TOWARDS PARTICIPATORY ECONOMIC ANALYSIS BY FOREST USER GROUPS IN NEPAL

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Executive Summary

This study, which forms part of the wider DFID Forestry Research Programme study 'The Economic Analysis of Stakeholder Incentives in Participatory Forest Management', focuses on the extent to which it is possible for forest users themselves to make financial calculations of the benefits and costs of community forestry (CF). An ideal opportunity to do this was presented in Nepal where the Nepal UK Community Forestry Project (NUKCFP) felt that greater transparency in terms of the returns to different stakeholder groups in the Forest User Groups (FUGs) might assist the process of achieving more equity within the FUGs. This was also seen as part of a process of capacity building in the FUGs. At the same time it was an opportunity to examine some of the economic impacts of community forestry, so this became a subsidiary objective. The study took place during two fieldwork periods totalling about four and a half weeks between January and March 1999.

The study focussed on four FUGs in Dhankuta and Terhathum Districts in the Koshi Hills of the Eastern region of Nepal. The methodology evolved through a process of experimentation to assess what was feasible, and therefore varied from each FUG. The fourth FUG case study represented a test-run of the participatory methodology. The initial intention was to develop a single methodology, but it was soon discovered that there were important trade-offs between the objectives, so that it proved necessary to develop two parallel inter-linked methodologies. The first was for the stakeholder groups to make the calculations and assess the results with minimal outside assistance, while the second, involving more external inputs, aimed to provide a better understanding of stakeholder incentives for secondary stakeholders, involving for example computer spreadsheet analysis of the data. The two methodologies are termed the 'FUG calculation' (i) and the 'project (economic) analysis' (ii).

Core elements of both methodologies included pre-study visits; a general FUG meeting at which a wealth ranking exercise was carried out (although in two cases this was done prior to the main fieldwork) and from which the FUG members were divided into three stakeholder groups - poorer, middle-wealth and richer households; some stakeholder group participatory rural appraisal (PRA) type exercises; a small group of key informants (representing the stakeholder group) to make the 'quantitative' calculations; and report back to the FUG. The main differences between the two methodologies are that in the 'FUG calculation' the data collected by the FUG stakeholders is cut down to the minimum necessary, the key informants make the calculations, and report back directly to the FUG while in the 'project analysis', a broader data set was generated, including labour inputs, current annual transaction costs, information on the livelihood system, and other sources of forest products (other community forests and private land). In the latter approach, the research team processes and analyses the data by computer and reports back to the FUG. There is nothing however to prevent a sequential and incremental approach in which both methodologies can be used. In this case the FUG calculation would be carried out first, and form the basis for the project analysis.

Various difficulties were encountered in the course of the study, and these caused constant modifications in the methodology. While visual methods were used to combat

the often low levels of numeracy and literacy, participant interest levels were clearly higher with the more numerate groups. Where numeracy and literacy were low, there was less confidence in the numbers and outsiders (to the stakeholder group) usually had to take over the calculations. One possibility would be for more numerate FUG members to assist the less numerate groups from other stakeholder groups although care would be needed to avoid 'elite bias'. Above all lower numeracy and literacy takes up more time, which proved to be the main constraint in this study, and patience on the part of the facilitators. Participants were prepared to give two half days (on successive days) to the study, but this appeared to be the upper limit. We therefore had to be increasingly selective in the tools and exercises.

It was found that the best way to generate the quantitative information participatively was through small groups of key informants representing the stakeholder groups. The main drawback of key informants is their representativeness, and some suggestions for tackling this problem are made in the paper. Triangulation also indicated a tendency for over-estimation of the quantities of forest products extracted. This was also a conclusion from a parallel case study in Zimbabwe in which an attempt was made at physical quantification using PRA groups (Davies et al, 1999). One aspect of the over-estimation was the percentage of families in each stakeholder group extracting each product. This could be overcome by asking all members of the stakeholder group participating in the PRA exercises which products they extract and when, probably after mapping the forest product flows. The problem also implies that a more longitudinal approach involving some kind of recording system and/or construction of an economic model based on biological parameters would be preferable. Or a simple household survey or census could be conducted on quantities of forest products extracted. The participatory approach could still be used for other quantitative aspects like deciding what values to use, for the labour requirements and for making the gross margin calculations.

Another problem was that most FUG members belonged to at least two FUGs. Since FUG equity depends on a range of sources of forest products, it would be better if the analysis could take in multiple CF use, as well as forest products from private land. While this was attempted in the first two case studies, it proved too time-consuming and so a decision was made to concentrate on the main CF in question. Wealth ranking is critical for correctly identifying the stakeholder groups, and it was difficult to develop a standard approach to this. A further shortcoming, but one which only affects the 'project analysis', was to assume a blanket labour opportunity cost in each FUG; this should be estimated for each stakeholder group since livelihood options were quite variable. Finally putting a value on livestock grazing proved problematic. Based on the observation that grazing was not a 'free good' and could not therefore be based on the opportunity cost of labour time involved, we tried to estimate the substitution fodder value of grazing.

In spite of these problems, many of which require more attention and experimentation, the research team felt that the methodology presented here could be used by FUGs to make, with appropriate facilitation, some basic financial calculations. Judging by feedback from, in particular, the second two case studies, this should at least initiate the process of sensitising wealthier stakeholders to equity issues. It would however require intensive training of facilitators through a 'learning by doing' approach involving one of

the researchers involved in the initial study. The methodology, as it stands, demands at least three facilitators for each FUG, one for each stakeholder group. There are however various possibilities for reducing facilitation costs, including the 'small farmer to small farmer' approach (*campesino a campesino*) developed in Central America: members of FUGs where the methodology has been carried out could assist other FUGs.

This study did not really do justice to the secondary objective of assessing the socio-economic impacts of CF, but progressed towards developing a workable methodology for tackling it. Apart from the need for a much larger sample of FUGs to represent the great diversity of conditions in Nepal, more analysis of the livelihood issues, especially the inter-relationships between forestry, livestock and arable cultivation, and assessment of the use of *all* forest resources by households, is needed. The participatory methodology presented here could be combined with more traditional tools for such an analysis.

Even within the limitations of this study, some interesting trends were revealed with possible policy implications for attempts to tackle poverty. For example, the study revealed that poorer households are currently benefitting less from CF than wealthier households. Because CF is mainly orientated to the production of intermediate products that are inputs in the farming system, and towards subsistence rather than cash generation, those households with more livestock, farmland and people will naturally benefit more.

The picture as regards the 'net equity' effects of CF, i.e., taking account of the switch from national forests, is less clear. The level of dependency on CF, which is related to the number of livestock, area of farmland and the extent of off-farm livelihood opportunities, appears to have an important role in explaining differences between the 'gross' and 'net' equity impacts of CF. In the first two case studies all the stakeholder groups were fairly dependent on the CF, although for the landless poor the dependency was more on marketable rather than intermediate forest products. This was also the case before CF, so that richer and middle stakeholder groups with more land and livestock lost most (in absolute terms) from the switch to CF. By contrast, in the latter two case studies the FUG members were generally less dependent on CF; in particular the richer households had more livelihood options and higher labour opportunity costs. In this situation, the poorer households, who were relatively more dependent on CF than the richer households, have lost out more from the switch to CF.

Finally it is essential for policies aiming to reduce poverty among forest-dependent communities to distinguish between the land-poor and landless poor, since their objectives and the nature of their dependency on CF are somewhat different; the landless are more interested in cash products than securing inputs into their farming system.

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Abbreviations

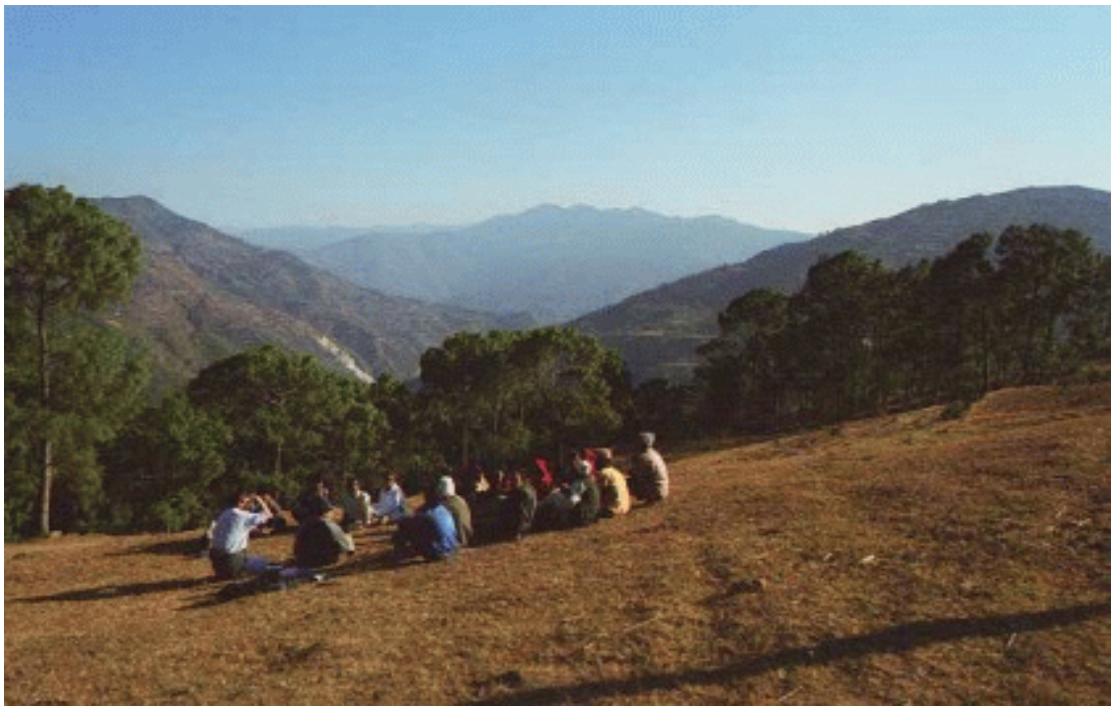
BCR	Benefit:cost ratio
CBA	Cost-benefit analysis
CF	Community forestry or community forest (depending on context)
FUG	Forest User Group
FUGC	Forest User Group Committee
FECOFUN	Federation of Community Forest Users of Nepal (an NGO)
NGO	Non-government organisation
Nrs.	Nepalese Rupees
NTFP	Non-timber forest product
NUKCFP	Nepal-UK Community Forestry Project
PRA	Participatory rural appraisal

Glossary of Nepalese words

bari land	rainfed upland farming area
bhari	a headload, weighing approximately 30 kg, carried in baskets
khet land	irrigated paddy or rice growing land on lower slopes and valley bottoms
ropani	a unit of land area equivalent to one twentieth of a hectare
Terai	the lowland southern area of Nepal bordering India

Note: The exchange rate at the time of the study was about Nepalese Rupees Nrs.109 per £ sterling and Nrs. 67 per US dollar.

Stakeholder groups calculating the returns to comm unity forestry



PART ONE

MAIN REPORT

1. INTRODUCTION

1.1 Background and objectives

This case study forms part of a wider research study entitled 'The Economic Analysis of Stakeholder Incentives in Participatory Forest Management (PFM)' financed by the Forestry Reseach Programme (FRP) of the UK Department for International Development (DFID) and implemented by the Overseas Development Institute (ODI). The study attempts to improve donor and project understanding of the economic incentives faced by different stakeholders, and in particular local forest users. The main objective of the research study is to develop a set of tools or methodological 'toolbox' for the economic analysis of PFM for use by donors and project managers throughout the project cycle. In the case of Nepal, more emphasis than in the other case studies is placed on the use of participatory research methods to develop a replicable methodology by which the primary beneficiaries - members of the Forest User Groups (FUGs) - can analyse the costs and benefits of community forestry (CF).

The case study particularly seeks to contribute to efforts to improve equity in the FUGs. Over the last decade a large proportion of the forests in the Middle Hills of Nepal have been converted from virtually open-access national forest areas to common pool resources. Most FUGs have introduced controls limiting the extraction of forest products, and introduced payments (sometimes nominal) for extraction rights to some of the products. As a consequence, the access of poorer traditional users of the forests has been somewhat reduced or made more expensive. *A priori*, one would expect the CF restrictions to have had less impact on the wealthier groups, since, with more private land to satisfy their own requirements, they were less dependent on the national forest areas. While FUG management has led to a marked improvement in the forest condition, the concern is that this is at the expense of welfare or equity objectives (Branney & Yadav, 1998).

The potential of economic or financial analysis[1], in which the benefits and costs to different stakeholders within the FUGs can be calculated, is that this can make the equity issues more transparent, and be used as a tool (most obviously by the poorer FUG members) for consultation and negotiation in the FUG. Thus the main aim of the study was to develop a methodology which would permit primary stakeholders to calculate, with appropriate outside support, the returns from community forestry. It was hoped that these calculations

[1]In this study the term 'economic' is used in its everyday sense and thus does not conform to the narrower cost-benefit analysis use of the term. Thus it refers to financial cash flow and subsistence or home consumption values, and does not include non-marketed or externality values.

would stimulate discussions in the FUGs leading to the identification of economic monitoring indicators. If a simple
viiins to each stakeholder group in the FUG can be identified, to be calculated on an annual basis, this could greatly increase transparency and accountability of the FUGs and so empower the poorer FUG members.

Several studies have discussed poverty in general terms, and assessed the factors that promote it - such as power relationships, decision-making mechanisms in the FUG, etc. - but none (at least in the NUKCFP) has attempted to 'quantify' it. Here we aim to show the actual returns from community forestry to poorer and richer households; we think that a quantitative assessment of product flows and values to different households is an important aid to designing effective project and policy interventions to alleviate poverty.

In sum there were two specific research objectives for this case study, a primary and secondary one:

(a) to develop a replicable participatory economic methodology by which FUG stakeholder groups can calculate the returns to community forestry, with the intention that these calculations become a tool to improve equity and build capacity in the FUGs;

(b) to permit secondary stakeholders (most obviously DFID) to better understand some of the socio-economic impacts of community forestry.

It is stressed that the second objective is subordinate in this study. Thus while there is some attempt to assess socio-economic impacts using more conventional (less participatory) economic analysis, it became clear that more time was needed to carry (b) out satisfactorily.

1.2 Report structure

This report is divided into two main parts. In Part One, we discuss the methodology and results in terms of the above objectives, and in Part Two we present more detailed analysis and calculations of the economic returns in each of the four case studies.

1.3 Study area

The field work was undertaken in the NUKCFP East area, based from the Dhankuta office in Dhankuta District in eastern Nepal (see Map 1). Five FUGs (with two of them combined in one study) were studied over a field work period of about four and a half weeks split into two stages: 17 January - 2 February, and 22 February - 6 March. The FUGs studied were in Dhankuta District, except the Bhaduare and Chuli Dada FUGs located in the neighbouring Terhathum District (see Map 2).

2. METHODOLOGY

2.1 An evolving methodology

Given the research objectives, it was realised that the methodology would evolve in the course of the study. Effectively, in the first three case studies, we were experimenting with different tools and working out what was essential and feasible for (a) the FUG stakeholder groups to make a basic economic calculation of the return to CF; and (b) how the project might utilise this information for an initial analysis of the socio-economic impacts of CF. This in fact resulted in two parallel methodologies. The early case studies also informed the external researchers unfamiliar with the region and livelihood systems. The fourth case study focussed explicitly on the calculations by the stakeholder groups with minimal assistance from the research team; the methodology used was the culmination of the previous case studies.

2.2 Selection of FUGs

The four case studies were purposively selected to support the objectives of the research study rather than in any attempt at representativeness, since the purpose of the study was to develop a replicable methodology. In view of the time limitation, three of the four case studies were relatively close to Dhankuta. The four case studies were:

A. Dumre Sanne FUG
B. Mainhakhop Giddyakhop FUG
C. Bhaduare and Chuli Dada FUGs (in a combined analysis)
D. Patle Pangsingh FUG

2.3 Wealth ranking and stakeholder groups

A prior invitation was made to all the households in the FUG to send a representative to a general meeting (the first day of fieldwork). Following introductions and explanations of the study objectives, in two of the case studies C and D wealth ranking was carried out by FUGC (Forest User Group Committee) members in consultation with the FUG members, mainly on the basis of land ownership, as well other criteria including food security and land quality. For case studies A and B, the wealth ranking was based on a prior survey of land ownership and food security.

Thence the participants were divided into three stakeholder groups: poorer households (usually a mixture of landless and land-poor families), 'middle wealth families; and 'richer' or wealthier households. In the case of A, we further divided the middle wealth stakeholder income into male and female sub-groups, partly to consider the pros and cons of separating stakeholders by gender, and partly because otherwise (for this FUG) the middle stakeholder group would have been too big for effective PRA work. There were usually between 10 and 20 participants in each stakeholder group.

2.4 PRA exercises with FUG sub-groups

The PRA exercises carried out on the first field day varied according to the evolving methodology. For example, in case study A calendars on livelihood activities and forest product flows were carried out; but these were not repeated in the other FUGs partly because it was felt that similar results would be found, but also because it was found that in the very limited time available other exercises were more essential for the task at hand; in particular, participatory maps showing the flows of forest products before and after CF proved very useful. The range of PRA exercises carried out were as follows:

- calendars of livelihood activities (agriculture, livestock, forestry and off-farm) and forest product flows, including sources, species, and the timing of sales and expenditure (A only)
- maps showing the flow of forest products from community forests and private land, both before and after the development of CF; this assisted the identification of benefits from CF and provided an initial basis for the 'before' and 'after CF' economic calculations (all except A)
- ranking and scoring of livelihood activities: the participants were asked to list all livelihood activities; a participant (in most cases) drew pictures to represent each activity; thence 50 stones were assigned to the activities; this allowed the team to assess the relative importance of forestry-related activities with other livelihood activities and sources of income (all case studies)
- ranking and scoring of benefits from the main community forest being studied: the participants were asked to list all the advantages or benefits of the CF, and to apportion 50 stones between pictorial representations of these; this was important for the identification of benefits and to enable the researchers to gauge the relative importance of the more and less tangible (often externality[1]) benefits of CF (all case studies)
- discussion of any disadvantages or costs of the main CF (all case studies)

These exercises were carried out simultaneously by each stakeholder group, which meant that the research team had to divide into sub-teams. At the conclusion of the first day's activities, four key informants were chosen from each stakeholder group (mainly according to the interest and capacity shown in the PRA exercises) for the quantitative data collection on the second day.

While the quality of participation was generally good, a few problems were encountered, and managed as far as possible:

- the time constraint sometimes cut short the last PRA exercises of the day;

[1]An externality can be defined as a benefit or cost which is either not marketable (external to the market) or occurs outside the project or forest boundary. Positive or negative externalities often fall on downstream users and provide potential for taxing the beneficiaries or 'polluters' in order to compensate or penalise those responsible for causing the externality.

- some participants (particularly in the 'poor' group) had difficulty counting stones due to numeracy problems;
- while most groups were reasonably stable, there were some people dropped in and out of, and the groups sometimes had to contend with a stream of interested outsiders, often from the other stakeholder groups;
- there were difficulties and a lack of standardisation at first in defining 'livelihood activities', making it difficult to draw comparisons between the ranking and scoring exercises carried out in the different groups, especially in case studies A and B. This was basically because the researchers divided into different 'research teams' for each stakeholder group without first agreeing on definitions. In some of the results it was apparent that the livelihood scores were based on time allocation (thus household service activities were included), while others focussed more on sources of income and the importance of end products in the household economy (as opposed to intermediate products like fodder and manure);
- it was sometimes difficult to avoid the 'leading question' problem; for example, in the forest benefit ranking exercise, if the respondents were only thinking about forest products, it was necessary to give an example of intangible benefits (e.g., "what about soil protection or water-related benefits?"). This also affected the discussion of the costs or disadvantages of CF.

2.5 Key informant data: forest product flows, labour inputs and costs

The study team stayed overnight in the community, and on the second day worked with the four key informants of each stakeholder group to derive the quantitative data. This took about 3-4 hours per group. The key informants were asked for the following information:

- annual household consumption (e.g., headloads (*bharis*) of firewood, fodder, etc.) currently and before CF, and the number or percentage of households collecting the products or grazing livestock in the forest
- forest product quantities collected and the number of grazing days from each CF and private forest land, currently and before community forestry
- the collection or grazing period
- who in the family collected/grazed
- number of collection trips per day
- journey time to and from the forest
- collection or grazing time in the forest, and any marketing or processing time (e.g., making plough shares, transporting resin to collection point, etc.)
- volume (headloads, bundles, etc.) per trip
- any hired labour and variable costs involved in collection or processing of products (e.g., felling tree and sawing timber, or preparation of large poles for construction) and any FUG payments
- the number of buffaloes, cattle (differentiating oxen from cows) and goats owned or kept per household

- ownership of tools used in forestry operations, their cost and economic life, and the extent to which they are shared with non-forestry livelihood activities
- landholding per household divided between lowland paddy (*khet)* and upland (*bari*)
- household composition

The latter two items were only added for case studies C and D, while tool ownership and cost was collected in the first main meeting in the final case study (D) as this was found to be more time-effective. These data are incorporated into the spreadsheet calculations of the financial parameters presented in Part Two. In addition, discussions were held on either the first or second day (according to time and flagging interest levels) on:

- on and off-farm income earning possibilities, including daily hired labour rates at different times of year - this formed the basis of the estimation of the labour opportunity cost used in the calculations;
- the relative importance of the land, labour and capital constraints faced by each stakeholder group, in order to identify the 'economic trade-off criteria' for livelihood comparisons[1];
- transaction costs of FUG members (but this was mainly collected in the key informant workshops - see below);
- whether product substitution was taking place, e.g., if firewood was less available for a particular stakeholder group, were households substituting firewood with greater use of dung or crop residues?

2.6 Key informant workshops

For the first three FUGs studied, a key informant workshop was held, following a day spent examining and processing the data. In the case of the first two FUGs studied (A and B), this workshop was held at the NUKCFP office in Dhankuta, while for case study C the workshop was at the nearest Forest Ranger post. For the final case study D this stage was skipped since it was considered less essential for the FUG's own calculations. The study was able to remunerate key informants with a small per diem for their half day participation in the workshop; in the communities tea and biscuits were provided.

The main aims of the workshop were to clarify the key informant data where discrepancies or anomalies were noted; derive values or prices for non-marketed forest products; calculate the transaction costs of FUG members[2]; assess the sustainability of forest product flows before and after community forestry; and if time permitted to further

[1] The economic trade-off criteria is the household's most limiting resource (land, labour or capital). Livelihood options should be compared in terms of returns to the most limiting resource(s) since this usually most closely conforms to farmers' own decision making criteria. See also Davies and Richards (1998), Section 6.4.

[2]The explicit incorporation of current transaction costs of FUG members (time involved in FUG work days and in Assembly and Committee meetings) in the calculations was, we think, an important development. Transaction costs are almost universally ignored in economic studies.

explore externality benefits and costs. Specifically the following exercises were carried out:

- a 'barter game' to establish the values or prices of non-marketed forest products
- a PRA exercise to assess the sustainability of the flows of products both before and after CF, and to assess other changes over time
- estimation of current transaction costs of FUG members (time spent in obligatory FUG protection, planting, weeding, etc., activities, and in attending meetings)

The barter game was based on an experience of assessing non-marketed non-timber forest product (NTFP) values in the Lomerio community forest management project in lowland Bolivia (Vallejos et al, 1996). It can be used in situations in which products are rarely (or never) marketed, as was the case here. It involves dividing the participants into buyers and sellers, with buyers purchasing the forest products in terms of a commonly consumed good with a well-known market value. For the latter we used 1 kg bags of rice and maize, but also asked the buyers and sellers to negotiate in cash.

An important aspect of the barter game approach is to simulate, as far as possible, an actual market situation. Thus sellers were given sticks, clumps of grass, etc., or pieces of card with a drawing of the forest product, while buyers used actual bags of rice/maize and hand-drawn rupee notes. These were physically exchanged for the forest products following negotiation. Normally (although the exact format varied from FUG to FUG) for each product, one group of key informants sold it in exchange for bags of rice/maize, and then the buying group took its turn to sell, this time for cash. For each product, the order of buying and selling was swapped, and individual product sellers alternated. For both this and the sustainability exercise, the key informants (who varied in number from 14 to 16) were split into two groups, and in case study A by gender. Then the two groups were brought together and the values compared. Following discussion, a consensus was reached about the value or price appropriate for the study. The labour opportunity cost was also estimated following discussions.

The sustainability exercise used a PRA tool developed and used by among others Hot Springs Working Group (1995) and IIED/HNWCP (1997). This involved considering the stock (forest condition) or flow (products) of the forest resource at three points in time: the present, the past (when the FUG was formed, e.g., six years ago) and the future (the same number of years as in the retrospective assessment, e.g., six years in the future). Each of the three points of time were represented by different coloured cards. The current situation was set at 10 stones, and participants were invited to place a number of stones in the past and future categories to show the relative scoring. This was carried out firstly for the 'with CF situation', and secondly for the 'before CF' situation. There was limited standardisation in the specification of these exercises: different groups assessed the sustainability of different stocks/flows.

2.7 Estimation of financial returns to community forestry

The following financial indicators of performance of the FUG sub-groups were estimated, based primarily on the key informant and workshop data:

- gross margin per household : for each stakeholder group this was calculated as the gross value of production (volume of forest products times price) less the cash costs like FUG payments and hired labour costs;

- the opportunity cost of CF as measured by the gross margin per household received before CF, when it was a national forest. This does not conform to the classic cost-benefit analysis definition of the 'without project' situation, and since it refers to a situation some years ago and which in most cases was not sustainable, it cannot be used as the basis for estimating a measure of project worth like the internal rate of return or benefit:cost ratio. While the estimations are subject to more uncertainty given the much longer recall period, it does provide an order of magnitude of what each stakeholder group sacrificed;

- the net margin per household equal to the gross margin with CF less the opportunity cost gross margin, and indicating whether the stakeholder group has experienced a net benefit from the transition to CF;

- gross margin per person day of labour from CF: here the gross margin is expressed per person day expended on forestry activities. This can be compared to the value or opportunity cost per person day in farming or off-farm activities.

- Benefit:Cost Ratio (BCR): this is the gross value of production divided by total cost, including the imputed cost of household labour (including transaction cost days) and depreciation on tools, as well as any direct cash costs - if the BCR is greater than 1, we can say that the household is experiencing a positive return to forestry activities (although the ratio is sensitive to various assumptions including the opportunity cost of family labour).

In case studies A and B we tried to look at the returns to CF in general since FUG members in all cases belonged to at least one FUG, and often three, and this would facilitated a better overall understanding of the impacts of CF and interactions with other parts of the household economy. But this was found to be too time-consuming and distracting from the primary objective of developing a truly participatory methodology. Thus for C and D the focus of the fieldwork was on the returns to the main CF.

2.8 Triangulation and sensitivity analysis

The researchers are well aware that the quantitative data collected using the short-cut methods described above are subject to potential unrepresentativeness of the key informants and various other sources of likely error or bias; the data should therefore be

treated as orders of magnitude rather than precise estimates. One way of cross-checking the results would be to compare them with parameters from other studies. Such parameters might include annual household firewood consumption, fodder consumption per livestock unit, etc., in order to see if the 'participatory data' appear reasonable. The labour use data could also be checked against household labour availability.

While such checks were not made here due to time/budgetary limitations as well as limited secondary data, a simple sensitivity analysis was carried out on the values used in the study. Thus the economic returns were calculated assuming prices (including the opportunity cost of labour) were over or under-estimated by 15%. This is also equivalent to over or under-estimating quantities by 15%. This provided a range within which there might be some confidence that the true (unknown) population parameter lies.

2.9 Report back to the FUG

This was carried out by the researchers for the first three case studies only, since for Patle Pangsingh FUG the calculations were carried out by the FUG key informant members permitting a discussion of comparative returns to stakeholder groups to take place there and then. In the case of the other FUGs, a visit was made on a separate day to the key informants with the objective of going through the calculations and 'returning' the data to the community, as well as to discuss how the results might be used to generate FUG discussions about equity.

2.10 Multiple visit data collection

In order to complement the PRA and key informant data collected, and to a certain extent, verify some of the main technical and financial parameters, it was decided that daily visits be made for a week to record the quantities collected for a number of households in Dumre Sanne and Mainhakhop Giddyakhop FUGs. Also, some labour times were recorded, and units of collection (headloads, bundles, etc.) weighed. The obvious problem of this exercise was its seasonal limitation: the quantities recorded were of limited use because of seasonal variation in extraction and consumption. However the labour data on collection times, and the unit weight measurements (e.g., per headload of tree fodder) were useful for cross-checking.

3. RESULTS: FUG DEVELOPMENT METHODOLOGY

3.1 Introduction

The methods evolved and changed as problems were encountered. The participatory methodology for FUG calculations was only achieved as a result of the experimentation in the first three case studies. Also it soon became apparent to the research team that there was a trade-off for the study between the primary and secondary objectives. Table 1,

which evaluates the usefulness of the range of tools used in the study, indicates the nature of the trade-off. A methodology appropriate for the FUG stakeholder groups to make the financial calculations (with minimal outside support) was found to be considerably different to one which would also allow the secondary stakeholders (the project or donor) to assess some of the socio-economic impacts of CF. This led to the development of two separate, but not necessarily mutually exclusive, methodologies requiring different levels of outside support:

(i) The *'FUG calculation'* methodology by which each stakeholder group can calculate how much it is benefiting from the CF in comparison with the other wealth groups and the situation before CF. The whole exercise can be carried out in the field with the support of an appropriately trained forest ranger or equivalent.

(ii) The *'project economic analysis'* methodology by which the secondary stakeholders can assess the socio-economic impacts of CF, for example improving their understanding of the nature and causes of differentiation. This analysis includes the recording of family labour inputs and production from other community forests used by FUG members and from their private land. It requires spreadsheet analysis by an economist, and feedback of the results to the community.

3.2 The tools developed in the study

The study developed the following set of tools for the two methodologies:

(i) *For the FUG calculation*:

(a) A simple methodological guideline for the calculation of benefits from a community forest, presented in Appendix 1.

This sets out a series of steps for the FUG to make the calculations. The guideline is not a detailed line by line set of instructions for making the calculations, which needs to be developed prior to the training of field staff as facilitators.

Table 1. Evaluation of some of the methods used in terms of the two methodologies

	FUG calculation	***Project analysis***
Wealth ranking	vital to differentiate FUG members into stakeholder groups	vital
Calendars of activities (livelihood and forestry)	unnecessary	useful if there is time: helps understanding of livelihood issues
Map of forest product flows with CF and before CF	essential for identifying benefits and sources	helps understanding of changes in product flows with CF
Ranking and scoring of livelihood benefits	unnecessary	very useful: shows role and importance of forestry in livelihood system
Ranking and scoring of forest benefits	unnecessary	very useful: shows relative importance of tangible vs. non-tangible benefits (externalities)
Discussion of costs or disadvantages of CF	useful, perhaps best at the end of the field exercise	vital: otherwise the analysis is 'benefit-biased'
Key informant calculations	vital	vital
Barter game to establish values of non-marketed products	useful but not essential; may be better to have a general discussion to arrive at a consensus of values	very useful as a basis for a consensus discussion on values
PRA sustainability of stock and product flows exercise	useful for FUG members to reflect on the sustainability of product flows	very useful since it indicates beneficiary perceptions of product scarcity
Feedback by research team	not necessary when FUG members do the calculations	vital but objectives need to be very clear

(b) FUG economic calculation form (Excel spreadsheet FUGECFORM) presented in Appendix 2.

This is a form to be completed in the field by representatives or key informants of each stakeholder sub-group with the assistance of a well-trained (in the methodology) forest ranger or equivalent. The idea would be for the FUG

representatives to carry out the calculations set out in the form on large pieces of paper and using the same sorts of visual aids as used in this pilot exercise. The form limits itself to what is considered to be the minimum information required for the stakeholders to calculate the average gross margin per household with CF and the net gain or loss from the switch from national forests to CF. It may be that NUKCFP decides later to drop the latter set of calculations, and only calculates the current annual gross margin from the CF. It does not include a calculation of labour use.

(ii) *For the project economic analysis:*

(a) Project economic analysis form (Excel spreadsheet PROJECFORM)

PROJECFORM, presented in Appendix 3, is a more sophisticated and extended version of FUGECFORM, and is designed so that the field data can be processed on a spreadsheet. Not all the data recorded on the form follows the strictly participatory approach demanded in *(i)*, basically because the participants' time availability would not permit this.

(b) Excel spreadsheet form ECONALFUG for analysing the data collected in PROJECFORM, and generating the calculations of a range of financial parameters.

3.3 Flow chart of activities

Figure 1 presents a flow chart of the activities required for the two inter-linked methodologies. The first five main activities listed are common to both methodologies, but the project economic analysis requires considerably more information than the FUG calculation. From Figure 1 we can identify seven main steps:

1. For both situations, pre-study visits are needed to establish rapport and explain the objectives of the study.

2. Wealth ranking, through which the stakeholder groups are identified, is essential in both approaches. The criteria for deciding wealth in the village needs to be determined by the FUG (agricultural land, access to off-farm employment, degree of food security, etc.). Ideally this data could be obtained through a census of the village. A quicker, less objective approach is for a number of the FUG members to sort people out into the agreed criteria. This could be through the traditional PRA approach to wealth ranking using cards.

3. With the short-cut approach, wealth ranking could be the first main activity of the general FUG meeting, following introductions, objectives, etc. For both approaches, the unit values and main cash costs (e.g., hired labour, FUG payments, marketing costs, etc.) associated with extracting the different products should be agreed. For the

project economic analysis, the annual transaction costs in terms of the number of days and hours required for obligatory FUG work and for meetings can be established. Secondly the replacement cost and economic life of tools should be checked.

4. The participants should then divide into stakeholder groups to draw the maps showing forest product flows with and before CF. For the simplified FUG calculation, the key informants can then be selected. For the project economic analysis a number of additional activities need to be carried out by the stakeholder group: ranking and scoring of livelihood benefits; ranking and scoring of CF benefits; a discussion of the costs and problems of CF; and a discussion of livelihood alternatives leading to agreement on the labour opportunity cost.

5. The key informants will then meet to estimate the quantities extracted currently and before CF in order to calculate the gross margin per household now and before CF. For the FUG calculation, the data recorded on large sheets of paper should be transferred to the recording form FUGECFORM. For the project economic analysis, the data should be transferred to PROJECFORM which is designed to record the following additional information: labour requirements per product currently and before CF; the quantities harvested from other CFs to which members of this FUG have access, and from private land, both currently and before CF; the ownership of tools; family or household composition; agricultural landholding; and attendance at FUG meetings.

   For the project economic analysis, the key informants should meet at a key informant workshop to clarify any data to the 'project team', who should have had time to make a preliminary revision of the data using the spreadsheet ECONALFUG. Other activities would be the barter game and PRA sustainability exercise.

6. For the FUG calculation, the gross margin before and after CF can be calculated by the FUG, but in the case of the project economic analysis this calculation would be done on the computer spreadsheet along with various other calculations (return per person day, benefit:cost ratio, etc.). The team should triangulate or cross-check the data from other sources, and carry out a sensitivity analysis.

7. The results can then be presented to the FUG. In the case of the FUG calculation the presentation would be by each key informant sub-group, while in the project analysis it would be by the research team.

There is nothing to stop a sequential or incremental approach being taken here. Thus the more participatory FUG economic calculation could be made first, and then the additional data could be collected for the project economic analysis. This would mean returning on a separate occasion to reconvene a general FUG meeting, and getting the stakeholder groups and key informants to generate the additional data required.

Figure 1. Flow chart of FUG calculation and project economic analysis methodologies

FUG CALCULATION		PROJECT ECONOMIC ANALYSIS (activities additional to FUG calculation)
1. **Pre-study visits** explanations, objectives, etc.		
2. **Wealth ranking** (could be carried out in step 3)		
3. **General FUG meeting** agree unit values and cash costs	------->	annual transaction costs cost and life of tools
4. **Stakeholder groups** map forest product flows select key informants	------->	rank livelihood activities rank CF benefits
5. **Key informants** (use FUGECFORM) extraction from main CF livestock ownership/grazing	------->	(use PROJECFORM) labour requirements extraction from other CFs ownership of tools household composition agricultural land attendance meetings key informant workshop: clarify data barter game sustainability exercise
6. **Data processing/analysis** key informant groups calculate gross margin per household now and before CF	-------->	team processes data with ECONALFUG spreadsheet sensitivity analysis, triangulation
7. **Report back** results presented to FUG by key informant groups	--------->	feedback by team to key informant groups/FUG

3.4 Difficulties experienced in developing methodologies

Low levels of numeracy and literacy

Predictably the tools worked best with more literate and numerate groups; due to better quality participation, they showed more interest in the process and results. It is difficult to avoid some minor mathematical complexities in the analysis, for example the need to convert quantities harvested by harvesting households into averages per household (this involves multiplying the quantities by the percentage or proportion of households collecting in the stakeholder group); also the calculation of the grazing value required some additional steps. While calculations were made with non-numerate/literate groups by using various visual aids, it was more difficult to maintain levels of interest, and the process tended to exceed participants' time availability. There was also the problem of bias towards more numerate participants.

However we did learn some useful ways to speed up the exercise and make it more accessible to non-numerate or literate people, through for example:

- bringing pre-drawn cards to represent forest products and livelihood alternatives, so that participants or researchers only needed to draw additional ones;
- using physical materials to represent forest products, e.g., twigs, grass, etc.;
- using different sized stones to represent thousands, hundreds, tens and units, and by arranged these in columns to facilitate summation;
- preparing hand-drawn rupee notes which could be physically added up;
- establishing data common to the different stakeholder groups, e.g., product prices and cash costs, by consensus in the general group discussions;
- using anecdotes, examples and games as far as possible, particularly to clarify the objectives of the economic analysis.

The participatory mapping exercise to identify forest product flows would also be expedited and improved taking advantage of the 'aerial photo mapping' technology developed by NUKCFP (Mather et al, 1998). The stakeholder groups could map the product flows diretly onto an approximately 90 cm by 90 cm transparency placed over a 1:1,250 or 1:2,500 aerial photograph enlargement.

Participants' time limitation

In spite of undertaking the exercise in the so-called 'slack' season, our experience revealed that two half days (on separate days) is probably the maximum time we can expect FUG members to devote to such an exercise. The time limitation was more of a problem in the more frequently visited FUGs, and for women who always had urgent household tasks awaiting. Therefore we were forced to be increasingly selective in the tools used.

Representativeness of the key informants

The quantitative data was based mainly on the average quantities of the four key informant households representing each stakeholder groups. The sample frame for selection of the key informants is provided by (a) the wealth ranking exercise, and (b) the mix of people who turn up on the day. Within this there are strong arguments for selecting the most numerate and literate members of each stakeholder group as key informants. Presenting the results as averages of the stakeholder groups also disguised vital differences: e.g., only five of the 30 'poorer group' families in case study A extracted resin, the most important product for this stakeholder group even on an average basis[1], so that 25 families were likely to be much worse off than the group average.

Over-estimation of quantities extracted

Comparison with the recorded annual extraction of various products by the FUG indicates that true extraction levels may be over-estimated. For example, for Dumre Sanne forest (case study A), both the FUG records and estimated likely extraction level from the size and condition of the forest indicated that the extraction reported by the key informants was on the high side; in particular the headloads reported for richer households was high because all the key informant households collected firewood from the CF. This caused a distortion since in reality many of the richer households relied more on private land, used agricultural residues or had bio-gas plants (Min Prasad Subedi, Dhankuta FECOFUN Chairman, pers. comm.).

This suggests another approach is needed to finding the percentage of households extracting each product from the CF. One approach would be to ask each member of the wider stakeholder group what products they extract and when at the participatory mapping stage. Another is for the key informants to be asked to think not so much about their own household situation, although this will always be a point of reference, but to consider the 'typical' household in their stakeholder group. This was the approach used by the key informants of the richer group in case study D, and the facilitator of that group felt it worked well. More objectively, a simple FUG survey or census could be carried out on extraction quantities. Even more desirably, but implying a higher cost, a longitudinal approach could be taken using a recording system.

Should the groups be divided by gender?

It was clear from the one FUG where we did this (in A the middle wealth group was divided into male and female representatives) that women have different perceptions and place different values on forest products. But one reason for mixed groups is that each gender tends to have a better knowledge of specific products (e.g., men know more about timber and poles, and women more about leaf litter and firewood). Also, given that the stakeholder groups were working simultaneously, we did not have enough trained

[1] Resin proceeds represented 34% of the gross value of the average household in the poorer sub-group, which lagged the other groups in terms of gross margin per household.

facilitators in the methods or time to do this (including the respondents' time limitation).

Excluded community members

The time devoted to each FUG did not permit a study of an important, if not often large, stakeholder group - excluded community members. While the priority here was on developing a methodology for assessing equity *within* the FUG, since exclusion may be a growing problem any future 'project analysis' study should treat the excluded villagers as another stakeholder group. There is also a case for dividing up the FUG membership and excluded village members according to their occupational basis. While this would have led to some very interesting comparisons, time did not permit this.

Multiple FUG membership

In all four case studies, most of the members belonged to two FUGs, and many to three or four. We would like to have calculated the return to community forestry in general, as well as the return to the main CF; this was in fact attempted for the first two case studies. This would have provided a more holistic picture of the situation with CF; analysis of just one FUG disguises differences in extraction from different CFs (mainly related to household to forest distance), and can thus distort the impression of the welfare impacts of CF. However, it was realised that the data requirements of assessing returns to each and all of the CFs used by FUG members were too cumbersome and time consuming. For example, each CF involves a different level of labour inputs, a different percentage of households extracting, etc.

Wealth ranking

The wealth ranking exercises were not carried out uniformly. In cases A and B, data from a prior visit or survey was used, while for C and D the wealth ranking was done on the spot by the FUGC representatives present, based on a range of criteria agreed by the participants. This was rather rushed and possibly not as objective as desirable; it is a sensitive exercise demanding particular skills of the facilitator. Ideally the wealth ranking should be carried out prior to the main study, following an initial visit to establish a consensus on criteria, and thence a survey of FUG members of the key criteria. Alternatively the well-known PRA approach using cards could be used (as in Hot Springs Working Group, 1995).

The value of livestock grazing

Two approaches to the value of livestock grazing in community forests were considered. If grazing were a 'free good' not in scarce supply, it would have been possible to use the labour time or cost as a proxy for its value. However in most cases it was apparent that grazing land was a valued commodity in scarce supply. We therefore based the grazing value on the estimated fodder substitution value of

grazing land, using both respondents' opinions on these values and secondary data.[1]

4. RESULTS: ANALYSIS OF COMMUNITY FORESTRY

4.1 Introduction

The calculations presented here represent a first approximation of the returns to CF. The shortcomings of a single visit approach relying on memory, and with a very small 'sample size' are well-known, and there is little doubt that a multiple visit approach involving farmer recording systems, participant observation, etc., and a statistically satisfactory sample size, will always be the desirable option. However, the problem is time and cost. At the same time we believe that, based partly on another case study in Zimbabwe (Davies et al., 1999), the key informant approach is one of the more reliable approaches to recording economic data. The main drawback of using key informants is their representativeness.

Also the calculation of the opportunity cost (foregone benefits of national forests) should only be treated as indicative, partly since it is based on memory recall of product flows of several years ago. Furthermore it does not conform to the classic 'with versus without' project economic comparison used in cost-benefit analysis, which assumes that the land use alternatives belong to the same time period. Clearly the product flows under national forests were not sustainable.

4.2 Average values extracted from the community forests

Table 2 presents the average gross value per household and per ha of the main community forests studied, and the average gross margin per person day. It reveals that a considerably higher gross value per household was extracted in A and B than in C and D. This implies a higher level of household livelihood dependence on CF in A and B (in the latter case in spite of the low value per ha), which is linked to the more limited livelihood options observed in these FUGs, and possibly due to more limited private land ownership.[2]

Table 2. Gross values per household and per hectare of forest area, and gross margin per person day (undifferentiated by stakeholder groups)

[1] The returns to labour varied very greatly according to who in the family took the animals grazing, and how many animals were owned: thus an adult taking one cow and a few goats would represent a much less efficient use of labour than a child taking a number of cattle and goats.

[2] We did not unfortunately record private land ownership, but even had we done so it would have been difficult to assess private tree resources.

	Gross value per household Nrs.000	*Gross value per hectare of forest Nrs.000*	*Gross margin per person day Nrs.*
A. Dumre Sanne	10.3	13.2	80
B. Mainhakhop Giddyakhop	14.7	3.6	65
C. Bhaduare & Chuli Dada	4.5	20.3	80
D. Patle Pangsingh	1.1	4.9	70

The low return to family labour in the case of B could be significant in that this was the forest with the highest value per household; it was also the poorest FUG and with least livelihood options (e.g., no paddy land was owned even by the 'richer' households). With a relatively low opportunity cost of labour, subsistence forestry activities were more attractive - in fact Mainhakhop Giddyakhop FUG members had little alternative in spite of the low per hectare value of their forest.

There was also a wide variation in the values per hectare. This is a function of both forest type and use. A, for example, was a mature pine forest whereas D's pine forest (a combination of naturally regenerated and planted trees) was composed of relatively young trees. The high value of C was due to the *Alnus nepalensis* (*utis*) forest type.

4.3 Gross margin per household

Table 3 confirms that, except in D, the poorer households extracted least from the forest, mainly because they had less livestock and farmland, which provide the main farming system demand for intermediate forest products. This was particularly the case for A and B since many (or all in the latter case) of the poorer households were landless and without larger livestock. For these households, the main interest was in forest products that could be sold, as well as in fuelwood for consumption. It was also observed that household or family size was generally smaller in the poorer households (for example, widows or single parent families) which would again affect extraction levels. In the case of A, several of the middle and poorer group households were benefitting from an FUG concession to extract and sell resin, while in B a concession to sell firewood was granted to the landless families.

Table 3. Gross margin per household (rank of stakeholder group in FUG)

	Poorer group Nrs.000 per hh.	*Middle group Nrs.000 per hh.*	*Richer group Nrs.000 per hh.*
A. Dumre Sanne	5.7 (3)	12.6 (1)	8.4 (2)
B. Mainhakhop Giddyakhop	11.0 (3)	12.2 (2)	16.4 (1)
C. Bhaduare & Chuli Dada	3.9 (3)	5.2 (1)	5.0 (2)
D. Patle Panghsingh	0.8 (2)	0.6 (3)	1.1 (1)

4.4 The importance of livestock related products

The relative importance of livestock inputs and grazing is particularly interesting. Table 4 shows the percentage of gross value for each CF coming from the extraction of tree and grass fodder, leaf litter and grazing. In most cases livestock-related products represented over half the gross value, and in a quarter of the groups over three quarters of gross value. There is a sharp contrast between the first two and second two case studies. In A and B, the proportion of gross value from forest products increased with wealth, while for C and D the opposite was true. Thus in A and B it was the richer households which were apparently more dependent on the CF in terms of inputs into the farming system, while in C and D the poorer households were more dependent.

Table 4. Percentage of CF gross value from livestock inputs and grazing

	Poorer group	*Middle group*	*Richer group*
A. Dumre Sanne	38%	77%	83%
B. Mainhakhop Giddyakhop	29%	49%	62%
C. Bhaduare & Chuli Dada	82%	75%	64%
D. Patle Pangsingh	65%	39%	27%

In A and B the poor and mainly landless households were more dependent on cash sales (for the poor group in A, resin sales represented 38% of gross income, while for the poor group in B, 66% was from firewood). The richer households with more animals and *bari* land, but relatively few other livelihood options, were more dependent on livestock-related CF products than the poor. In cases C and D, the poorer groups did have land and livestock, and with limited other livelihood options were heavily dependent on the CF, while the richer households had more off-farm options and a higher opportunity cost of labour, as well as more on-farm tree resources - and so were less dependent on CF livestock inputs.

4.5 Returns to family labour

Table 5 shows the return per person day of family labour including transaction cost days spent on FUG work and meetings, and compares it with the estimated opportunity cost of family labour averaged throughout the year and undifferentiated by stakeholder group in the four FUGs. It reveals that for the poorer households in all the FUGs except (marginally) C, the return to family labour was below the FUG opportunity cost of labour. Again the correlation is not exact, but generally the returns to labour among the middle and richer groups were higher than the FUG opportunity cost of labour.

Table 5. Gross margin per person day and estimated labour opportunity cost (rank in FUG)

	Poorer group Nrs./ day	*Middle group Nrs./ day*	*Richer group Nrs./ day*	*Ave. opp. cost Nrs. / day*
A. Dumre Sanne	71 (2)	103 (1)	65 (3)	80
B. Mainhakhop Giddyakhop	44 (3)	80 (1)	74 (2)	67
C. Bhaduare & Chuli Dada	79 (2)	75 (2)	84 (1)	80
D. Patle Pangsingh	60 (3)	68 (2)	78 (1)	80

One reason for this is that livestock grazing was generally a higher labour return activity, especially where children were used. The poorer households had less (or no) livestock to graze, whilst for the richer households the social opportunity costs of their children's education is probably high. As already mentioned, those with more livelihood options and thus a higher opportunity cost of labour will be less attracted to (presumably) lower labour return forestry activities, and *visa versa*. However the FUG average masks probable differences in opportunity costs between the stakeholder groups.

4.6 Transaction costs

This study attempted to include recurrent annual transaction costs in the financial return calculations. Ideally the establishment or initial transaction costs should be included in an economic study of CF, and while this was attempted in one case, this was not a classic cost-benefit analysis (CBA) type study in which costs and returns are considered over time to give a discounted measure of net worth (as the internal rate of return or net present value). Also any stakeholder group considering whether to devote their time to CF activities would consider the establishment costs as a sunk cost; what matters to them is the present return to their scarce resources. The transaction costs were simply measured

in terms of the opportunity cost of time spent on obligatory FUG activities (planting, protection, weeding, etc.) and in meetings. Table 6 shows transaction costs as a percentage of total costs (including imputed family labour) for each stakeholder group.

Table 6. Annual transaction costs as a percentage of total costs

	Poorer group	*Middle group*	*Richer group*
A. Dumre Sanne	3%	2%	2%
B. Mainhakhop Giddyakhop	4%	8%	5%
C. Bhaduare & Chuli Dada	14%	13%	16%
D. Patle Pangsingh	19%	22%	13%

Table 6 shows there were no obvious differences between the stakeholder groups; overall the transaction costs of the poorer groups were about the same as the richer groups. What is more noticeable is that for the more dependent FUGs, A and B, the transaction costs as a percentage of total costs were significantly lower than for C and D. This is explained by economies of scale. In A and B, people devoted much (if not most) of their time to forestry-related activities; therefore the transaction costs were relatively low as a proportion of total costs, usually less than 5%. But in a situation in which forestry is just one of many livelihood activities, transaction costs as a proportion of total costs can be significant - up to and sometimes above 20% of the cost. This shows how important it is to include transaction costs in any financial or economic study of community forestry.

4.7 Benefit: cost ratio from CF

The benefit:cost ratio (BCR) comparison in Table 7 shows the value of forest products divided by the direct costs involved in management and extraction, including family labour valued at its estimated opportunity cost. First, it reveals that in few cases was the BCR greater than 1, indicating that community forestry is not particularly 'profitable' although still worthwhile. However it should be noted that there may be important non-market values which are not quantified but which constitute an important element in the FUG members' incentive to participate. Second, some of the indirect benefits may be under-estimated, most obviously the importance of manure for crop productivity (see for example Thapa, 1989). It is interesting to note from A that it is not always the richer households which benefit most from CF.

Table 7. Benefit:cost ratios with CF (rank in FUG)

	Poorer group	*Middle group*	*Richer group*
A. Dumre Sanne	1.0 (2)	1.3 (1)	0.8 (3)
B. Mainhakhop Giddyakhop	0.7 (3)	1.2 (1)	1.1 (2)
C. Bhaduare & Chuli Dada	1.0 (2=)	1.0 (2=)	1.1 (1)
D. Patle Panghsingh	0.8 (2=)	0.8 (2=)	1.0 (1)

4.8 Opportunity cost of CF: the foregone benefits of national forests

Table 8 presents the opportunity cost of CF in terms of the foregone benefits derived from the previous national forest areas. This is not of course the conventional contemporaneous opportunity cost, and is misleading in that the national forest product flows were probably not sustainable, but at least indicates the perceptions of the stakeholder groups of what they think they gave up for CF. There is an interesting pattern in that in A and B the richer groups gave up most while the poorer groups gave up least, and in C and D, the richer households gave up least and the poorer households most (C) or second most (D). The explanation appears to lie in the relative levels of livestock ownership, alternative livelihood opportunities and labour opportunity costs, as discussed in Section 4.4.

Table 8. Opportunity cost of CF in terms of foregone national forest benefits (rank in FUG)

	Poorer group Nrs.000 per hh.	*Middle group Nrs.000 per hh.*	*Richer group Nrs.000 per hh.*
A. Dumre Sanne	4.9 (3)	10.0 (2)	11.2 (1)
B. Mainhakhop Giddyakhop	8.2 (3)	16.4 (2)	22.4 (1)
C. Bhaduare & Chuli Dada	8.1 (1)	7.0 (2)	6.6 (3)
D. Patle Panghsingh	2.6 (2)	3.2 (1)	0.2 (3)

4.9 The net economic gain or loss from CF

Table 9 presents the difference in gross margin per household before and after CF, or what we call the 'net equity' effect of CF. It shows that generally the foregone unsustainable benefits were higher than the current more sustainable benefit flows. Once again there is

an observable difference between the two more CF-dependent FUGs (A and B) and the less CF-dependent FUGs C and D. In the former case, the richer groups lost out most in 'net' terms while in the latter case the richer groups came off best.

Table 9. Net gain or loss from switch to CF (rank in FUG)

	Poorer group Nrs.000 per hh.	*Middle group Nrs.000 per hh.*	*Richer group Nrs.000 per hh.*
A. Dumre Sanne	0.8 (2)	2.5 (1)	(2.8) (3)
B. Mainhakhop Giddyakhop	2.7 (1)	(4.2) (2)	(6.0) (3)
C. Bhaduare & Chuli Dada	(4.2) (3)	(1.8) (2)	(1.6) (1)
D. Patle Panghsingh	(1.8) (2)	(2.6) (3)	0.9 (1)

It can thus be observed that while in 'gross equity' terms the poorer groups were indeed less well off in A and B, the richer groups, due to their greater CF opportunity costs, fared worse in 'net equity terms'. By contrast the richer groups in C and D did not lose out much from the switch to CF; in fact their access to off-farm tree resources improved. There is also the observation that the land-poor, but not the landless, are more dependent on off-farm tree resources in their farming systems. Paradoxically the negative equity impacts of CF may be greater where there is a more even distribution of land and poorer households are relatively better off.

It might be thought that the 'net equity' effect is rather academic. However, the fact that some FUGs have expressed a desire to return their CFs to national forest status (Min Prasad Subedi, Chair of FECOFUN, Dhankuta District, pers. comm.) indicates that this is not the case.

4.10 Gains and losses from CF in terms of forest product types

Table 10 attempts to show where the main gains and losses were in terms of product types. This presents an incomplete picture since gains or losses from one community forest can be compensated by losses or gains both from private land and other community forests to which FUG members have access. While there is no obvious overall pattern, in general for case studies A and B most stakeholder groups lost fuelwood due to FUG restrictions, and some (but not all) lost grazing rights. Resin was an important gain for poor and middle groups in A. In the case of C and D, all groups lost grazing due to CF restrictions but to some extent compensated this with increased grass and/or leaf litter and fuelwood collection. It is also noticeable that gains in higher value timber/pole extraction were limited to the richer and middle-wealth groups.

Table 10. Significant gains and losses from the advent of CF in terms of product types (less significant gains and losses in brackets)

	Poorer group	*Middle group*	*Richer group*
A. Dumre Sanne	gains: resin losses: fuelwood	gains: grazing resin losses: fuelwood	gains: nothing losses: grazing
B. Mainhakhop Giddyakhop	gains: fuelwood losses: nothing	gains: nothing losses: grass tree fodder (poles)	gains: nothing losses: grazing poles fuelwood
C. Bhaduare & Chuli Dada	gains: grass fuelwood losses: grazing	gains: grass fuelwood losses: grazing	gains: grass fuelwood losses: grazing
D. Patle Pangsingh	gains: grass losses: grazing fuelwood	gains: leaf litter (timber) (grass) losses: grazing	gains: leaf litter fuelwood timber losses: (grazing)

4.11 Changes in dependency on community forestry and private land

The data collected was not sufficiently complete to properly analyse changes in the dependency by FUG members on CF (or ex-national forest areas) and private land, but does provide some clues. Table 11 shows changes in terms of the percentage of gross value coming from the main CF under study, from other CFs accessed by FUG members where this data is available (only A and B), and from private land. This data was not available from D due to the narrower focus of the objectives.

Table 11. Changes in dependency in terms of percentage of gross value per household on community forests and private land (PL)

	Poorer group	*Middle group*	*Richer group*

A. Dumre Sanne	Main CF - up 9% All CFs - down 3% PL - up 4%	Main CF - down 3% All CFs - down 5% PL - up 5%	Main CF - down 4% All CFs - up 2% PL - up 2%
B. Mainhakhop Giddyakhop	Main CF - up 6% All CFs - same PL - same (landless)	Main CF - down 10% All CFs - down 9% PL - up 11%	Main CF - down 11% All CFs - down 15% PL - up 14%
C. Bhaduare & Chuli Dada	Main CFs - down 54% PL - up 54%	Main CFs - up 6% PL - up 34%	Main CFs - up 18% PL - up 12%

What we can observe is that for two (A and B) of the three poorer groups, dependency on the main CF increased slightly with private land remaining unchanged, while for the poorer group in C there was a large fall in forest products from the two main CFs and a corresponding increase from private land. In contrast, dependency on the main CF fell slightly for the middle and richer groups in A and B, with a compensating increase in extraction from private land.

4.12 Comparison with livelihood alternatives

The first level of comparison considered here is between returns to family labour in CF activities and from hired labour opportunities, both on and off farm. As expected this shows that the return to labour in CF was generally lower than could be earned from off-farm employment or peak labour farmwork, but higher than off-peak on-farm hired labour. From Table 5, if we leave out the two outlier calculations, there is a range of Nrs.60 to Nrs. 84 per person day, with an approximate average of Nrs. 73, based on a 10 hour working day. This comes to approximately Nrs. 60 for an eight hour day. Table 12 presents data collected (rather unsystematically) from key informants on labour rates on and off-farm for men and women. Off-farm labour rates were in a range of Nrs.70-100 per day for men, and Nrs. 60-70 for women, while on-farm hired labour in the peak season averaged approximately Nrs.70 (men) and Nrs.65 (women) compared to Nrs.50 and Nrs.45 in the off-peak season.

Table 12. Summary of on and off-farm hired labour rates (based on an 8 hour day[1])

		A. Dumre Sanne	*B. Mainhakhop Giddyakhop*	*C. Badhuare and Chuli Dada*	*D. Patle Pangsingh*	*Approx. average (range)*
On-farm rates[2]						
Off-peak	Male	48	40		60	50 (40-60)
	Female	48	40		47	45 (40-48)
Peak	Male	72	60		80	70 (60-80)
	Female	72	60		64	65 (60-72)
Off-farm employment						
When available	Male	100	70	95	75	85 (70-100)
	Female		70		60	65 (60-70)

Notes:
[1]On-farm labour is usually paid on a basis of a 5-6 hour day, but for comparative purposes the rates are standardised here to an eight hour day.
[2]Includes payment in kind (food).

In addition we assessed the returns to land and household labour from agriculture with economic data collected by the nearby (to Dhankuta) Pakhribas Agricultural Research Station in the early 1980s (Leslie & Marsh, 1985), and using current prices from the study area. Economic and agronomic data were systematically collected during an 18 month period in 1983-84 from 40 farms in the area covering a range of conditions and farming systems. Local informants commented that agricultural technology has not changed significantly in the area. Table 13 presents the calculation of the gross margin per hectare and person day from maize and millet relay cropping on mid-altitude (approx.1100-1500 metres) *bari* land, and for paddy rice, on its own and in combination with maize and wheat, on *khet* land. The budgets do not include the value of straw or other by-products.

Table 13 shows that if we take the average of the two maize-millet budgets on *bari* land, the return to labour was generally higher on *khet* land, but the return to land lower except for the higher value paddy-maize combination. The sensitivity analysis shows the returns are very sensitive to the yield and price assumptions; both yields and prices are highly variable from year to year. Comparison with Table 2 reveals that the gross margins per person day (after allowing for an eight hour day) and per ha (except for the very high values recorded in C) were generally higher in agriculture as would be expected. But given the normally different suitability of soil for agriculture and forestry, it is of limited usefulness to compare returns to land.

This analysis confirms a hierarchy of livelihood activities generally in accordance with the PRA ranking and scoring exercises. At peak periods in the agricultural calendar, those with

land, especially *khet* land, prioritise farming activities. At other times, off-farm employment is normally preferred if it is available, and forestry only becomes attractive when the labour opportunity cost falls. However this is also a rather simplistic comparison. First, unless farmers can afford inorganic fertilizers, agricultural sustainability is highly dependent on forestry and livestock activities (Thapa, 1989). Also, while many of the forestry activities are lower labour return activities than other livelihood options, they can be carried out in 'slack moments' or by those in the family with lower opportunity costs, most obviously children (although a low financial opportunity cost is misleading if it is at the expense of education, as we observed particularly in case study B).

Table 13. Gross margin per hectare and person day from agricultural activities (based on data from mid-altitude sites in the Koshi Hills, Leslie & Marsh, 1985)

													Sensitivity analysis	
			Gross	Seed	Seed	Compost	Compost		Oxen	Gross margin	Family	Gross margin	20% lower yield/price	20% higher yield/price
		Yield	value	rates	cost	rates	cost	Oxen	cost	per ha.	labour	per day	GM per day	GM per day
		kg/ha	Nrs./ha	kg/ha	Nrs/ha	tonnes/ha	Nrs/ha	days	Nrs/ha	Nrs./ha	days/ha	Nrs./day	Nrs./day	Nrs./day
A. BARI LAND														
Maize/millet budget 1														
	maize	1,392	13,920	35	438	21	3,507	31	5,580		178			
	millet	1,816	19,749	15	195						263			
	system total		33,669		633		3,507		5,580	23,950	441	54	39	69
Maize/millet budget 2														
	maize	1,438	14,380	25	313	21	3,507	18	3,240		74			
	millet	1,450	15,769	15	195			10	1,710		141			
	system total		30,149		508		3,507		4,950	21,184	215	99	71	126
B. KHET LAND														
Paddy/fallow														
	rice	1,357	17,302	50	775	1	127	30	5,310		114			
	system total		17,302		775		127		5,310	11,090	114	97	68	126
Paddy/maize														
	rice	1,660	21,165	50	775	1	127	13	2,340		96			
	maize	1,615	16,150	28	350	6	1,052	31	5,580		124			
	system total		37,315		1,125		1,179		7,920	27,091	220	123	90	156
Paddy/wheat														
	rice	1,385	17,659	50	775	1	127	30	5,310		114			
	wheat	1,300	9,263	80	640	6	1,002	49	8,820		73			
	system total		26,921		1,415		1,129		14,130	10,247	187	55	28	82

PRICES (Nrs/unit)		Harvest	Dry season	Average	Seed
	Unit	price	price	price 1/	price 2/
maize	kg	7.50	12.50	10.00	12.50
millet	kg	8.75	13.00	10.88	13.00
paddy rice	kg	10.00	15.50	12.75	15.50
wheat	kg	6.25	8.00	7.13	8.00
oxen 3/	day			180	
compost 4/	tonne			167	

Notes:

1/ Since farmers produce both for subsistence and cash sale, but mainly the former, we have averaged the price at harvest and during the dry seasc (this representing the opportunity cost value of home consumption).

2/ Based on the dry season opportunity cost value.

3/ The current hire charge of a pair of oxen, plough and driver is Nrs. 160 for a 5-6 hour day. To this is added food and fodder costs of driver and oxen.

4/ In 1984 this was estimated at Nrs.50/tonne based on the economic value of the incremental maize output from compost (Leslie & Marsh, 1985). We have adjusted this according to the increase in the value of maize from 1984

5. CONCLUSIONS

5.1 Methodology development

By the end of the fieldwork, the research team was reasonably confident that a methodology had been developed which could be used by FUGs to make some basic economic calculations with appropriate local facilitation, and which could provide the basis for achieving greater transparency, and possibly equity, within the FUGs. Case study D was effectively a test of this methodology. Judging by the latter experience, the methodology was successful in sensitising the wealthier stakeholders to equity issues. A subsequent visit by one of the authors to Patle Pangsingh FUG revealed that the exercise had been discussed at the monthly FUGC meeting and a decision taken to further discuss it at the annual assembly with the whole FUG group. However it is inevitable that the process of refining the methodology will need to continue. There are at least seven areas of concern which require further consideration and work.

First, the tools are still problematic for non-numerate or literate people - who are usually to be found in the poorer stakeholder groups. There is clearly scope for the development of more visual tools. Also it is possible that more numerate or literate people from other stakeholder groups in the FUG could help any one stakeholder group carry out the calculations although care would be needed to avoid elite bias. However, ultimately it may have to be accepted that for making these kinds of calculations some minimum level of numeracy is necessary for genuine participation.

Second, the wealth ranking exercise is a crucial stage in correct identification of the stakeholder groups. This needs to be carried out more systematically than was possible in some of the case studies.

Third, there is the concern about the representativeness of the key informant approach. To counter this problem, the number of households extracting each product should be noted when the wider stakeholder group is mapping forest product flows. A simple survey or census of forest product extraction would also overcome this problem.

Fourth is the tendency of participatory approaches (according to our experience) to overstate production or extraction levels. The implication here is that a household survey or a longitudinal approach involving some kind of recording system would be preferable, although this would have higher cost implications. There is also scope for biological/economic modeling, as used in other economic studies of community forestry, notably Hill and Shields (1998).

Fifth, the methodology needs to be able to consider the situation of excluded community members of the FUG. Once again time prevented analysis of excluded people as another stakeholder group. But it was also not clear what kind of calculation might be useful for sensitising the FUG to their situation and considering how they might be included. The

respondents' time limitation may not be so constraining here, since the team could return on a separate occasion for discussions with this stakeholder group.

Sixth is the question of multiple FUG membership. In order to consider the equity effects of CF, it is desirable to consider access to all forest resources, both communal and private. We attempted to collect data from all CFs accessed by FUG members in A and B, but it was realised that this was too time consuming for participatory analysis, and so the focus in C and D was on the main CF under discussion. However it is essential for any 'project level' economic analysis of CF, since decision-making and incentives are the result of the whole range of options for accessing forest resources.

Seventh, at various points in this report we remark on the importance of the differences in labour opportunity costs between stakeholder groups, but the calculations have assumed the same opportunity costs for stakeholder groups across each FUG. Future exercises should estimate the labour opportunity cost for each stakeholder group.

The other main problem for replication of the methodology in Nepal is the training and level of facilitation required for the FUGs to carry out the calculations. In these pilot case studies, each stakeholder group was assisted by at least one economist or CF practitioner with an economics background. While this was due to the experimental nature of the work, it is recognised that the facilitators, who should be of a level at least equivalent to forest rangers, need to be very well trained. Facilitators can only really be trained through the 'learning-by-doing' approach, i.e., by taking part in a study under the supervision of an economist or forester involved in the pilot study. The methodology, as it stands, demands at least three facilitators for each FUG; one for each broad stakeholder group. There are however various possibilities for reducing facilitation costs. One of these would be to train local FECOFUN staff in the methodology; another would be to adopt the 'small farmer to small farmer' approach (*campesino a campesino*) developed in Central America: members of FUGs where the methodology has been carried out could assist other FUGs carry out the calculations.

Assuming NUKCFP agrees that the pilot study is sufficiently encouraging to warrant further development, we envisage the next steps in this process to be:

1. At least one further test of the methodology used in case study D, this time by NUKCFP staff without external assistance.
2. Further modification of the methodology and forms.
3. Development of detailed line by line guidelines for making the calculations in FUGECFORM.
4. Design and implementation of a training programme[1] for forest rangers and other equivalent staff working in CF, including those from NGOs.

[1]Step 4 could be programmed to coincide with the scheduled visit of the ODI economist in late 1999 or early 2000 to provide in-country training in Nepal in the use of the economic tools developed in the wider FRP research study.

5. Implement the new methodology with supervision by an economist or forester involved in the initial study.

5.2 Socio-economic impacts of CF

This study did not really do justice to the secondary objective of assessing the socio-economic impacts of CF, but progressed towards a methodology which could be used, along with more traditional socio-economic tools, to achieve such an objective. Apart from the need for a much larger sample of FUGs to represent the great diversity of conditions in Nepal, more analysis is needed of the livelihood issues, especially the inter-relationships between forestry, livestock and arable cultivation, and the use of *all* forest resources by households (including other CFs accessed by FUG members and private forest resources). In fact, as indicated in Table 1, the livelihood analysis was cut down as the study advanced because of the trade-off between the study objectives and the participants' time limitation.

Even within the limitations of this study (Section 3.4), some interesting trends were revealed which might have policy implications for attempts to tackle poverty. First, the study revealed that poorer households are currently benefitting less from CF than wealthier households. This is partly because CF is more orientated towards the production of intermediate products that are inputs in the farming system, and towards subsistence rather than cash generation. Thus households with more livestock, farmland and people will naturally benefit more.

However the picture as regards the 'net equity' effects of CF, i.e., taking account of the switch from national forests to CF, is less clear-cut. The level of dependency on CF, which is related to the number of livestock, area of farmland, and the extent of off-farm livelihood opportunities, appears to have an important role in explaining differences in the 'gross' and 'net' equity impacts of CF. In case studies A and B, all the stakeholder groups appeared to be fairly dependent on the CF (although for the landless poor the dependency was more on marketable than intermediate forest products). This was also the case before CF, so that the richer and middle-wealth stakeholder groups with more land and livestock lost most (in absolute terms) from the switch to CF. By contrast, in case studies C and D, the FUG members were generally less dependent on CF, and in particular the richer households had more livelihood options and higher labour opportunity costs. In this situation, the poorer households, who were relatively more dependent on CF than the richer households, lost more from the switch to CF.

Finally it is essential for policies aiming to reduce poverty among forest-dependent communities to distinguish between the land-poor and landless poor, due to differences in the nature of the dependency on CF and user objectives; the landless are more interested in cash products, while the land-poor may be more concerned with inputs into their farming system.

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APPENDIX 1

METHODOLOGICAL GUIDELINES FOR THE FUG CALCULATION

The benefits of a Community Forest (CF) may not be shared equally by its Forest User Group (FUG) households. This methodology has been designed so that FUG households can make the calculations themselves under the guidance, at least for the first application, of a forest ranger. The objectives of this guideline are to describe the steps necessary to calculate the economic benefits of a Community Forest (CF) to different subgroups (stakeholders) of the Forest User Group (FUG), and to define the role of different people involved in the calculations.

The methodology consists of 10 steps in the calculation of economic benefits and their distributional impacts. They are as follows.

1. Information from a general meeting

All households belonging to the FUG should be invited to attend a general meeting. This invitation should of course be sent some days before, and should be for as convenient a day as possible. The tasks for the general meeting can be divided into two main parts:

(i) The division of FUG households into different sub-groups (or stakeholders) based on landholding, security of food supply, wealth and income, according to the criteria which the members consider most important. Usually FUG households can be divided into three sub-groups. Each sub-group may also be differentiated by gender to reflect the different perspectives of men and women, but this increases the amount of work and time in the calculations. Alternatively the wealth ranking exercise could be done prior to the meeting in order to maximise the time available for calculations and discussions.

(ii) Estimation of values or prices for each forest product harvested from the CF and the associated costs of forest product use. The unit value of a forest product may vary in different seasons, in which case the average value should be used in the calculation. These costs are the out-of-pocket (cash) outlays in forest product harvest, processing and marketing activities (e.g., payments to the FUG, hired labour costs, transport to market costs, etc.). Based on the alternative income earning opportunities of FUG members at different times of year, the opportunity costs of labour for each stakeholder group should be discussed. A particularly important discussion is whether it should be different for the different stakeholder groups.

2. Mapping by each stakeholder group and selection of key informants

Following the wealth ranking exercise, the FUG members present should divide into their respective stakeholder groups and undertake the mapping exercise to examine the flows of forest products currently and before CF. Ideally this will be done on overlays of the NUKCFP aerial photography 'photo-maps'. From this a list of forest products harvested by the stakeholder group currently and before CF can be compiled. For each product, the number of households in the stakeholder harvesting that product can be noted.

The next step is to select four representatives (or key informants) from each stakeholder group for the economic calculations described in Steps 3 to 9.

3. Calculation of gross value of forest products harvested from the CF

The objective of this exercise is to calculate the annual total gross margin of forest products per household from the CF. The first step is to estimate the quantity harvested per household extracting each forest product. The average quantity harvested per household is then found by multiplying the first figure by the proportion or percentage of households in the stakeholder group harvesting the product. This figure can then be multiplied by the unit value to find the gross value.

4. Calculation of gross value of grazing in the CF

We also need to know the gross value of animal grazing in the CF in order to get the total gross value. For this, we have to know the number and type of animals per household, and the number of days grazed in the CF. We assume that a young animal eats about half the amount an adult animal eats. For example, if there are two adult cows and two young oxen being grazed in the CF, the total number of cows and oxen grazed in the CF would be three.

The value of feed an animal eats during grazing in a CF depends on the availability of the feed and the number of hours grazed per day in the CF. Based on discussions with FUG members and published information on how much a buffalo, cow, goat, etc., eat we calculate that an adult buffalo, a cow or ox, and a goat eat an amount worth about Nrs.8, Nrs.5 and Nrs.1 respectively per 'grazing day' in the CF.

Calculation of the gross value of grazing is then similar to the calculation of the other forest products. The average number of animals per household grazed in the CF is multiplied by the number of days grazed and the unit value per grazing day to find the gross value of grazing from the CF.

5. Calculation of gross margin from the CF

If we subtract the cash costs associated with forest product harvesting, processing and harvesting from the total gross value (of products and grazing) of the CF, we get the total gross margin of the CF per household.

6. Calculation of gross value of products from this forest before formation of CF

We now have to find out the average quantities of various forest products harvested per household from this forest before it was established as a CF. The procedure of calculating this gross value is the same as for 4. The same unit values or prices as used in the calculation with CF must also be used for this calculation. It may be that some of the key informants are too young to recall forest product flows before the advent of CF. In this case replacement key informants need to be found from the stakeholder group.

7. Calculation of gross value of animal grazing before CF

We also have to calculate the gross value of animals grazed in the same area of forest before the establishment of the CF. This is the same as step 4.

8. Calculation of gross margin before CF

This is the same as Step 5.

9. Net gain or loss per household from the CF

The net gain or loss from CF is calculated by subtracting the average gross margin before CF from the gross margin with CF. If the result is positive, it means that the stakeholder group has gained from CF. However it should be remembered that the flow of forest products before CF is unlikely to be sustainable, and therefore this calculation does not represent an average annual loss, but merely gives an idea of how much the stakeholder group feels it gave up when the forest tenure changed in comparison with what they extract at present.

10. Feedback and discussion of results

Finally each stakeholder group should present the calculations and the results to the whole FUG, although this might be done initially at the end of the session in which the calculations were made in the presence of the facilitator and the representatives of the other stakeholder groups.

APPENDIX 2: FUGECFORM

CALCULATION BY FORESTRY USER GROUP OF ECONOMIC BENEFITS OF COMMUNITY FORESTRY

NAME OF FUG> NAME OF SUB-GROUP> DATE CARRIED OUT>

BASIC INFORMATION ON FUG
Total forest area (hectares):
Main species:
Area planted or under plantation:
Age of areas planted:
No. households:
Year of FUG formation:

1. WEALTH RANKING

No. households in this Sub-Group>

2. GENERAL INFORMATION TO BE COLLECTED FROM GENERAL MEETING

2.1 UNIT VALUES OR PRICES (for all forest products from the CF)	Unit	Average price Nrs.	Dry season price Nrs.	Wet season price Nrs.
Fuelwood (green)	bhari			
Fuelwood (dry)	bhari			
Tree fodder	bhari			
Ground grass	bhari			
Thatching grass	bhari			
Broom grass	bhari			
Leaf litter	bhari			
Timber - species 1:	cu ft sawn			
Timber - species 2:	cu ft sawn			
Large poles - species 1:	pole			
Large poles - species 2:	pole			
Small poles - species 1:	pole			
Small poles - species 2:	pole			
Sticks/small poles - construction	bundle			
Sticks/small poles - bean climbing	bundle			
Forest grazing - buffaloes	animal	8		
Forest grazing - cattle/oxen	animal	5		
Forest grazing - goats	animal	1		
Plough set (yoke, shaft, plough)	part			
Other				
Other				
Other				
Other				
Other				
Other				
Other				

2.2 COSTS IN CASH (Nrs.)	Nrs.									
Annual FUG membership fee										
	Fuelwood (dry or green)	Tree fodder	Ground grass	Thatch grass	Timber	Poles	Plough parts	Other:	Other:	Other:
FUG harvesting permit fees										
FUG application fees										
Hired labour cost per unit of product										
Material costs per unit of product										
Processing cost per unit of product										
Transport/marketing cost per unit product										

3. INFORMATION FROM SMALL NUMBER OF REPRESENTATIVES OF SUB-GROUP

No. representatives> = A

3.1 VALUE OF FOREST PRODUCTS HARVESTED FROM CF

Forest production	Unit	Quantity harvested per household extracting B	Number of representative households harvesting C	% of representative households harvesting (C/A) = D	Average quantity harvested per household B*D=E	Unit value Nrs/unit F	Gross value of products Nrs. E*F=G	FUG costs Nrs. H	Average FUG cost per HH Nrs H*D=I	Hired labour costs Nrs. J	Average hired labour cost per HH Nrs. J*D=K	Other cash costs Nrs. L	Average cash crop per HH Nrs. L*D=N
Fuelwood (green)	bhari												
Fuelwood (dry)	bhari												
Tree fodder	bhari												
Ground grass	bhari												
Thatching grass	bhari												
Broom grass	bhari												
Leaf litter	bhari												
Timber - species 1:	cu ft sawn												
Timber - species 2:	cu ft sawn												
Large poles - species 1:	pole												
Large poles - species 2:	pole												
Small poles - species 1:	pole												
Small poles - species 2:	pole												
Sticks/small poles - construction	bundle												
Sticks/small poles - bean climbing	bundle												
Plough set (yoke, shaft, plough)	part												
Other:													
Other:													
Other:													
Other:													
Other:													
Other:													
Other:													
TOTAL													

3.2 CALCULATION OF VALUE OF LIVESTOCK GRAZING IN COMMUNITY FOREST

IF sub-group representatives have livestock which graze in the community forest:

	Average number of livestock grazing in CF per household Mature	Young (0.5 of adult)	Number of animal units grazing in CF	Number of grazing days	Value per grazing day Nrs.	Gross Value of grazing in CF Nrs.
	O	P	O+(P*0.5)=Q	R	S	Q*R*S=T
Buffaloes					8	
Cows and oxen					5	
Goats and sheep					1	
TOTAL GROSS GRAZING VALUE						

3.3 CALCULATION OF GROSS MARGIN FROM COMMUNITY FORESTRY

	Nrs.
Total gross value of forest products (G)	
+ Total gross grazing value (T)	
= Total gross value from CF1	
less Total FUG payments (I)	
less Hired labour cost (K)	
less Other cash costs (N)	
= TOTAL GROSS MARGIN FROM CF1	

3.4 CALCULATION OF VALUE OF PRODUCTS FROM THIS FORES	
No. representatives> = A	
Forest production	Unit
Fuelwood (green)	bhari
Fuelwood (dry)	bhari
Tree fodder	bhari
Ground grass	bhari
Thatching grass	bhari
Broom grass	bhari
Leaf litter	bhari
Timber - species 1:	cu ft sawn
Timber - species 2:	cu ft sawn
Large poles - species 1:	pole

APPENDIX 3: PROJECFORM					
ECONOMIC STUDY OF COMMUNITY FORESTRY					
NAME OF FUG>	NAME OF SUB-GROUP>			DATE CARRIED OUT>	
BASIC INFORMATION ON FUG					
Total forest area (hectares):					
Main species:					
Area under plantation:					
Age of plantations:					
No. households:					
Year of FUG formation:					
1. WEALTH RANKING					
No. households in this Sub-Group>					
2. GENERAL INFORMATION TO BE COLLECTED FROM GENERAL MEETING					
2.1. UNIT VALUES OR PRICES (Nrs.)		Nrs.	Dry season	Wet season	
(for all forest products from the CF)	Unit	Average	price	price	
Fuelwood (green)	bhari				
Fuelwood (dry)	bhari				
Tree fodder	bhari				
Ground grass	bhari				
Thatching grass	bhari				
Broom grass	bhari				
Leaf litter	bhari				
Timber - species 1:	cu ft sawn				
Timber - species 2:	cu ft sawn				
Large poles - species 1:	pole				
Large poles - species 2:	pole				
Small poles - species 1:	pole				
Small poles - species 2:	pole				
Sticks/small poles - construction	bundle				
Sticks/small poles - bean climbing	bundle				
Forest grazing - buffaloes	animal	8			
Forest grazing - cattle/oxen	animal	5			
Forest grazing - goats	animal	1			
Plough set (yoke, shaft, plough)	part				
Other					
Other					
Other					
Other					
Other					
Other					
Other					
Family labour per person day: peak season					
Family labour per person day: off-peak					
Number of hours per person day	10				

2.2. COSTS IN CASH (Nrs.):								
	Nrs.							
Annual FUG membership fee								
	Fuelwood (dry or green)	Tree fodder	Ground grass	Thatch grass	Timber	Poles	Plough parts	Other:
FUG harvesting permit fees								
FUG application fees								
Hired labour per unit of product								
Material costs per unit of product								
Processing cost per unit of product								
Transport or marketing cost per unit								
2.3. COST AND LIFE OF TOOLS AND EQUIPMENT USED IN FORESTRY								
	Cost/item Nrs.	**Number of years of life**	**%used in forestry**					
Axe								
Khukari knife								
Kherpa knife								
Doko (basket)								
Namlo								
Dori (rope)								
Sickle								
Hand-saw (2-man)								
Hand-saw								
File								
Plane								
Chisel								
Other:								
Other:								
Other:								
Adjustment factor (representing % dependence on CF1 in forestry activities)								
2.4. CURRENT TRANSACTION COST TIME OF FUG								
FUG protection days								
FUG cleaning/weeding days								
FUG plantation/planting days								
FUG singling/pruning days								
FUG fire protection days								
FUG boundary maint. days								
FUG other days								
% FUG work days peak season								
% FUG work days off-peak								
Hours per FUG work day								
No. of assembly meetings								
% members attending assembly meetings								
Hours per assembly meeting								
No. FUGC meetings								
% committee members in this group								
% attending FUGC meetings								
Hours per FUGC meeting								
2.5. INFORMATION ABOUT OFF-FARM EMPLOYMENT OPPORTUNITIES AND HIRED LABOUR RATES:								

3. INFORMATION FROM KEY INFORMANT SUB-GROUP

No. of key informants> = A

3.1 FOREST PRODUCTS HARVESTED AND FAMILY LABOUR REQUIREMENTS

	Unit	1. Fuelwood a. green	b. dry	2. Fodder a. tree	b. grass	3. Thatching grass	4. Leaf litter	5. Timber a. sawn timber	b. large poles	c. small poles	6. Sticks	7. Forest grazing a. buffaloes	b. oxen & cattle	c. goats	8. Plough sets	9. Other	10. Other
Quantity harvested per hh extracting		bhari	bhari	bhari	bhari	bhari	bhari	cubic ft.	poles	poles	bundle	days	days	days	parts		
CF1 -																	
CF2 -																	
CF3 -																	
CF4 -																	
Private land																	
LABOUR FOR CF1 ONLY:																	
Percentage of households collecting	%																
Collection or grazing period	period																
Number of months	mths																
Collectors/harvesters:																	
% men	%																
% women	%																
% children	%																
Number of trips (total)	trips																
Journey time	hrs																
Collection/grazing time	hrs																
Marketing/processing time	hrs																
Volume/trip	bhari																

3.2 CALCULATION OF GROSS VALUE AND COSTS OF PRODUCTS HARVESTED FROM CF1 ONLY

		CF1 quantity harvested per household extracting	Number of key informant households extracting	Percentage key informant households extracting	Average quantity harvested per household	Unit value Nrs/unit	Gross Value products Nrs.	FUG payments Nrs.	Average FUG cost per HH Nrs	Hired labour costs Nrs.	Average hired labour cost per HH Nrs.	Other cash costs Nrs.	Average other cash costs per HH Nrs.
Forest production	Unit	B	C	(C/A) = D	B*D=E	F	E*F=G	H	I=H*D	J	K=J*D	L	N=L*D
Fuelwood (green)	bhari												
Fuelwood (dry)	bhari												
Tree fodder	bhari												
Ground grass	bhari												
Thatching grass	bhari												
Broom grass	bhari												
Leaf litter	bhari												
Timber - species 1:	cu ft sawn												
Timber - species 2:	cu ft sawn												
Large poles - species 1:	pole												
Large poles - species 2:	pole												
Small poles - species 1:	pole												
Small poles - species 2:	pole												
Sticks/small poles - construction	bundle												
Sticks/small poles - bean climbing	bundle												
Plough set (yoke, shaft, plough)	part												
Other:													
Other:													
Other:													
Other:													
Other:													
TOTAL													

3.3 CALCULATION OF VALUE OF LIVESTOCK GRAZING IN COMMUNITY FOREST

IF sub-group key informants have livestock which graze in community forest:

	Average number of livestock grazing in CF per household				
	Mature	Young (0.5 of adult)	Number of animal units grazing in CF	Number of grazing days	Value per grazing day Nrs.
	O	P	O+(P*0.5)=Q	R	S
Buffaloes					8
Cows and oxen					5
Goats and sheep					1
TOTAL GROSS GRAZING VALUE					

3.4 CALCULATION OF GROSS MARGIN FROM COMMUNITY FORESTRY (CF1 ONLY)

	Nrs.
Total gross value of forest products (G)	
+ Total gross grazing value (T)	
= Total gross value from CF1	
less Total FUG payments (I)	
less Hired labour cost (K)	
less Other cash costs (N)	
= TOTAL GROSS MARGIN FROM CF1	

3.5. OWNERSHIP OF TOOLS AND OTHER FORESTRY ITEMS BY SUB-GROUP

Item	**No.per hh.**
Axe	
Khukari knife	
Kherpa knife	
Doko (basket)	
Namlo	
Dori (rope)	
Sickle	
Hand-saw (2-man)	
Hand-saw	
File	
Plane	
Chisel	
Other	
Other	

3.6. AVERAGE HOUSEHOLD COMPOSITION AND AREA FARMED BY KEY INFORMANTS

Household size	
Adults 16 or over	
Children 10-15	
Children under 10	
Agricultural land (ropanis)	
bari land	
khet land	

3.7 ATTENDANCE AT FUGC MEETINGS BY SUB-GROUP

% groupmembers attending FUGC meetings	
% FUGC meetings attended	

3.8 PRODUCTION AND LABOUR INPUTS BEFORE COMMUNITY FORESTRY

	Unit	1. Fuelwood a. green	1. Fuelwood b. dry	2. Fodder a. tree	2. Fodder b. grass	3. Thatching grass	4. Leaf litter	5. Timber a. sawn timber	5. Timber b. large poles	5. Timber c. small poles	6. Sticks	7. Forest grazing a. buffaloes	7. Forest grazing b. oxen & cattle	7. Forest grazing c. goats	8. Plough sets	9. Other	10. Other
Quantity harvested per hh extracting		bhari	bhari	bhari	bhari	bhari	bhari	cubic ft.	poles	poles	bundle	days	days	days	parts		
NF1 -																	
NF2 -																	
NF3 -																	
NF4 -																	
Private land																	
LABOUR FOR NF1 ONLY:																	
Percentage of households collecting	%																
Collection or grazing period	period																
Number of months	mths																
Collectors/harvesters:																	
% men	%																
% women	%																
% children	%																

3.9 CALCULATION OF VALUE OF PRODUCTION AND COSTS BEFORE COMMUNITY FORESTRY: NF1 ONLY

No. key informants> = A

		NF1 quantity harvested per household extracting	Number of representative households extracting	Percentage representative households extracting	Average quantity harvested per household	Unit value Nrs/unit	Gross value of products Nrs.	Hired labour costs Nrs.	Average hired labour per HH. Nrs.	Other cash costs Nrs.	Average other cash costs per HH Nrs.
Forest production	Unit	B	C	(C/A) = D	B*D=E	F	E*F=G	H	H*D=I	J	J*D=K
Fuelwood (green)	bhari										
Fuelwood (dry)	bhari										
Tree fodder	bhari										
Ground grass	bhari										
Thatching grass	bhari										
Broom grass	bhari										
Leaf litter	bhari										
Timber - species 1:	cu ft sawn										
Timber - species 2:	cu ft sawn										
Large poles - species 1:	pole										
Large poles - species 2:	pole										
Small poles - species 1:	pole										
Small poles - species 2:	pole										
Sticks/small poles - construction	bundle										
Sticks/small poles - bean climbing	bundle										
Plough set (yoke, shaft, plough)	part										
Other:											
Other:											
Other:											
Other:											
Other:											
Other:											
Other:											
TOTAL											

PART TWO

CASE STUDIES

A. DUMRE SANNE FUG

B. MAINHAKHOP GIDDYAKHOP FUG

C. BHADUARE AND KULI DADA FUGs

D. PATLE PANGSINGH FUG

CASE STUDY A: DUMRE SANNE FOREST USER GROUP

A1. Introduction

The Dumre Sanne FUG community forest (CF) is a pine forest of 128 ha composed of *Pinus Roxburghii* ('chir' pine). However most members of the FUG, comprising 164 households, belong to at least one other FUG, in many cases two other FUGs, and in exceptional cases three other FUGs. Dumre Sanne CF is very close to the main (Dhankuta - Dharan) road, facilitating market access for products such as firewood and resin. Details of the four CFs are presented in Table A1.

Table A1. Basic information on four CFs used by Dumre Sanne FUG members

Name	*Area (ha)*	*Households*	*Year established*	*Forest type*
Dumre Sanne	128.2	164	1993	Pine
Patle Sanne	147.1	287	1994	Broadleaf/pine
Mulabari	202.0	300	1997	Broadleaf
Handikhara	112.1	163	1993	Broadleaf sal/pine

Source: NUKCFP, Dhankuta, 1998

A2. Wealth ranking

The wealth ranking, based on land holding size and food self-sufficiency, is presented in Table A2. This resulted in four logical stakeholder groupings:

- landless and with very low food self-sufficient households
- small size and low food self-sufficient households
- medium size and moderate food self-sufficient households
- larger size and food self-sufficient households

Table A2. Dumre Sanne FUG: wealth ranking

Land holding (*ropanis*)[1]	0	1-10	10-20	20+
Number of households	29	82	37	16
% households	17.4%	49.1%	22.2%	9.6%
Food self-sufficiency (months)	0-3	3-6	6-12	12+
Number of households	43	73	38	10
% households	25.7%	43.7%	23.4%	5.4%

Although some 85 FUG members attended on the first day, very few members corresponding to the last group (the smallest anyway) turned up, so the medium and larger landholding size groups were merged into one group (richer households). The small-size landholding group was much the biggest, and in the interests both of gender differentiation and a manageable number of people for PRA exercise, we divided it into men and women. There were therefore four groups representing three main 'stakeholder' sub-groups:

- poor and landless households
- male representatives of 'middle' wealth status households
- female representatives of middle wealth households
- 'richer' households

In addition, there were 3-4 poor families in the community who had not joined the FUG. These 'excluded families' were unwilling to pay FUG fees and the joining fee of Rs.51, but collected firewood from the CF anyway.

A3. Ranking and scoring of livelihood activities

The results of the ranking and scoring of livelihood activities exercise are presented in Table A3. The latter is difficult to interpret due to the different criteria or understanding of the term 'livelihoods' used by the data collection teams. Thus the poor and 'male middle' groups adopted a time-based criteria and included activities like 'household care' and other domestic activities, while the other groups focussed more on 'productive' activities external to domestic duties and income generation; in some cases activities were aggregated (e.g., a range of forestry activities into 'forestry' in the case of the 'female middle' group); and there was an unclear distinction between activities providing intermediate goods or inputs into another productive activity (e.g., collecting fodder) and those providing end-use products (e.g., resin production).

[1]20 *ropanis* = 1 hectare.

Table A3 shows that for most groups 'agriculture' and/or livestock were the most important productive activities. An interesting exception was the middle female group which placed forestry first; with the addition of fuelwood collection, forestry activities accounted for over 50% of the total. This indicates that women have a keener appreciation of the importance of forestry in the household economy, while men perhaps focus more on farming and cash earning activities. As in the other PRA exercises, there was little similarity in the results of the male and female middle wealth sub-groups. The importance given to cash generation activities by both the poor and male middle wealth group representatives is noticeable. In the case of the poor group, the lack of land obliges them to seek wage employment.

Table A3. Ranking and scoring of livelihood activities for Dumre Sanne FUG

	Poorer group		*Middle group Men*		*Middle group Female*		*Richer group*	
Activity	Rank	Score(%)	Rank	Score(%)	Rank	Score (%)	Rank	Score (%)
Crop production [1]	1	22	2	17	3	14	1	21
Livestock/milk production	2	20	1	21	2	16	1	21
Forestry					1	48	3	19
Fuelwood collection	5	10	7	8	4	5		
Household care			7	8			5	10
Services			2	13			4	13
Fruit production							6	6
Vegetable production							6	6
Resin tapping	5	10	4	11			8	2
Pensions and remittances					4	5		
FUG fund					4	5		
Business							8	2
Reciprocal labour exchange	4	18						
Wage labour (general)	2	20			4	5		
Wage labour (on-farm)			2	13				
Wage labour (construction)			7	8				

[1]Composed of highland crops (maize, millet, beans and mustard) and lowland paddy rice, wheat and barley.

A4. Ranking and scoring of Dumre Sanne CF benefits

Once again there were problems of standardisation between the data collection teams, so that comparison between the four stakeholder groups of the data presented in Table A4 is not straightforward. Thus different groups mentioned different benefits according to the way advantages or benefits were presented or defined by the researchers. However, we can observe that:

- forest products were important for all groups, as semi-subsistence inputs/resources and income generating (e.g., resin tapping by poorer families) and employment (more for the poor) opportunities
- users clearly distinguished between tangible and intangible benefits, and in many cases ranked the latter highly, e.g. the poorer and male middle groups ranked water yield and soil erosion control highly, even though the forest was downhill from most of their farmland
- community management and control, and solidarity in general, were highly rated by the male middle and richer groups (e.g., for the control and prevention of forest fires), but these benefits were not considered by poorer and middle female groups

Table A4. Ranking and scoring of forest benefits from Dumre Sanne CF

	Poorer group		*Middle group Men*		*Middle group Women*		*Richer group*	
Activity	Rank	Score (%)	Rank	Score (%)	Rank	Score (%)	Rank	Score (%)
Fuelwood	1	10	5	11	8	7	2	13
Timber	6	8	8	6	11	5	7	6
Poles	8	6	7	8				
Tree fodder							6	8
Leaf litter	8	6			8	7	7	6
Grass fodder	1	10	1	17	3	10		
Thatching grass			5	11				
Grazing	6	8			3	10	2	13
Resin (and cones)	1	10			8	7	11	4
Agricultural tools	1	10			3	10		
Nursery seedlings	8	6			1	12		
Water	1	10			1	12		
Red soil	11	4	9	6				
FUG employment			2	13				
FUG fund					7	9		
Cash income							7	6
Soil conservation / erosion control	1	10	2	13	3	10	4	11
Community management and control							1	17
Group solidarity			2	13			5	10
Clean air							7	6

A5. Discussion of disadvantages or costs of community forestry

The following costs or disadvantages of Dumre Sanne CF were observed or commented on:

- the poor group pointed out their loss of revenue from firewood sales (prior to CF, each family sold 5-6 headloads per week for about three months of the year) and the imposition of grazing controls; they also said that they did not see any benefits from their contributions to the FUG fund, and that they were very concerned about the plan to use the fund for electrification

- providing labour for FUG activities (nursery, protection) was disliked, but the male middle group felt this was necessary for FUG solidarity
- the increase in the monkey population and associated crop losses resulting from better forest protection

A6. Values from the barter game

Table A5 presents the barter game results from the two groups of key informants (women and men). Unsurprisingly, the unit values or 'prices' tended to reflect the labour time involved in forest product collection. Time unfortunately prevented a thorough discussion of the consensus view on prices; the final column shows the actual values used in the study. These are based partly on the results of the barter game, but also on a wider analysis of values in the area.

Table A5. Values derived from barter game for Dumre Sanne FUG (values per bhari unless otherwise stated)

	kg of rice (range)		*Implicit value (Nrs)*		*Values used*
Key informant group	*Women*	*Men*	*Women*	*Men*	*Nrs. / unit*
fuelwood	4	-	60	-	40
tree fodder	4-6	1.5	60-90	22.5	35
grass	-	1.5-2	-	22.5-30	25
leaf litter	1	0.5-1	15	7.5-15	10
thatching grass	4	-	60	-	25
hired farm labour/ day	4	-	60	-	-
family labour/day	-	-	-	70	90 peak 60 off-peak
grazing *(bharis of fodder per 'grazing day' [1])* - buffaloes - cattle/oxen - goats	-	 1 0.5 0.17	-	 21 10.5 3.6	 8 5 1

[1/] A grazing day is normally about 5-6 hours.

One observation from Table A5 is that the women placed much higher values on forest products than the men, possibly because they are more acutely aware of the time involved. Men hardly ever collected fuelwood so they were unable to value it. The labour value estimates can be compared to Nrs.35 (including refreshments valued at Nrs.5) for a five hour day (thus equivalent to Nrs.70 for a 10 hour day). The grazing values derived (by men) from the estimated fodder equivalent resulted in rather high values when checked against published data on livestock consumption.

A7. Sustainability of stocks and flows

Table A6 presents the results of the PRA sustainability analysis of forest stocks and flows from the various CFs which FUG members had access to, rather than specifically Dumre Sanne CF (in the subsequent FUG case studies, this exercise refers to a specific CF). In general it was felt that there has been an improvement in forest condition due to fire control, restrictions on grazing, soil erosion prevention measures, and silvicultural improvements associated with resin extraction. The men were slightly more cautious than the women. There appears to be a discrepancy between men and women on fuelwood consumption; the women felt that there had been a considerable increase in overall fuelwood consumption due to the increased population (there were only 111 households when the FUG was created). The men argued that more was extracted before the advent of CF due to extraction by outsiders.

Table A6. Perceptions of sustainability and population in Dumre Sanne FUG
(female key informant group unless otherwise stated)

	6 years ago	*Present day*	*6 years in future*
Forest area	10	10	12
Forest condition	7	10	12
Forest condition (men)	9.5	10	11
Population	8	10	12
Population (men)	9	10	11
Fuelwood consumption	7	10	12
Fuelwood extraction (men)	10.5	10	10
Leaf litter consumption	5	10	11

The supply of leaf litter has increased recently, but is not expected to continue to do so at the same rate. Overall livestock (ruminant) numbers seem to be falling, although some households have been using their new cash incomes from resin tapping to purchase cattle. Whereas in the past cattle were kept mainly on crop fields, the trend is towards stall-feeding and consequently more leaf litter is required to return the manure to the fields.

A8. Returns to stakeholder groups

Table A7 presents the financial parameters calculated from the key informant data, while Table A8 gives the share of forest wealth by the different sub-groups. Table A7 presents the financial indicators as a range corresponding to a sensitivity analysis of 15% over or underestimation of prices (including the labour opportunity cost). It shows that the poorer

households were extracting least out of the CF, while the middle group was extracting most. The poorer households with less agricultural land and livestock, and a higher dependency on off-farm employment, were less dependent on forestry; however, the concession to extract resin to several of the poorer households was an important income source. The richer households extracted less because they too were less dependent than the middle income households; for one thing they had less livestock.

Table A7. Summary of returns to Dumre Sanne FUG
(range assuming 15% over or underestimation of prices)

Gross margin per household (hh) with and before community forestry (CF)	*Poorer group Nrs.000*	*Middle group Men Nrs.000*	*Middle group Women Nrs.000*	*Richer group Nrs.000*
Gross margin per hh. with CF	4.8 - 6.6	10.1 - 13.8	11.1 - 15.2	7.1 - 9.7
Gross margin per hh. before CF	4.1 - 5.7	6.8 - 9.4	10.1 - 13.8	9.5 - 12.8
Net gain/loss per hh. from CF	0.7 - 1.0	3.3 - 4.4	1.0 - 1.4	(2.4) - (3.2)
Other indicators:	*Nrs.*	*Nrs.*	*Nrs.*	*Nrs.*
Gross margin per person day with CF	60 - 82	84 - 115	88 - 121	55 - 75
Benefit:cost ratio with CF	1.0	1.3	1.3	0.8

It might have been expected that the relatively low return to richer households from CF was due to greater reliability on private or on-farm tree resources, but the data does not confirm this. The reason appears to lie with the relative returns to agricultural land, which they had more of than other stakeholder groups. Assuming there is a higher return to labour from cropping as opposed to forestry and livestock activities, more time would be devoted to farming; in other words the labour opportunity cost of forestry activities may be higher for richer households, and forestry is a more attractive option for households with less livelihood options.

The fact that the middle wealth households have more livestock (which increases the dependence on fodder, leaf litter, etc.) seems to support this; and judging from the gross margin per person day, it does appear that richer households derive a relatively low return to labour from their forestry activities. Against this is the argument that forestry is crucial to maintaining crop yields due to the importance of manure or compost in the farming system; one would expect households with more agricultural land to need more manure and livestock, and thus be more dependent on forest resources. Field studies suggest that

1 ha of farmland requires 1.8 ha of forest to maintain crop yields (Thapa, 1989). We did not investigate whether wealthier farmers were using inorganic fertilizers.

The opportunity cost calculation indicates that wealthier households may have lost more from the switch to community forestry than poorer households. This is because the Dumre Sanne household economy appears fairly dependent on forest resources, at least in comparison with case studies C and D; the wealthier households were perhaps even more dependent on forest resources in the past, and so were extracting more products, whereas now their interest has shifted more towards paddy farming. In contrast the poorer families, with relatively little land, were less dependent on forest resources except as a source of cash income. They therefore lost least in the switch to CF. Thus the net gain/loss per household shows richer households suffering a net loss as a result of CF, poorer households a slight gain and medium income households benefiting most. The middle income group seem therefore to be the main beneficiaries of community forestry in this case.

Table A8. Share of forest wealth from Dumre Sanne CF

	Poorer group	*Middle group (average)*	*Richer group*
% share of households	18%	50%	32%
% share of forest wealth (gross value)	10%	63%	27%

Table A8 confirms that both the poorer and richer households were receiving proportionately much less value from CF than the middle wealth group. The reasons for this have already been discussed.

A9. Data feedback

In view of the problems of literacy and numeracy, this was made as simple and graphic as possible. Also time meant that we could only do it for one stakeholder group - the female middle income group. First, grass, sticks, pieces of wood, etc., were collected to provide visual representation of the products. Second, the quantity of each forest product was represented in stones. Where large numbers were involved (e.g., 270 grazing days), a composite was developed (e.g. 9 large stones, each stone representing a month). Third, the price or value of each product was presented in hand-drawn Rupee notes. These were placed on a large piece of paper on the floor. The value of production calculation was the most difficult stage given the numeracy problem, and was carried out by the female facilitator who was an FUG member.

The participants seemed well satisfied with the exercise, and some said it confirmed what they thought - that it was worthwhile belonging to the FUG[1]. A member of the poorest (landless) group said that she was not getting half the products of the middle income group, and that for her the calculation would not be so positive (confirmed in Table A7). The participants said they would like to go beyond the gross value stage to take the costs into account, and that the calculations could be very useful in discussions in the FUG. While it did appear that the participant were genuinely excited with the calculations, it should be pointed out that it was difficult to avoid leading questions about the usefulness of the study.

CASE STUDY B: MAINHAKHOP GIDDYAKHOP FOREST USER GROUP

B1. Introduction

Mainhakhop Giddyakhop CF is a mixed broadleaf forest considerably larger than Dumre Sanne CF, and also has good market access (about an hour's walking distance from the road). FUG members used up to four CFs, although the norm was either two or three CFs. Table B1 presents general information on the four CFs. All the forests were of the dry deciduous mixed broadleaf type, also known as mixed Sal forest. Living conditions were more difficult than in the other three case studies. There were severe constraints as regards water (women claimed they typically spent 4-6 hours a day collecting water for household use) and education: the school was hardly functioning, and since the women had to collect water, the children had to look after the cattle. No lowland paddy land was available for even the 'richer' households in these communities. Most people belonged to the Rai and Limbu ethnic groups.

Table B1. Basic information of four CFs used by Mainhakhop Giddyakhop FUG members

Source: NUKCFP Dhankuta, 1998

Name	*Area*	*Number of households*	*Year established*	*Forest type*
Mainhakhop Giddyakhop	271.2	65	1994	Dry deciduous mixed broadleaf
Garjuwa Pakha	43.8	100	1993	Dry deciduous mixed broadleaf
Khenwa	67.9	34	1994	Dry deciduous mixed broadleaf

[1]Although we did not attempt to present the estimation of a gross margin per person day; this would have confirmed that it was worthwhile according to the calculation in Table A7.

Beleni Pakha	203.3	201	1993	Dry deciduous mixed broadleaf

B2. Wealth ranking

In this case, the FUG with the help of Dhankuta District Forestry Office had recently carried out a census of households in the FUG, including land owned, and it was agreed with the participants to use these data for wealth ranking. The wealth ranking in Table B2 is therefore based on land ownership.

Table B2. Wealth ranking in Mainhakhop Giddyakhop FUG

Land holding (ropanis)	*0*	*1-10*	*10-20*	*20+*
No. households	9	10	10	37
% households	12.3	15.4	15.4	56.9

The 50 representatives present of the 65 households were thus divided into three main groups:

- landless, very low food self-sufficient households (poorer group)
- small size and low food self-sufficient households with land holdings up to 20 ropanis, thus amalgamating the two middle groups in Table B2 (middle group)
- medium size and moderate food self-sufficient households (richer group)

It should be emphasised that 'richer' is very much a relative term: the 'richer' households in this FUG would probably fall into the 'poor' category in most other FUGs. It was noted that the small landless group was squatting on government land on the edge of the Dhankuta-Dharan road which forms a boundary of Mainhakhop Giddyakhop CF.

B3. Map of resource flows before and after the development of CF

The three groups developed maps of forest product flows before and after community forestry. The maps and ensuing discussions provided a good basis for the key informant data, and revealed how FUG rules have impacted on resource use patterns. For example, groups noted that:

- they have reduced their consumption of poles and timber by two-thirds due to the FUG requirement and cost of obtaining permits
- due to the increase in population and FUG controls, they are having to travel further afield to collect some forest products, and increasingly use branches and twigs from on-farm tree fodder to substitute firewood
- they used to collect thatching grass from Bileni Pakha forest

- many households take their animals at various times of year (for up to 3 months) to graze in more distant forests

B4. Ranking and scoring of livelihood activities

Table B3 presents the results of the ranking and scoring of livelihood activities. The poor or landless group valued fuelwood highest since they have been granted permission (and receive an annual licence) by the FUG to extract and sell fuelwood at the roadside. They paid royalties to the FUG on a monthly basis (Nrs. 60/month). Virtually all the productive activities of the landless group were cash-based. Without land, they possessed no large livestock, which greatly reduced their dependence (except as a source of cash products) on the forest. Second equal in importance were on and off-farm (mainly road maintenance) wage labour; combining the two, wage labour was easily their most important activity. For the middle group, wage labour was also most important, with crop and livestock activities ranked next. For the richer group, wage labour dropped to a distant third place behind cropping and livestock which together accounted for 86% of the total score.

Table B3. Ranking and scoring of livelihood activities for Mainhakhop Giddyakhop FUG

	Poorer group		*Middle group*		*Richer group*	
Activity	*Rank*	*Score (%)*	*Rank*	*Score (%)*	*Rank*	*Score (%)*
Crop production and ginger cultivation			2	23	1	50
Livestock/grazing			6	10	2	36
Fodder/thatch grass			3	14		
Goats/pigs/poultry	5	15	5	11		
Fuelwood collection	1	24	4	13	3	6
Household care	4	17				
Weaving			7	4		
Wage labour in general			1	25	3	6
Reciprocal labour					5	2
Labouring (on-farm)	2	22				
Labouring (off-farm)	2	22				

B5. Ranking and scoring of benefits from Mainhakhop Giddyakhop CF

Table B4 presents the result of the ranking and scoring of benefits from Mainhakhop Giddyakhop CF. The poor (landless) group only identified direct or tangible forest values. Unsurprisingly, the marketed fuelwood scored highest, followed by tree fodder and grazing for goats. Some of the benefits mentioned by the poor group reflects the standardisation of criteria problem mentioned earlier. The middle group ranked tree fodder and agricultural tools highest, reflecting the importance of livestock and farmland. Timber and poles was most important for the richer group, followed by fuelwood and livestock-related benefits. They also placed a high value on soil conservation or erosion control.

Table B4. Ranking and scoring of Mainhakhop Giddyakhop FUG benefits

	Poorer group		*Middle group*		*Richer group*	
Activity	*Rank*	*Score (%)*	*Rank*	*Score (%)*	*Rank*	*Score (%)*
Fuelwood	1	27	3	11	2	13
Timber/poles	5	11			1	20
Small poles	7	5				
Tree fodder	2	18	1	25	6	8
Grass fodder					8	6
Thatching grass	6	7	5	8	2	13
Grazing	3	16	4	10		
Agricultural tools			2	23	6	8
Sticks for bean climbers					5	10
Leaves to feed pigs			6	9	10	2
Leaves to make plates					10	2
Bark for rope making					10	2
White clay			7	2		
Wild yams			8	2	10	2
Soil conservation / soil erosion control					2	13
Temple site					10	2
School	4	14				
Credit	8	2				

B6. Disadvantages or costs of community forestry

The middle group listed most problems, although some of these were in response to leading questions. These included not being allowed to collect 'thatching grass' for fodder; strict rules about attending Assembly meetings; obligatory FUG work days; having to pay fees for firewood; and for Committee members the time involved in organising and attending meetings. The richer group felt the main problem was the growth of the aggressive *Eupetorium* weed which suppresses (thatching and grazing) grass and

seedlings. Ironically, a major cause of this was more effective fire control. A second problem was the increase in jackals and foxes which attack chickens.

B7. Values from barter game

Table B5 presents the results of the barter game from the two (mixed-gender) groups of key informants. This shows there was rather a large discrepancy in the barter values between the two groups, with the first group generally suggesting lower values, except for the labour opportunity cost. The consensus value discussion resulted in values generally between the two estimates, but occasionally in values outside the range. This suggests that the values derived from any one exercise may be unreliable, but that the barter games provided a good basis for an informed discussion on appropriate values. However it is vital to leave sufficient time for the condensed discussion.

Table B5. Values derived from barter game for Mainhakhop Giddyakhop FUG
(values per headload or bhari unless otherwise stated)

	kgs of rice or maize (mz.)		*implicit monetary value*		*consensus*
Key	*First*	*Second*	*First*	*Second*	*Both*
fuelwood	2 kg rice	2.5 kg rice	30	37.50	40
tree fodder	1 kg rice	6 kg mz.	15	37.50	30
grass	1 kg rice	-	15	-	25
leaf litter	1 kg mz.	1 kg rice	6.25	15	10
thatching	1 kg rice + 1kg	6 kg mz.	21.25	37.50	25
sticks for	4 kg mz.	5 kg mz.	29	31.25	20
sticks for	6 kg mz.	5 kg mz.	37.50	31.25	20
plough set	40 kg mz.	48 kg mz.	250	300	270
leaves fed	3 kg mz.	5 kg mz.	18.75	26.25	20
leaves for	1 kg mz.	1 kg mz.	6.25	6.25	10
bark for	3 kg mz.	7.2 kg mz.	18.75	45	25
family	18 kg mz.	-	112.50	-	75 (10 hrs.)
family	5 kg rice	-	75	-	50 (10 hrs.)

Note: 1 kg rice was worth Nrs.15/kg and 1 kg maize Nrs.6.25/kg in the community.

B8. Sustainability of stocks and flows

Table B6 presents the results of the PRA sustainability analysis of forest stocks and flows. The positive view of sustainability with CF contrasts strongly with the negative views of stocks and flows in the without CF situation, i.e. assuming a continuation of national forests. The improvement in forest condition is ascribed to forest fire and grazing controls as well as planting. Before CF, outsiders were harvesting a considerable share of production; one group thought that up to half the firewood was taken by outsiders. Other observations are the increase in tree planting on private land (perhaps doubled) and that livestock numbers may have increased overall due to the population increase but fallen per household.

Table B6. Perceptions of sustainability in Mainhakhop Giddyakhop FUG

A. WITH COMMUNITY FORESTRY	*6 years ago*	*Present*	*6 years' time*
Forest area: 1st group key informants	8	10	10
Forest area: 2nd group key informants	10	10	10
Forest condition: 1st group	8	10	15
Forest condition: 2nd group	6	10	13
Forest products: 1st group	12	10	9
Firewood: 1st group	14 inc. 8 outsiders	10	11
Firewood: 2nd group	12	10	10
Population: 1st group	11 inc. 4 outsiders	10	12
Population: 2nd group	7 exclud. outsiders	10	13
Number of trees on private land: 1st group	5	10	12
Livestock: 1st group	9	10	12
B. WITHOUT COMMUNITY FORESTRY			
Forest condition: 1st group	13	10	7
Forest products: 1st group	12	10	7
Firewood: 1st group	11 inc. 5 outsiders	10 inc. 5 outsiders	11 inc. 6 outsiders

B9. Returns to stakeholder groups

Table B7 presents the financial returns to the stakeholder groups. It shows that, as in Dumre Sanne, the poorer group was benefiting least from CF at present; this is largely because they are landless. About two thirds of their gross value came from the sale or consumption of firewood. However about 8% of this was paid back as license money to the FUG. The richer group, with more land and livestock (average 6 cattle and 8 goats), was benefiting more. About 40% of their gross value came from grazing.

These 'richer' households, still relatively poor compared to other FUGs, were highly dependent on forest resources; with more livestock and farmland per family, they also took out more products when it was a national forest. Therefore their net loss from the introduction of CF was the highest of the three stakeholder groups.

Conversely the landless were not able to benefit much from national forests, and have in fact received some benefit from CF due to the firewood concession. Therefore, in net terms, the poorer group has fared better than the other groups. However this should not distract from the fact that currently they benefit least from CF. What is also noticeable is the very low returns to labour; this appears to confirm that in general the poorer households had a much lower labour opportunity cost, and were forced into activities with lower labour returns than the other groups.

Table B7. Summary of returns to Mainhakhop Giddyakhop FUG
(range assuming 15% over or underestimation of prices)

Gross margin per household (hh) with and before community forestry (CF)	*Poorer group Nrs.000*	*Middle group Nrs.000*	*Richer group Nrs.000*
Gross margin per hh. with CF	9.3 - 12.8	10.3 - 14.1	13.9 - 18.9
Gross margin per hh. before CF	7.1 - 9.6	13.9 - 18.9	18.9 - 25.9
Net gain/loss per hh. from CF	2.2 - 3.2	(3.6) - (4.8)	(5.0) - (7.0)
Other indicators:	*Nrs.*	*Nrs.*	*Nrs.*
Gross margin per person day with CF	37 - 50	68 - 92	63 - 86
Benefit:cost ratio with CF	0.7	1.2	1.1

Table B8 confirms that the richer group is benefiting proportionately more than the other stakeholders in Mainhakhop Giddyakhop.

Table B8. Share of forest wealth from Mainhakhop Giddyakhop CF

	Poorer group	*Middle group*	*Richer group*
% share of households	14%	30%	56%
% share of forest wealth (gross value)	11%	26%	63%

B10. Data feedback

The data feedback exercise proved rather less satisfactory than with Dumre Sanne FUG. The numeracy problems were even greater in Mainhakhop Giddyakhop. Setting out the calculations with a group which included some people not in the original exercise resulted in a lot of discussion about the numbers used and most of the time was spent in modifying and recalculating the numbers, which was not particularly helpful and was not the objective of the feedback exercise. What this showed was the limitation of this feedback approach in comparison with a more participatory calculation in the first place, and where the team's objectives in the feedback were not sufficiently clear for them to achieve a satisfactory dialogue.

CASE STUDY C: BHADUARE AND CHULI DADA FOREST USER GROUPS

C1. Introduction

Bhaduare and Chuli Dada community forests are two almost contiguous forests belonging to the inhabitants of Musankhel village, which comes under Basantapur Village Development Committee (VDC). Each CF has a FUG, but most (64% or 28 households) of the FUG members (59 combining the two FUGs) were common to both FUGs. Therefore, we took the two CFs and their users together in this case study. They were predominantly from higher caste Brahmin and Chetre groups.

Bhaduare CF is mainly composed of a naturally regenerating *utis* forest (*Alnus nepalensis)* of 7.5 ha. It was heavily denuded about 25 years ago due to tenurial conflict among the villagers. The legal battle over ownership of the forest reached the Supreme Court. The latter assigned communal rights of the land to the adjoining villagers. Then the villagers informally formed a committee to protect and regulate use of the forest. The present CF is thus the outcome of the protection activities initiated well before the official CF recognition in 1994.

Chuli Dada CF is another small forest (5.4 ha) of mixed pine and broadleaf species. The forest was highly degraded before it was handed over to 43 households organized into the Chuli Dada FUG in 1992. Subsequently, it was planted with *Pinus roxburghii* (chir pine). Other broadleaf species such as *utis*, *Mauha* and *Chilaune* were naturally regenerating. The households of both FUGs also have a large number of trees on their private land, mainly fodder trees and bamboos planted on the terraced *bari* (rainfed) land.

Table C1. Basic Information on Bhaduare and Chuli Dada FUGs

Name of CF	*Area (ha)*	*Households*	*Committee members*	*Year established*	*Forest type*
Bhaduare	7.54	44	11	1992	*Alnus nepalensis (utis*)
Chuli Dada	5.40	43	11	1992	Mixed pine and broad leaved species

Source: NUKCFP Dhankuta, 1998

C2. Wealth ranking

The 30 or so attendees on the first day of fieldwork were divided into three stakeholder groups by the FUG Committee members present, according to criteria decided by the participants in the absence of a prior study. A 'rich' household was defined as one (a) with more than 2 ha of private land in the village; (b) with other private land in the *Terai* lowland area of Nepal; (c) which had someone in permanent off-farm employment; and (d) which sold surplus grain in most years. A middle income household was defined as one with (a) 1-2 ha of private land; (b) some off-farm employment; and (c) which was normally self-sufficient in food production. A poor household was defined as one with (a) less than 1 ha of private land; (b) which was not self-sufficient in food production; and (c) relied on on-farm employment for part of the year. The results are presented in Table C2.

Table C2: Wealth ranking in Bhaduare and Chuli Dada FUGs

Stakeholder group	*Total number of households*	*Percentage of households*	*No. households present*
Poorer group	34	58	17
Middle group	16	27	11
Richer group	9	15	5
Total	59	100	33

C3. Ranking and scoring of livelihood activities

Following the participatory map of forest product flows before and with CF, livelihood activities were ranked and scored with stones. Table C3 shows that for the poorer and middle-wealth households, upland (*bari*) farming was the most important livelihood strategy, while for the wealthier households, animal husbandry (buffalo and cattle) husbandry was ranked first. This reflects the higher capital outlay involved. Fuelwood collection was an important activity for the middle and poorer groups, but not for the richer group. This may be due to the fact that 'rich' households have more trees on their farms, from where they may be drawing a higher proportion of their fuelwood requirement. Remittance from foreign jobs was an important source of income for the richer households, while pig farming (by lower caste households), casual wage labour, shop and cardamon sales, and weaving constituted important sources of income for the poorer households. Goat farming, vegetable and milk sales were the main income sources of for the 'middle' group.

Table C3. Ranking and scoring of livelihood activities in Bhaduare and Chuli Dada FUGs

	Poorer group		*Middle group*		*Richer group*	
Activity	*Rank*	*Score (%)*	*Rank*	*Score (%)*	*Rank*	*Score (%)*
Upland farming	1	20	1	20	2	13
Lowland farming	2	19	5	10	5	10
Livestock (buff./cattle) production	3	18	3	12	1	14
Goat production	8	6	3	12		
Pig production	5	8				
Fuelwood collection	4	12	2	14		
Foreign remissions	10	2	10	2	2	13
Off-farm employment			10	2		
Sale of vegetables			8	6	7	6
Sale of milk/goats			6	8		
Shop	10	2	10	2		
Priest			9	4	11	5
Wage labour	5	8			7	6
Reciprocal labour			6	8		
Weaving	5	8			11	5
Cardamom sales (one person)	8	6				
Other forest benefits					2	13
Skilled labour					6	8
Pension					7	6
Timber sawing					7	6

C4. Ranking and scoring of Bhaduare and Chuli Dada CF benefits

From Table C4, we can observer that for the poorer and middle-wealth groups, subsistence forest products such as fuelwood, (fodder) grass and thatch grass were the most valued forest products, while for the richer group, less tangible values like 'social benefits', 'participation and awareness' and soil conservation were regarded as the main benefits. However it was apparent that some fairly dominant committee members in the richer group influenced the scoring.

Table C4: Ranking and scoring of forest benefits from Bhaduare and Chuli Dada CF

	Poorer group		*Medium group*		*Richer group*	
Benefit	*Rank*	*Score (%)*	*Rank*	*Score (%)*	*Rank*	*Score (%)*
Fuelwood	1	27	1	22	9	5
Broom Grass	5	11				
Thatch grass	4	14	2	16	4	11
Grazing	6	6	6	6	7	8
Leaf litter	3	16	4	8		
Grass	2	22	3	10		
Tree fodder			6	6	6	8
Cardamom			6	6	5	11
Soil conservation			6	6	2	16
Spirit control			4	8		
Social benefits			10	4	1	29
Participation/awareness					3	12
Livestock						
FUG Fund	6	6				

C5. Disadvantages or costs of community forestry

The participants mentioned the following costs or disadvantages of CF:

- the poorer group said that they are facing increased difficulties in grazing and collecting fuelwood due to the restrictions imposed by the FUG. They also mentioned that the population of wild animals, which attack crops, goats and poultry, have increased
- the middle group listed cash penalties if the members do not participate in FUG workdays and meetings or when livestock enter the forest, and fuelwood collection limitations as most restricting

- the richer households (strongly influenced by the committee members present) said they were overloaded with FUGC activities. The problem of wild animals eating crops was also mentioned

C6. Unit values from key informant workshop

The key informant workshop took place at Basantpour Range Post. In this case there was one mixed gender group of 12 key informants. Rather than using the barter game, which gave mixed results in the first two cases studies, and in view of the better numeracy and literacy, the key informants were asked for their farmgate willingness to pay in cash and kind (bags of maize). The results are presented in Table C5. Subsequent discussion led to slightly modified prices in the study for ground grass (Nrs.32 per *bhari*) and leaf litter (Nrs.16 per *bhari*).

Table C5. Values of forest products for Bhaduare and Chuli Dada FUGs
(per *bhari* unless otherwise stated)

Product	***Nrs. per unit***
Fuelwood	40
Tree fodder	40
Ground grass/broom grass	40
Thatching grass	60
Leaf litter	20
Sawn timber - alder (*utis*)	108 per cubic feet
Sawn timber - *chilaune*	132 per cubic feet
Large poles - *chilaune*	192 per pole (length 12 feet)
Small pole - alder (*utis*)	25 per pole (girth one ft, length 8 ft)

C7. Sustainability of stocks and flows

Table C6 presents the outcome of the PRA sustainability exercise. The key informants felt that while the forest area was unchanged, the forest condition in terms of density and crown cover had substantially improved and would continue to improve in spite of an increase in people and livestock. However grazing and fuelwood availability could halve over the next six years.

Table C6. Perceptions of sustainability in Bhaduare and Chuli Dada FUGs

	Six years ago	*Present day*	*Six years' time*
Forest area:			
Bhaduare	10	10	10
Chuli Dada	10	10	9
Forest condition:			
Bhaduare	6	10	15
Chuli Dada	1	10	20
Human Population	8	10	12
Livestock population	12	10	10
Grazing opportunities	20	10	5
Fuelwood availability			
With CF	10	10	5
Without CF	5	10	5

C8. Returns to stakeholder groups

Table C7 shows that the poorer group was extracting less value from the forest than the rich and medium group, which received a roughly similar value from the forest. The values for Bhaduare and Chuli Dada are much less than the previous two case studies; this can be attributed to a lower dependency on CF, due to the better alternative livelihood options and greater importance of trees on private land - for all three groups, the value of forest products derived from their own land was greater than the value coming from the two CFs. Thus we can conclude that these FUGs are less dependent on the CF resource than Dumre Sanne and Mainhakhop Giddyakhop FUGs.

Table C7. Summary of returns to Bhaduare and Chuli Dada FUGs
(range assuming 15% over or underestimation of prices)

Gross margin per household (hh) with and before community forestry (CF)	*Poorer group Nrs.000*	*Middle group Nrs.000*	*Richer group Nrs.000*
Gross margin per hh. with CF	3,337 - 4,520	4,385 - 5,951	4,203 - 5,710
Gross margin per hh. before CF	6,925 - 9,370	5,961 - 8,065	5,569 - 7,534
Net gain/loss per hh. from CF	(3,588) - (4,849)	(1,576 - 2,114)	(1,365) - (1,824)
Other indicators:	*Nrs.*	*Nrs.*	*Nrs.*
Gross margin per person day with CF	67 - 91	64 - 87	71 - 96
Benefit:cost ratio with CF	1.0	0.9 - 1.0	1.1

The poorer group also extracted more before CF while the richer group extracted least, although the absolute differences were small. This resulted in the poorer group being the main losers as a result of the transition to CF. The richer group fared marginally best in terms of the 'gross' Benefit:cost ratio of CF, while the middle group fared best in terms of the 'net' equity effect of CF. Table C8 also shows that the large poorer group received less than a proportionately equal share of forest wealth, and that the middle group appeared to be doing best.

Table C8. Share of forest wealth from Bhaduare and Chuli Dada CFs

	Poorer group	*Middle group*	*Richer group*
% share of households	58%	27%	15%
% share of forest wealth (gross value)	51%	32%	17%

Finally it is worth noting that Bhaduare FUG planted Cardamom (*Alainchi)* in two blocks of the forest during 1994 and 1996 covering a little under 5 ha. Subsequently the cardamon areas were leased out to two FUG members for periods of 10 and five years following a bidding process. Other FUG members benefit from the concession fees paid into the FUG fund. If a more equitable approach to cardamon production and marketing

could be developed, average financial returns would be increased. There could be a case here for the FUG to grant the cardamon concession to the poorer families as a group, although there would be the difficulty of deciding who should be in the poorer group, and changes in the poor group status over time.

C9. Report-back

In the report back, we presented the results to about 50 people, and explained how the figures were derived, using visual materials and drawings as far as possible. But it was noted that most users, including the women and poorer people, were literate enough to understand what was written on the large brown paper. A discussion ensued about the quantity of fodder and grass collected, especially as stated by the poor key informant group. The discrepancy was that poorer households had included a type of weed eaten by goats. The users were encouraged to ask questions about the study in smaller sub-groups of 15-20 people. They seemed generally happy with the exercise and that it could contribute to improving equity in the FUG. The FUGC members present made a commitment that it would be further discussed in the Annual Assembly.

CASE STUDY D: PATLE PANGSINGH FOREST USER GROUP

D1. Introduction

Patle Pangsingh CF is mainly a pine forest of 40 ha composed of *Pinus roxburghii* (*chir* pine), but also including other hardwoods such as *Castanopsis spp.* (patle katus), *Alnus nepalensis* (utis), and *Schima wallichii* (*chilaune*). The FUG comprised 180 households. Once again most FUG members also used other CFs, in this case Pancha Kanya, Sildhunga and Hadikharka CFs.

The forest had become rather degraded before it was assigned to the FUG in 1990. In 1991, the FUG started planting *chir* pine, and in 1992 some broom grass was planted. In this case the methodology used in the previous case studies was modified and minimised with the prime intention of enabling the key informant stakeholder group representatives to make the financial flow calculations themselves.

D2. Information gathered from general meeting

The initial meeting was attended by about 50 FUG members, of which about 10 were women. Following introductions and the usual preliminaries, the men and women divided to prepare maps of forest product flows before and after CF. The maps helped identify the range of CF products harvested. Thence several pieces of information, which in the previous case studies were derived from the key informants, were generated:

- the unit values of forest products, and the opportunity cost of labour

- FUG payments, hired labour and other cash costs associated with forest product extraction, processing and marketing
- current transaction costs (days in FUG work, meetings, etc.)
- cost and economic life of tools
- off-farm income earning opportunities

These data were common to the three stakeholder groups. Table D1 presents the unit values of various forest products and the opportunity cost of labour agreed in an open discussion. The values derived were similar to the other case studies. Male hired labour rates were reported to be slightly higher than female rates.

Table D1: Values of forest products and family labour for Patle Pangsingh FUG

Forest Products and labour	*Nrs./unit*
Fuelwood (dry)	40/bhari
Fuelwood (green)	20/bhari
Tree fodder	40/bhari
Ground grass	30/bhari
Thatching grass	50/bhari
Leaf litter	10/bhari
Sawn timber - pine	96/cubic foot
Sawn timber - utis	96/cubic foot
Broom grass	40/bhari
Leaves to make plates	2/bundle
Wage labour (male)	100/day – agricultural peak season
Wage labour (male	75/day – agricultural off-peak season
Wage labour (female)	80/day – agricultural peak season
Wage labour (female)	60/day – agricultural off-peak season

D3. Wealth ranking

At the end of the general meeting, the 50 households were divided by the FUGC members present into the normal three stakeholder groups based on the ownership of private land (both in this area and in the lowland *Terai*) and income from off-farm activities.

D4. Ranking of livelihood activities

The following observations can be made from Table D2:

- fuelwood was valued more highly by the poorer and middle groups
- timber (both pine and *utis*) was most important for the middle group
- the richer group ranked soil conservation second (equal) and also placed a value on water

Table D2. Ranking and scoring of forest benefits from Patle Pangsingh CF

	Poorer group		*Middle group*		*Richer group*	
	Rank	*Score (%)*	*Rank*	*Score (%)*	*Rank*	*Score (%)*
Fuelwood	1	28	2	26	2	10
Ground grass	2	26	3	14	1	20
Thatching grass	3	14	5	6	6	6
Leaf litter	7	5	4	10	6	6
Timber	4	9	1	32	2	10
Broom grass	5	7	6	4	9	4
Leaves to make plates	5	7	8	2	2	10
Resin					9	4
Water			8	2	6	6
Environmental Conservation			6	4	2	10
Social Organization	7	5				

D5. Calculation of financial returns

The key informants of the three stakeholder groups came to Chuli Ban Range Post in the nearby village of Kagate at 7 a.m. on the following morning. Using large sheets of paper and pictures or physical representations of each product, each key informant stakeholder group calculated the gross value and gross margin before and after CF. Stones of different sizes (to represent units, tens and hundreds) and maize grains were used to show the quantities, prices and values of the forest products. They then calculated the net gain or loss from CF by deducting the gross margin of the forest before CF from the gross margin of the forest with CF. Each group then presented its calculations in a general key informant meeting.

Table D3 presents the financial returns of the three stakeholder groups. As with Bhaduare and Chuli Dada, the values involved are much lower than in the first two case studies; this reflects a more favourable set of livelihood alternatives, many of them off-farm, and a lower dependence on CF (although the data here does not include forest products derived from other community forests). It shows an advantage to the richer group in terms of both the gross and net effect of CF. The richer group is again extracting more forest products than the other groups, although in this case the poorer households may be extracting more than the middle wealth group (however it can be noted that the poorer group had a lower gross margin per person day and BCR than the middle group). A second major observation is that the middle and poorer groups were extracting much more from the Patle Pangsingh forest when it was a national forest; this results in a large net loss from CF for these groups, while the richer group experienced a net gain from CF.

Table D3. Summary of returns to Patle Pangsingh FUG
(range assuming 15% over or underestimation of prices)

Gross margin per household (hh) with and before community forestry (CF)	*Poorer group Nrs.000*	*Middle group Nrs.000*	*Richer group Nrs.000*
Gross margin per hh. with CF	642 - 872	507 - 736	870 - 1,314
Gross margin per hh. before CF	2,167 - 2,932	2,699 - 3,651	172 - 235
Net gain/loss per hh. from CF	(1,525) - (2060)	(2,192) - (2,915)	698 - 1079
Other indicators:	*Nrs.*	*Nrs.*	*Nrs.*
Gross margin per person day with CF	51 - 69	55 - 80	62 - 93
Benefit:cost ratio with CF	0.8	0.8 - 0.9	1.0

Table D4 confirms this general picture. The richer households are gaining a relatively much higher proportion of the forest wealth from Patle Pangsingh than the other stakeholder groups. The discussion at the end of the exercise revealed that the richer group were quite concerned with the net margin calculated by the poorer groups. They said that this made it clear to them that not all households benefit equally from CF.

Table D4. Share of forest wealth from Patle Pangsingh CF

	Poorer group	*Middle group*	*Richer group*
% share of households	22%	33%	44%
% share of forest wealth (gross value)	16%	23%	61%