? possible answers include wood, charcoal/coal;

[3] Henninger 1998, Appendix 2 Availability of Survey and Census Data lists data for 141 developing countries; Appendix 3 comprises Household Surveys Completed in Africa since 1985.

- if wood is a source of energy for any of the above activities, who in the household usually collects the wood? (see Figure 2: South Africa Household Questionnaire 1).

Section 8.5 Agricultural Production

- for subsistence, small-scale farmers, crops listed include 'madumbe/other tubers' and 'imifino, morongo berries, mushrooms' (see Figure 3: South Africa Household Questionnaire 2);

- for large-scale, commercial farmers, the value of farming activities in the past 12 months is broken down into field crops, horticulture, animal products, forestry products and other farm income.

Section 8.6 Other Forms of Self-Employment

- categories include collecting wood/fuel for sale, as well as herbalist, traditional healer and building or repairing houses, which may be assumed to have some FP use (see Figure 4: South Africa Household Questionnaire 3).

However, many of the definitions are too broad to allow clear identification of forest products or activities. For example:

Section 3 Food Spending and Consumption

- Was X bought or consumed by this household in the past month? etc. (see Figure 5: South Africa Household Questionnaire 4), where the only relevant category - 'madumbes, sweet potatoes, other roots/tubers' - includes both forest and farm products.

Sections 8.1, 8.2 and 8.3 Employment

- codes used do not distinguish between 'agriculture, forestry and fishing' or between 'farming and related occupations', or differentiate among manufacturing, retailing or crafts activities (see Figure 6: South Africa Household Questionnaire 5).

Interestingly, **Section 7 Land Access and Use** focuses exclusively on crop agriculture and livestock, with no questions about on-farm tree cultivation.

Zambia Household Budget Survey (HBS). The Zambia HBS was carried out between July 1993 and March 1995 and was based on a two-stage stratified sample covering 1,800 households. Two-thirds of the households involved in the survey were located in 'metropolitan areas' (comprising the 10 largest towns) and only one-third in non-metropolitan areas (although nearly three-quarters of Zambia's 1,819,600 households were located in non-metropolitan areas). Moreover, in urban areas, high-income households had a fourfold higher chance of selection than low-income households. This introduced a bias towards urban areas, and, within those areas, towards the richer households with a larger percentage of consumption based on cash spending than own produce or barter.

This sampling strategy may have been appropriate for the purposes of the survey, which was "primarily designed to collect expenditure data in order to re-weight the Consumer Price Index" (Republic of Zambia Central Statistical Office, 1996). It is also likely to have facilitated the use of consumption and expenditure diaries, which require a high degree of education as well as literacy if the complex and accurate records required are to be kept. They not appropriate for administration to illiterate respondents. However, the combination of biases towards, urban, wealthy and educated households means that the data collected is unlikely to be of much use for FDP estimation purposes, where the target population is assumed to be predominantly rural and poor and often marginalised from education services.

As in the South Africa Integrated Household Survey, employment and other economic activities in the Zambia HBS did not differentiate within the 'agriculture, forestry and fishing' category, known as 'agriculture, forestry, hunting and fishing' in Zambia. Nevertheless, the Zambia HBS may have collected information of relevance to numbers of FDP on the nature of enterprises carried out by the respondents (this was an open ended question, so it will depend on how the answers have been coded), building materials

and energy sources (options include: collected firewood, purchased firewood, charcoal own produced and charcoal purchased).

A highlight of the survey from the FDP perspective is that it set out to collect data on "the value of food and other goods consumed by households from their own farms, gardens or from the wild" (Republic of Zambia Central Statistical Office 1996). Data in **Section 7: Hunting, Fishing and Gathering,** may contain information of relevance to numbers of FDP, since the section includes questions on collecting or gathering wild fruits, caterpillars, honey and firewood (see Figure 7: Zambia HBS 1). The Household Consumption Diary includes a similar section (see Figure 8: Zambia HBS 2), while the Household Expenditure Diary leaves plenty of room for "other" products.

Ghana. Arnold (unpublished) notes that the Ghana LSMS surveys "collect information from households on income from and expenditure on a number of forest products (furniture, fuelwood and charcoal, bushmeat and snails, palm wine and akpeteshie, honey, shea butter and dawadawa), by ecological zone, location (urban, semi-urban, rural), and expenditure class... This would seem to be one data source that could be worth exploring more widely". We have not had access to these surveys.

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As a first step towards pursuing Option 3, DFID might wish to consider commissioning researchers to look at the potential of databases of existing censuses and surveys in a selection of countries. It would be necessary for such work that full copies of census and survey questionnaires be made available. We would also consider recommending a series of visits to national statistical offices to gain access to their raw data.

The advantage of pursuing this course is that it would be relatively cheap because it could - if the questionnaires and data collected prove to be relevant to our purposes - make use of existing data. However, existing survey databases probably do not contain much information about numbers of people depending on forest products for their livelihoods. Sample sizes may also be insufficient to provide the basis for reliable estimates of forest dependence.

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Appendix 4: Option 4 - Adding onto existing censuses and surveys

Objectives

There is a prima facie case that a tool designed to collect quantitative information should be relevant to estimation of *numbers* of FDP. A 'module' might be added to an existing survey or census data collection instrument to investigate numbers of people who have some degree of dependence on forest-derived resources. Alternatively a specialised survey might be set up to do this, and we discuss this option in Appendix 5.

For the moment, we assume that the objective of the add-on 'module' is primarily that of identifying the numbers or proportions of people who fall into various categories related to degrees and types of forest dependency. We review what can be done, assuming this objective can sensibly be considered separately from any more comprehensive inventory of livelihood attributes e.g. those attributes not immediately connected with forest resources.

A census of population

The estimation of numbers of FDP has a superficial resemblance to a population census, where the primary interest is in numbers of individuals recorded by place of residence, and usually rather crudely divided into groups by such factors as age, sex, or a few other easily ascertained descriptive characteristics. The requirement that these descriptors be very simple ties in with the size of the census operation. It is dependent on a large field force usually including many individuals with limited training or experience, who are temporarily deployed as data collectors. But how and to what extent an individual is dependent on forests is not something which can be so simply ascertained. Therefore, we suggest adding on a 'module' to a census is not a realistic option. However, there might be a case for moving towards standardised collection and presentation of census data at the ISIC 2-digit level, showing membership of 'agriculture, forestry and fishing' in terms of its components categories.

Add-on to a household survey?

We might consider using National Statistical Office field staff with experience in household surveys, and making a reasonably sophisticated forest-people module an add-on to a survey whose infrastructure is already in place. In many countries a household survey is the best-developed and most familiar vehicle by which general economic characteristics are ascertained for population aggregates. There is a massive literature on the costs, problems and outputs of such surveys. They are generally regarded as successful if they generate reasonable information about well-defined, major constituents of income, consumption, expenditure and the like.

Even at this level, it is widely recognised that a household survey challenges the organisational skills and taxes the financial resources of government statistical bodies in many developing countries. The infrastructure assumed for a ‘typical’ household survey may lack crucial elements for an FDP focus such as the comparatively large amount of off-road transport needed. On the positive side, an add-on module which arrived with a financial 'dowry' might be attractive to National Statistical Office staff.

However, there are two serious limitations:

- The sort of questions which could be addressed will be limited surrogates for the more complex information we would like to have - this sort of question being within the compass of interviewers and respondents alike. Examples of questions which could be included are: (i) heat source used in cooking; (ii) use of a (largely pre-determined) list of forest products.

- Most household surveys have sampling strategies which favour urban dwellers and the formal economy; people who are 'close' to the forest may have a low degree of representation. There are unlikely to be strata in such a survey which would coincide with those most suitable for a cost-effective focus on FDP. It is likely that an add-on directed at FDP would be best served if the sampling set-up for the original survey were reviewed.

The sample might be augmented to ensure adequate representation of people with a predictably relatively high degree of forest dependency.

The World Bank's Living Standards Measurement Surveys (LSMS) surveys, which have been carried out in 31 countries (Henninger 1998), are designed to be flexible. "Two characteristics distinguish LSMS surveys: (i) multi-topic questionnaires designed to study multiple aspects of household welfare and behaviour and (ii) extensive quality control features" (Grosh, 1995). Sectoral and small enterprise modules can be added into this flexible framework". (See example of South Africa LSMS survey in Appendix 3). However, LSMS surveys are characterised by their own publicity as measuring welfare very largely in cash economy terms - in relation to income and consumption - whereas broader welfare indicators such as basic needs or sustainable livelihoods are more appropriate for measuring numbers of FDP.

The above limitations suggest that an add-on to an agricultural survey might be a more appropriate option than an add-on to a household consumption and expenditure survey. This would not have an urban bias problem and might well be a more suitable instrument for including the sort of questions and type of indicators which would be of interest from an FDP perspective.

Nevertheless, an add-on 'module' would probably only allow a small range of quick and relatively simple questions. An attempt to build a more detailed picture suggests the need for careful consideration of the setting where the survey will be used. A sampling strategy that targets relevant respondents effectively will be more cost-effective. A regime where data-collectors are well-briefed on the nature of forest-people interactions in the study area will have more chance of collecting meaningful observations. Considerations like these push us in the direction of surveys set up specifically to meet forest-people objectives. These are discussed in Appendix 5.

Appendix 5: Option 5 - Special purpose surveys

Advantages and disadvantages

The drawbacks of add-on survey 'modules' can in several cases be overcome in a survey structure specially-designed to suit the purpose. Some of the points in Appendix 4 are briefly re-stated here in this more positive vein.

The sampling scheme can be adapted to suit the selected terrain. For instance there could be advantages in using area-based sampling methods such as transect samples, familiar to foresters, but less well-known in household survey operations (see Section 4.3.1).

The resources needed, such as transport, can be planned for more effectively in an independent study than when one is reliant on another study which already poses demands close to the limits of competence of a survey organisation. Field staff - probably a smaller number - may still come from the same parent organisation, e.g. a National Statistical Office, but can be selected as having some appropriate knowledge and can be trained relatively intensively in necessary additional topics. Fieldwork teams may be include people with forest knowledge as well as experienced survey field staff.

The timing of survey rounds can be made to accord with known seasonalities of availability of relevant respondents or of 'hungry months' when people may be at their most dependent on forest foods. There may well be no single 'best' time to conduct such a survey and in some cases dividing a survey into waves at varied times of year may be a desirable feature of the plan.

If the survey is managed as a one-off exercise, there is likely to be more direct control of field costs, better field staff supervision and management and greater dedication to ensuring good-quality relevant results. In institutional terms, it is likely there will be more choice of survey contractors if the survey is run as an independent project.

On the other hand, the lack of an appropriate organisational framework for a stand-alone study may make it more costly and in some instances more

difficult to carry out to an acceptable standard. Building upon existing project teams, local centres of excellence and some specialist inputs may or may not be possible at reasonable cost.

Complexity and questionnaire design

Brocklesby and Ambrose-Oji (1997) contrast the largely indigenous Upper Village population of Mount Cameroon with the ethnically heterogeneous population of contract workers in the nearby coastal strip whose patterns of forest product utilisation are markedly different. Similar messages come from Kotey *at al* (1998)'s study of Ghana: “Great local variability in the availability and use of NTFPs was found in a recent study”. Substantial parts of Byron and Arnold (1999) also relate to these issues (see Chapter 3).

As far as survey research is concerned, the message is that standardised questionnaires concerning detailed forest dependencies are unlikely to come across as relevant. But open-ended questions which allow respondents to volunteer responses, especially in 'qualitative' form, are generally much more difficult to administer if the likely responses are complex in form or ill-understood by the interviewer. In terms of eliciting meaningful information, it must be borne in mind that professional survey enumerators are often drawn from a fairly narrow segment of society. Therefore we may only be able to use standard survey instruments for a few forest products and simple markets.

One approach to the sort of questions which might be asked is to look at the horizontal axis of Table 6 (Chapter 3), which concerns the nature of dependence on the forest. This is expressed in terms of seven specific elements of dependence: forest foods; forest medicines; wood, fuel; fodder; housing materials and furniture; forest soil fertility; and religious and cultural values. Of these, the first five elements are categories of forest product. A similar approach is that of Penny Scott, who suggests that in household surveys simple indicators - such as the respondent's use of a specified list of forest resources (measuring 'extent' of dependence) and labour used on in-forest activities (measuring 'intensity' of forest resource use) - may be enough to measure numbers of FDP and their degree of forest dependence.

If such an approach is agreed to be suitable, this suggests a way of:

(a) modularising a relatively formal study, so that study methods elicit agreed information about these themes from target groups (Shepherd *et al*'s user categories 1-4); and/or

(b) structuring a single study so that ‘skip questions’ allow chunks of the schedule of questions to be identified quickly as being irrelevant to a given respondent and the interviewer can skip to the next relevant question.

Household-level vs community-level information

Most household surveys are based on units at a single level: the household. However, in the relatively complicated process of teasing out forest-people relationships, there is an argument for 'community-level surveying'. The combination of household and community-level work, and incidentally the integration of qualitative and quantitative results, fits with an area-based sampling approach and the need to achieve some balance and consistency in the account which respondents provide of resources, nature and timing of activities, extent and criticality of dependence, and the like. These issues are explored in Appendix 6.

Measuring change over time

The special-purpose survey approach is unlikely to set standards for regularly-repeatable 'routine' studies, so if the estimation of change is of great importance, this approach will have less to recommend it. However, given the extreme paucity of existing forest-people data at present, it may well be premature to think in terms of routinising - possibly even 'fossilising' - study procedures which will be novel and unvalidated when first taken to the field.

Nevertheless, a one-off survey may become the jumping-off point for future work, the baseline against which secular change is estimated or the impact assessed of some intervention not so far planned. This implies a need for careful consideration of a few key pieces of information which can provide at least baseline information.

Appendix 6: Option 6 - Running specialised PRA exercises

Participatory rapid appraisal (PRA) is an established method for conducting research and promoting development, and most NGOs and University social science departments in developing countries are familiar with its basic tools; such tools are also increasingly used by community foresters (Barton *et al*, 1997; Jackson and Ingles, 1998). This option outlines how PRA techniques could be used to collect information on numbers of FDP.

A common problem with PRA studies for our purposes is illustrated by Britta Ogle's contribution to Ruiz Pérez and Arnold (1996), "People's Dependence on Forests for Food Security - Some Lessons Learnt from a Programme of Case Studies". The case studies - in Bolivia, Tanzania, Thailand and Vietnam - all used RRA or PRA techniques in two communities, with several visits over six weeks of fieldwork (the Tanzania, Thailand and Vietnam teams also used formal questionnaire surveys). Each team used their own tools "to suit their specific needs", and attempted to include:

> 1) a description of use of and dependency on forest products; 2) a description of changes in availability and access to these products; 3) a description of strategies to cope with the changes; 4) an identification of the most vulnerable groups and an analysis of factors influencing vulnerability; 5) an identification of priority action to support the vulnerable; and 6) a testing of some rapid and qualitative methods and approaches (Ogle in Ruiz Pérez and Arnold 1996).

These objectives appear compatible with our study. However, the variety of techniques used to collect information and the small number of sites covered mean that the results are of little use for estimating magnitudes, let alone numbers of FDP. Moreover, the Bolivian team was apparently unable to agree on how the information collected should be analysed. In the following sections, we consider briefly how problems with these three aspects - techniques (or tools), sampling, and analysis of the information collected - can be addressed to produce useful PRAs for estimating numbers of FDP. Should DFID wish to pursue this option, these aspects would require further development which is beyond the scope of the present study.

<u>Techniques/tools</u>

We would recommend building on the work of Penny Scott in Uganda (Scott, 1998) and on techniques recently developed by the SSC in Malawi to suggest a set of consistent, structured participatory research tools. To recall the strategy suggested by Byron and Arnold's 'typology' approach in Section 3.2, we need to:

1. Define users

2. Define their relationship to the forest/forest outputs (products)

3. Define the importance of this relationship for their livelihoods

4. Assess the impact of change, including availability of alternatives

Penny Scott's assessment, carried out in six parishes around Mount Elgon National Park in 1993-94, contains participatory research tools which are well developed to measure 1-3 and also to provide an indication of 4. The users were defined initially by proximity to the forest - 'near villages' and 'far villages'. The tools used included (at village level) a household listing and scoring, resource discussion and ranking and seasonal calendar and (at household level) semi-structured interviews including quantitative information on the use, collection and sale of each forest product (or 'resource'). Forest products were used as the main indicators of the *extent* of forest dependence of the household, while labour used on 'in-forest activities' was used as an indicator of the *intensity* of forest dependence. In addition, forest walks provided a forum for "discussions about past and present uses of the forest". Some of the differences are summarised in Table 7.

Scott's approach confirms our view, based on the SSC's experience in Malawi, that it is difficult to generate quantitative information at the village level or through general discussion during PRAs. This can be best done at household level (which is the logical unit of measurement since consumption and sale of forest products takes place at this level). Nevertheless, participatory group discussion can be used to agree definitions - such as whether a product is from the 'forest' - as well as to add valuable insights on questions like change (as discussed in Scott's forest walks). Participatory

techniques could also be used to look at issues of choice and at coping strategies - how communities and vulnerable groups within them cope in times of scarcity or emergency - although this is not attempted by Scott. Thus, participatory approaches allow a more detailed exploration of the complex people-forest relationship than is possible through a survey of households.

Table 7: Differences between near and far villages[a]

proximity of village	**average number of resources/household**			**average number of hours on in-forest activities/household**		
	used	collected	sold	consumption	sale	total
near	10.0	6.9	1.4	1,035	176	1,211
far	6.6	1.7	0.4	277	84	361

Notes: a Differences between average number of resources used/collected/sold, and average number of hours used. Data are from the household interviews.

Source: Scott, 1998.

Sampling, generalisation and comparability

One of the challenges of using PRA to collect information on FDP is that these methods have mainly been used to generate local actions, empower participants and produce information at local level and it is not possible to use this information to make generalisations that apply to a larger population. According to Henninger (1998), one disadvantage of PRA approaches "is that they use relatively small samples that make it difficult to extrapolate results and compare different surveys. A second major limitation is that the quality of participatory approaches varies greatly with the skills of the facilitators and the established level of trust between facilitators and participants". However these constraints are not impossible to overcome. In order to do so, the planning of the PRA exercises should take into account some basic principles usually applied to surveys. The SSC has recently been involved in a number of projects where efforts are made to introduce some of the principles of statistical methods into 'qualitative' studies approaches. We briefly discuss what we consider to be the most important principles that can be borrowed from standard sampling.

When statisticians talk about sampling they imply a series of requirements in the selection of the sample, these are:

1. A group of study units from an identifiable population are included in the study; each of them provides information independently of the others.

This means that the population of interest (sometimes called recommendation domain) needs to be well defined. Any generalisation or extrapolation resulting from the study will apply to that population. In addition, the sampling unit (communities, households or individuals) should be carefully defined. Having a large enough sample permits a study of the variability between units and this is that eventually provides an indication of what statisticians call 'precision' in the generalisation of results to the whole population. If a PRA exercise is looking at the relative importance of indicators of forest dependence, a set of indicators might consistently be regarded by a sample of communities as important whereas a second set might be regarded as important by some communities but not by others. The generalisation of the first set would be more reliable than the generalisation of the second set.

2. Sample size.

The sample size is determined by the resources available and the level of precision required for the generalisation of the study. If we require more precise results the sample size should be larger. PRA practitioners tend to resist carrying out PRA studies in a suitably large number of study units mainly because of the demands on resources that this implies. For example in our experience in Malawi, one of the studies was initially proposed by the PRA specialist as three case studies, one in each of the main agroecological zones. Eventually, under SSC guidance, the study was designed as a sample of 30 locations, stratified by the Sphere of Influence Clusters of the Famine Early Warning System (FEWS) where PRA tools were to be used to discuss with the communities and collect the required information for the study.

3. There is some element of randomness in the selection of the sample.

The inclusion of an element of randomness supports the claim that the sample is representative. This does not mean that simple random sampling is necessary, nor even advisable. The use of stratification, cluster sampling or multi-stage sampling should be seriously considered to fit the requirements of

the specific conditions of the study; in Section 4.3.2 we discuss stratification for studies designed to collect information on numbers of FDP.

4. The information that comes from different PRA sites must be appropriate for integration and analysis.

To achieve this, the information should be of the same nature and similar quality. Probable inconsistencies in results derived from different facilitators and facilitators' varying abilities needs to be addressed. This is not an easy problem to tackle, and in our experience attempting to solve it implies imposing a structure on PRA exercises that brings certain restrictions to the usual flexibility of PRA tools and makes the approach 'interactive' rather than fully participatory (Scott, 1998). This is a trade-off that we have found unavoidable and that in our experience requires careful planning, testing of tools and training of facilitators as well as good communication between PRA experts and statisticians. A further requirement to ensure comparability of results is the design of a debriefing document to be used by the PRA teams to record the results from the PRA exercises. The integration of results is then based on the integration of the debriefing documents.

Analysis of information

Depending on the nature of the information generated, the analysis of a sample of PRA exercises can take different forms. Quantitative information such as that coming from matrices of scores or ranks is often suitable for statistical analysis provided certain conditions are met. Information from other types of tools such as causal diagrams or village maps that are not suitable for numerical manipulation requires different analysis strategies. A review of options available to analyse this type of information can be found in a series of papers under the title “Integrating qualitative and quantitative approaches in socio-economic survey work” (DFID project R7033, SEM) by SSC and NRI to be published by NRI in the near future.

Appendix 7: Option 7 - Adding FDP 'modules' onto existing participatory research

Projects carried out by DFID and other organisations working in developing countries frequently have a research element. In community forestry this is often qualitative in nature - involving case studies or participatory exercises - and does not attempt to estimate numbers of people in the area concerned.

Participatory research exclusively designed to capture numbers of FDP and their relationship with the forest (Option 6) would be time-absorbing and expensive. As a lower-cost option, it would be possible to suggest a set of participatory research tools which could be incorporated into existing research projects. In particular, we have identified four categories of project into which such a set of structured, participatory information-collection tools might be incorporated:

1. DFID's forestry projects;
2. The IUCN's Framework for Evaluating Management of Protected Areas, designed to provide a standard approach to monitoring and evaluation by parks authorities, which is near completion[4];
3. FAO Community Forestry Group's guidelines to help district foresters carry out research, which has been under development for some time;
4. FAO's Food Security and Agricultural Projects Analysis Service's vulnerability profiling project, which aims to profile vulnerability to food insecurity in the context of livelihoods systems which include forest dwellers, farmers and others.

As with adding 'modules' onto existing surveys (see Option 4), Option 7 would have two main disadvantages:

[4] We received a 'draft for discussion' from Equilibrium - the UK consultants who are coordinating this effort as part of a wider Forest Innovations project - on the day when this report was going to print. We have unfortunately not had time to comment on it, but we include the material in Appendix 9 (IUCN, 2000b).

1. The selection of sites for the research would be dictated by the requirements of the existing project and would, therefore, not necessarily be suited to the purpose of estimating numbers of FDP. For instance, a very small number of sites or households involved in a study might mean that only indicative conclusions were possible.

2. The questions asked and methods of asking them would be constrained by the nature of the existing research and by the abilities of the existing research teams, who might not be trained in the required techniques.

Nevertheless, this option would certainly represent a relatively low-cost alternative to Option 6. The main costs involved would be the development of a handbook of basic tools for collecting and processing information, to be incorporated into FAO/DFID/IUCN forestry project guidelines, and some additional funding for existing research projects to cover time dedicated to using these tools and processing the information which they would generate. The compilation of results from a large number of projects would need to be centralised and managed by a suitable unit which would encourage projects to run the FDP modules and chase up the results.

Appendix 8: Interviewees' contact details

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FIVIMS at FAO:
http://www.fivims.net

National Center for Geographic Information and Analysis:
http://www.ncgia.ucsb.edu/pubs/gdp/pop.html

Non-Wood Forest Products at FAO Forestry Department:
http://www.fao.org/WAICENT/FAOINFO/FORESTRY/NWFP/NONWOOD.HTM

Population Action International:
http://www.populationaction.org

UNEP/GRID (Global Resource Information Database):
http://grid2.cr.usgs.gov

USGS EROS Data Center:
http://edcdaac.usgs.gov/glcc/globdoc1_2.html

WCMC 'hidden' site (not yet public) - interactive maps -
http://www.wcmc.org.uk/forest/poverty/

World Resources Institute:
http://www.wri.org

Appendix 10: Terms of Reference

1. Background

At present there are no reliable estimates on the number of people in the world whose livelihoods are directly or indirectly associated with forestry. A growing number of case studies linked to forestry, rural development and sustainable livelihoods projects provide an indication at local level of the potential beneficiaries of forestry programmes. These range from businesses and the labourers they employ to small farmers, artisans, urban traders and consumers of forest products. However, there is no worldwide database on the numbers employed in forestry, let alone the numbers of people whose livelihoods are associated with forest resources.

A number of sources might, however, provide information which could be used to arrive at estimates based on extrapolation. In general, countries publish information on output and employment only at the general level of "Agriculture, Hunting, Forestry and Fishing" suggested by the widely used ISIC classification[5]. However, some countries where forestry is a particularly important economic activity, such as Indonesia and Canada, have a separate category of output and employment figures for forestry products. In addition, forest cover and population mappings are available based on Geographic Information Systems (GIS); these provide some basic information on numbers of people living in close proximity to forested areas. General land use and agricultural/forestry production figures are available from the FAO. Figures are also available for many countries on the utilisation of primary forest products in production, trade and consumption.

2. Objectives

The current proposal is for a feasibility study which would attempt to answer the following questions:

c) Is the data available from existing sources sufficient to allow reasonable estimates of numbers *employed* in forestry to be made on the basis of extrapolation using reliable economic modelling/statistical techniques?

d) Is the data available from existing sources sufficient to allow reasonable estimates of numbers whose *livelihoods are otherwise associated* with forestry to be made on the basis of extrapolation using such techniques?

e) If not, what alternative methodologies (e.g. sample surveys in carefully selected locations) could be used to construct reasonable estimates?

f) Broadly, how would research in these directions compare in terms of effectiveness and cost?

[5] ISIC = International Standard Industrial Classification. The precise definitions used depend on the version used. Here we refer to 'Revision 2, Major Division 1' which is used, for instance, in the International Labour Organization (ILO) Yearbook of Labour Statistics.

3. Scope of the work

The current feasibility study would attempt to answer the questions outlined above in four stages:

i In order to properly define the categories of Forest Dependent People (which we assume at this stage would cover those employed in forestry or whose livelihoods are otherwise associated with forestry), the team would carry out a brief survey of secondary sources (books, periodicals and publications available from international organisations working with forestry, rural development and sustainable livelihoods). In addition, interviews would be carried out with key informants at organisations such as the IUCN, IAC Wageningen, IIED, ODI, NRI, FAO, CIFOR, the Forest Stewardship Council, CIDA, SIDA and DFID (Forestry Advisors/Field Managers) to elicit views on definitional approaches. UK-based interviews would be carried out in person; overseas interviews by phone or email.

ii The team would then identify and critically assess databases and mappings which could potentially be used to extrapolate estimates of Forest Dependent People. It would arrange meetings with some of the international organisations who have put together such databases and mappings in order to explore the methodologies used and the shortcomings/weaknesses of the data collected. Examples of such organisations are the International Labour Organization (ILO, Geneva), the International Tropical Timber Organization (ITTO, Japan), the UN Economic Commission for Europe UNECE (Geneva), the FAO (Rome) and the World Conservation Monitoring Centre (WCMC, Cambridge, UK)[6]. In addition, the team would examine a small sample of individual country databases containing figures on output and employment which are available on the Internet.

iii The team would then assess the potential of alternative methodologies such as key informant studies and sample surveys in carefully selected locations. The team would suggest the most cost-effective ways of employing such alternative methodologies in order to obtain reliable estimates at regional and global levels.

iv Finally, the team would write a report in which it would set out clearly the degree of reliability which could be expected from extrapolations based on existing sources and from alternative methodologies. The report would present scenarios for future research ranging from a low-cost, indicative approach (e.g. based on extrapolations from existing sources combined with a limited number of field studies) to mid-range cost and reliability (e.g. the consistent inclusion of forestry-related questions in existing household and business surveys) to more expensive alternatives such as regular Forest Dependent People monitoring programmes.

[6] The WCMC is an organisation established by the IUCN-The World Conservation Union, the World Wide Fund for Nature (WWF) and the UN Environment Programme.

Section 2 of John Palmer's e-mail to Sarah Levy of 20/03/00

The poor forest-dependent people for the purposes of this FRP pre-project are those in DFID forestry partner countries, which are listed in the FRP briefing notes for project proposers:

Africa - Cameroon, Ghana, Malawi, Nigeria, Republic of South Africa, Uganda and Zimbabwe

Asia - India and Nepal

Latin America - Belize, Bolivia, Brazil, Eastern Caribbean States, Guyana, Mexico.

"Forest-dependent" means dependent on forest/woodland/tree-derived goods and services. The dependency includes water, fuelwood, shelter, medicinal plants and culinary herbs, nutritionally important forest fruits and other foods, timber, fodder, dry-season grazing, the broad suite of non-timber forest products (bamboos, rattans, gums, resins, latex, oils, etc.). "Dependent" means needful for sustainable livelihood and not easily substituted by non-forest goods and services except at extra expense.