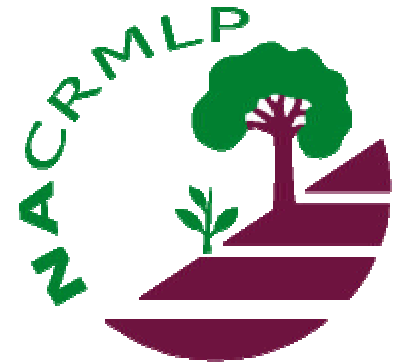


NEPAL AUSTRALIA COMMUNITY
RESOURCE MANAGEMENT AND
LIVELIHOODS PROJECT

Marketing of Timber Products from Pine
Plantations



Prepared for

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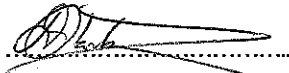
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Acronyms

Cu ft	Cubic feet
DFO	District Forest Officer/District Forest Offices
FECOFUN	Federation of Community Forestry Users of Nepal
FOB	Free On Board
FUG	Forest User Group
HMGN	His Majesty's Government of Nepal
IRR	Internal Rate of Return
NACRMLP	Nepal-Australia Community Resource Management and Livelihoods Project
NGO	Non Government Organisation
NRM	Natural Resource Management
NTFP	Non Timber Forest Product
NZ	New Zealand
TOR	Terms of Reference
VAT	Value Added Tax

Summary

This study examines the scope for marketing of timber from community pine plantations established as part of Nepal-Australia forestry projects that commenced in the 1970s. It draws on the experiences of two community based sawmills – the Chaubas sawmill in Kabhre Palanchok and the Shree Chhap sawmill in Sindhu Palchok. The study also analysed markets for timber from the plantations and the scope for expanding sales. Recommendations are made to guide future project activities of NACRMLP.

The Chaubas sawmill was established seven years ago and is operated by four FUGs with another FUG supplying logs. The Shree Chhap sawmill was established around 18 months ago and is operated by a single FUG with other FUGs supplying logs to it.

It is concluded from the analysis of the performance of the Chaubas and Shree Chhap sawmills and estimated costs and returns from sawmilling based on prevailing market conditions that the ability of community based sawmills to provide long term net financial and economic benefits is uncertain. It is suggested that economic and financial returns from log sales are likely to be greater than those from community based sawmilling. In particular, the estimated residual log stumpage price for community based sawmilling is around Rs10-20/cu ft while that for logs sales is around Rs35/cu ft. This illustrates that community based sawmills are in fact reducing rather than adding value. Similarly, estimation of financial cash flows from community based sawmilling with a log stumpage price of Rs25/cu ft provides negative cash flows over time.

A simple economic analysis, which removes consideration of taxes and values non-market economic and social benefits as the income generated in sawmill employment, shows net economic benefits at a stumpage price of Rs25/cu ft. This implies that the value of economic and social benefits from community based sawmills is sufficient to outweigh financial losses. However, if the stumpage prices are increased to Rs40/cu ft (the government's imposed minimum royalty for pine plantation wood) the net economic flows turn negative. This implies that, at this price, the community benefits from employment are not sufficient to justify the financial losses from a sawmill. This approach is also being borne out in practice where two of the FUGs previously supplying logs to the Shree Chhap sawmill have opted to sell logs to third parties rather than to the sawmill. The economic and financial returns are also highly sensitive to relatively small changes in cost and revenue parameters indicating that sawmill investments are very risky.

These conclusions represent a considerable change from the past where community based sawmill developments have been promoted because of their potential to provide community benefits from utilisation of the maturing pine plantations. However, the two sawmills supported were initial steps and much can be learnt from their experiences. The challenge is now to create a more robust financial and economic base for utilisation of community forests. Key lessons learnt are:

- **Sawmills are a risky business.** Variability in the profits generated by the community based sawmills demonstrates that there are substantial risks associated with sawmill investments. Those risks stem from market and production issues and are borne by the local communities that have invested in and are responsible for managing the sawmills. The risk is particularly high because the community based sawmills are entirely focused on sawing

thinnings which produce lower quality timber with low prices. Other sawmills in Kathmandu that buy logs spread the risk associated with plantation pine as it generally represents only a very small proportion of their total business. For what are generally poor and reasonably remote communities, increased exposure to risk can have serious consequences, particularly in its impacts on the poorest members of these communities.

- **Communities do not have the required business and management skills.** The organisation, management and marketing of timber associated with community based sawmills is a complex business. It requires considerable expertise in technical, management and business planning. The mills have acquired technical skills from external sources. However, neither of the sawmills have business plans and many problems have been encountered in the marketing of sawn timber.
- **Outputs need to be market oriented** The activities of the sawmills have been focused largely on production. This is understandable but it has meant that the quality of the sawn timber produced has not met market requirements with the result that prices have been considerably less than expected. The sawmills have also tended to produce timber and then tried to market it. This has put them at a disadvantage in the market. There has also been a reluctance to enter into longer term contracts for fear of being treated unfairly. Related to this, reliability of supply has been a concern for many customers. As an example of the lack of market understanding, FUGs supplying the Shree Chhap sawmill were unable to achieve the price they wanted for the timber. Rather than sell it for a lower price they kept the timber which, in the meantime, deteriorated in quality. Fifteen months later it had to be sold for a much lower price. There is also a need to focus on producing dimensions of timber and grading timber to produce sizes for which the market is willing to pay a premium.
- **Cost control is vital.** An important contributing factor to the losses from the sawmills has been that actual harvesting and transport costs are much higher than originally planned. The Chaubas sawmill has been experimenting – with some success – in contracting out services to reduce costs. Sawmilling costs, once all costs are taken into account, have also been much higher than planned.

Market issues

Understanding the market is very important when considering future options for the sale of logs and timber from community pine plantations. Timber supply, demand and prices were assessed through discussion with timber brokers and sawmillers.

It is difficult to get a clear picture of potential volumes of plantation pine that will be available in coming years because of uncertainty over the actual volume of wood in plantations and uncertainty over the accessibility of forests. Nepal-Australia forestry projects have established over 22,000 ha of community plantations in Kabhre Palanchok and Sindhu Palchok. However, the quality of plantations is highly variable and there is no estate wide inventory. Data in operational plans are also highly variable. Nevertheless, as they were the only available source of information, these plans were used to estimate supplies of logs available from plantations that were judged to be accessible for harvesting. This analysis suggested that a total of around 3,200 ha were accessible and that 50,000-100,000 cu ft per annum were likely to be available from thinning operations. This is a relatively small volume but considerably more than the existing sawmill capacity. It is highly desirable that thinning occurs as many of the plantations are overstocked and thinning will improve the quality of logs available in the future.

On the demand side, the Kathmandu market is dominated by Sal, a natural forest hardwood mostly sourced from the Terai region. Over the last 5-10 years natural pine mostly from the west of Nepal has gained a foothold in the market and is estimated to account for around 25% of sales. Both Sal and natural pine are used in high value appearance and strength uses. In comparison, plantation pine is used mainly as supports for construction where it competes with much lower value timbers. Plantation pine is restricted to this end of the market as it is a much weaker timber. In addition, younger, fast grown timber is generally not used for appearance purposes. There is some furniture made from seasoned plantation pine, but only in very small quantities. Plantation pine sawn timber sells for about Rs200-250/cu ft. This compares with natural pine that sells for Rs400-500/cu ft and Sal that sells for Rs950-1200/cu ft in Kathmandu.

Future directions

Given market realities, the experiences of the Chaubas and Shree Chhap sawmills, and the conclusions that community based sawmills cannot demonstrate a capacity to generate long-term sustainable financial or economic benefits, it is proposed that NACRMLP should not advocate the development of community based sawmills. Rather, the emphasis should be on working with FUGs and the sawmill management committees to identify viable options for the future. These activities should focus on equipping local communities with the necessary skills to assess business options and decide on actions for the future. Development of entrepreneurial and business management skills will be very important.

In association with this skill development it is suggested that NACRMLP work with the two sawmills to facilitate consideration of options for the future. These options should include comparisons with returns from sales of logs. It is also recommended that they include options for involving the private sector in sawmill investment and management. The private sector has advantages because it can take on and manage risk more effectively than small communities. Involving the private sector would also provide the opportunity for business skills development and transfer. Recommended options for consideration and assessment by local communities include sale of the sawmills, tendering a contract for operation of the sawmill, joint ventures as well as relocation to a more central location. FECOFUN has also raised the option of a cooperative marketing structure for plantation pine. It is recommended that this and any other option only be considered if it can be demonstrated that it provides net benefits to communities.

Four themes for proposed project actions are recommended. These are:

- Building **competitive markets** that will assist in maximising returns from log and timber sales;
- Developing **entrepreneurial and business management skills** relevant to assessing alternative options for generating income from log and timber sales;
- Utilising **action learning and self-monitoring** to assess impacts of timber marketing activities and alternatives on the communities and the poor in particular; and
- Promoting an **enabling policy environment** for community forestry and income generation from timber sales.

In addition, it is recommended that NACRMLP can assist in addressing a number of policy issues that have adverse, implications for the utilisation of community based forests. The most

important of these is the planned 40% tax on log and timber sales outside of the local FUG areas. This tax will severely reduce benefits from utilising community forests, which will accrue to local communities. Depending on how the tax is applied, it could cause substantial losses. Implementation of the tax is likely to discourage FUGs from harvesting. This will have adverse implications for returns and for future productivity of the forests. Other policy issues to be addressed include the way in which VAT is calculated, simplifying the number of approvals required by DFOs for forest harvesting and timber production, minimum log stumpage, government restrictions on the number of trees to be removed, and business registration practices.

In conclusion, this study has identified considerable doubt over the ability of community sawmills to provide long-term sustainable economic and financial returns in their current form. The attractiveness of such investments needs to be judged by individual communities. This report sets out activities that will assist communities develop the skills to deal with these issues. It also identifies policy issues which the Project can help to address. Both of these activity streams will facilitate increased returns from utilisation of community forests.

1 Introduction

Mark Kelly, Timber Marketing Specialist (Australia), prepared this report. It forms one of a series of inputs which NACRMLP is making to encourage FUGs to take a greater interest in more active forest management and the associated utilisation of forest products, as part of the Project's overarching poverty reduction goals.

1.1 Terms of Reference

The Terms of Reference (TOR) for the Timber Marketing Specialist are provided at [Annex 1](#). These cover marketing of timber, NTFPs and the policy environment for community forestry in Nepal. The first component of the TOR, with which this report is concerned, focuses on the potential for marketing of timber products, specifically to:

- undertake an analysis of possible management structures for timber harvesting and processing operations;
- undertake an analysis of the economic parameters which indicate whether milling, value adding, or round log sales are very likely to be the best option for individual FUGs or clusters; and
- explore marketing options and systems for sawn timber from community forests.

Potential management structures for timber harvesting and processing operations should flow from the analysis of economic parameters and an assessment of the markets for logs and timber from community forests. The focus in this analysis is on the plantation forests established by earlier projects which have been supported by the Australian Government. Potential structures and future directions are considered based on an analysis of experience to date with sawmill investments and market drivers for plantation products.

1.2 Project Goals

The overall aim of NACRMLP is “to improve sustainable rural livelihoods in Nepal”. The purpose of the project is “to reduce rural poverty by developing and institutionalising equitable and sustainable community based natural resource management systems”. NACRMLP incorporates a number of components. Component 2, income generation and equity within rural communities has the objective “to develop and promote income generating activities for forest users through an action learning approach which addresses the priority concerns of the poor and marginalised”. The market analysis presented in this report addresses Project elements outlined in Component 2 to:

- develop strategies to ensure that enterprise development by FUGs is underpinned by institutional frameworks that address issues of equity and governance;
- undertake market research and develop support mechanisms for marketing and enterprise development;
- strengthen the technical expertise and management skills of FUGs so that they are better able to develop and manage commercial enterprises; and
- examine options available for the development of forest-based enterprises and work with FUGs to establish pilot enterprises.

1.3 Approach, Methodology and Outputs

The approach to this analysis has been to examine the market situation for community based timber processing developments with particular regard to pine plantations that have been established as a result of earlier projects supported by the Australian government. The market analysis is based on a supply chain approach to identify the overall supply/demand situation relevant to the production of pine timber from community forest plantations and the financial and economic returns from the sale of timber from community based forests. This included consideration of activities from the forest to final product markets in Kathmandu. Figure 1.1 (page 3) provides an outline of the supply chain analysis and key issues addressed.

Two community sawmills have been established with support from previous Nepal-Australia forestry projects. The Chaubas mill in Kabhre Palanchok was established seven years ago and the Shree Chaap mill in Sindhu Palchok was established around 18 months ago. The experience of these mills was reviewed and used as the basis for identifying returns from community sawmills. Lessons learnt from these operations were used to identify paths for the future.

Key components of the activities undertaken as part of this analysis included:

- consideration of the outcomes of investments in the two sawmills;
- analysis of the overall market demand and supply situation for potential timber outputs and consequent market opportunities; and
- preparation of options for assisting the development of income earning activities from harvesting trees in the forests.

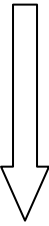
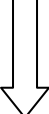

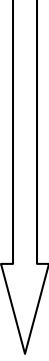
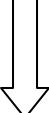

The key output from this report is the identification of activities that will deliver on the outputs identified within Component 2 of NACRMLP. These activities are proposed for implementation as part of project activities in coming years.

Chapter 2 sets out the context of timber marketing as part of NACRMLP. This includes an examination of the experiences of the development of the Chaubas and Shree Chhap sawmills. Chapter 3 examines the supply and demand situation for timber from FUGs, particularly *Pinus patula* that has been the focus of plantation activities for over 20 years. It provides an assessment of potential market opportunities and constraints.

Analysis of the key factors influencing options for development based on plantations is presented in Chapter 4. The experiences of the Chaubas and Shree Chhap sawmills together with market prices are used as the basis to estimate the financial and economic returns expected from sawmilling investments, comparisons with the returns from the sale of logs, and the implications for future development of timber processing operations.

Conclusions and recommendations from the analysis are presented in Chapter 5. These include options for marketing timber from community forests and potential management structures for such developments. This chapter also sets out suggested activities, which NACRMLP could undertake to facilitate to enhance the impacts that timber marketing could make on long-term poverty reduction.

Figure 1.1: Supply Chain Analysis

Component of supply chain	Key issues
<p>Forest plantation log production / supply</p> 	<ul style="list-style-type: none"> • Volume of logs to be produced <ul style="list-style-type: none"> – Areas, growth rates – From FUG operating plans • Planned thinning activities and timing • Policy activities and procedures influencing production <ul style="list-style-type: none"> – DFO approvals requirements – Regulations relating to sawmill location and operation – Taxes • FUG activities
<p>Harvest</p> 	<ul style="list-style-type: none"> • Volumes to be harvested • Timing of harvest activities • Planning and organisation of harvesting activities <ul style="list-style-type: none"> – Supply of labour for activities • Costs of harvesting • DFO activities and policies
<p>Transport to sawmill</p> 	<ul style="list-style-type: none"> • Costs • Means of transport • Timeliness of transport – logs left in forest/road side
<p>Sawmilling</p> 	<ul style="list-style-type: none"> • Investment costs for sawmills • Running costs including taxes • Recovery rates • Profitability • Products/outputs • Timing of production and reliability of supply • Markets and marketing • Alternative structure advantages and disadvantages <ul style="list-style-type: none"> – Chaubas cooperative structure – Shree Chhap single FUG ownership – Other management structures • Transparency of operations • Legislative base for FUGs to operate sawmill – business registrations
<p>Timber products</p> 	<ul style="list-style-type: none"> • Types of products and values • Sizing and grading activities and facilities – product quality • Stockpiling and timing issues • Role of brokers in selling of timber • Sale and marketing arrangements
<p>Transport to market</p> 	<ul style="list-style-type: none"> • Costs • Contractors • Organisation and management eg, timeliness • Location of markets
<p>Timber markets / demand</p>	<ul style="list-style-type: none"> • Size of timber market • Competitiveness of plantation pine with natural forest timbers • Uses of pine – construction, furniture • Wholesale buyers / brokers • Timber prices • Marketing arrangements eg, contracts for mills

2 Marketing Forest Products – a new phase for NACRMLP

Australian support for reforestation activities in Nepal began in the 1960s. From the mid-1970s this support was provided via a number of development assistance projects. These projects focused on reforestation of degraded land, forest protection and the development and establishment of FUGs as viable structures. Plantation establishment and management were emphasised, together with training to facilitate development of requisite skills to enable FUGs to undertake these activities. In more recent years there has been a strong focus on the development of FUGs through training. Poverty reduction has been a long-term underlying aim of all project activities.

Most of the plantations were established between the early 1980s and the early 1990s and so are now around 15-25 years old. A large proportion of the plantations are in need of thinning if growth rates are to continue and larger, more valuable logs are to be produced over the next 10-20 years. Production of logs from thinning also provides scope for income generation. At the same time, a number of FUGs have become interested in generating income from the sale of wood from their plantations. The establishment of two community based sawmills has been supported by earlier projects.

It has been suggested (Acharya et al 2001 p.15) that the development of approaches to marketing of forest products represents the third stage of development of NACRMLP. These three stages being:

- Stage 1 - development of FUGs with a focus on establishment of tree plantations, forest protection and subsistence products for households.
- Stage 2 - movement to forest management and utilisation as a basis for generating income. Support for the development of sawmills is seen as part of this stage.
- Stage 3 - increasing emphasis on investment of FUG funds generated from forest utilisation.

From the review conducted in this Project, it appears as though movement to utilisation of the community forests could only be regarded as being in the very early stages of development and that considerations relating to investment of FUG funds is also only in its infancy. Gilmour (2003) also observes this new stage of development of community forestry in Nepal. He also points out that there are many challenges associated with this stage of development.

Many of these challenges have been recognised in the design of NACRMLP which, as already pointed out, includes an emphasis on forest utilisation. This is acknowledged in various Project activities including:

- training needs for harvesting;
- planning for harvesting and timber production;
- business planning and management skills;
- distribution of income from sale of logs;
- development of sawmill operations and NTFPs; and
- ongoing development of FUGs.

2.1 Sawmill Development as part of NACRMLP

The potential for processing of plantation logs from FUGs in community based sawmills emerged as an option for future development in the mid to late 1990s. A major motivating factor appears to have been the desire to maximise employment and returns generated from log harvesting rather than simply selling logs. It appears that reports by Jackson et al (1995) and Ladley (1995) laid the basis for previous phases of Australian support in the sector, to assist the development of community based sawmills.

The construction of two sawmills – the Chaubas sawmill and the Shree Chhap sawmill – had been supported by earlier phases of the Nepal Australia projects. The Chaubas sawmill received a loan for the purchase of equipment and the establishment of the mill. The Shree Chhap sawmill received support for investment activities but investment funds for the mill were raised by the FUGs. The following provides a brief history of the experience and performance of each mill.

2.1.1 Chaubas Sawmill

The Chaubas community sawmill was constructed in 1995 and opened officially in May 1996. It is jointly owned by four FUGs: Chapani Kuwa, Faga Khola, Dharapani Hile and Rachhama. Another FUG has sold logs to the mill but has not been involved in sawmilling. The mill was established with the support of a loan from previous projects. Not all of the loan has been repaid. The mill was upgraded from a 24 inch to a 36 inch band saw with funds raised by the FUGs themselves through the sale of logs. Until July 2000 an external sawmill manager was employed – a forest ranger from the DFO staff. He was later replaced with a local high school graduate who now manages the mill. Similarly, until 1999, sawers in the mill were from outside, but local people were trained and employed in the sawmill from that time, except for the head sawyer. The mill is registered under the Cottage Industry Act as a timber processing unit.

The Chaubas sawmill was initially established with a view to producing sawn timber for local sale and to create a revolving fund for community development activities. However, it was soon realised that local demand was not sufficient to consume the quantity of timber produced and that sale to outside markets would be required.

The mill has processed a total of 59,000 cu ft and produced 28,397 cu ft of timber, a recovery rate of 48%. Of the timber produced only 1092 cu ft was sold locally with the rest being sold outside the local area to the Kathmandu valley market. Mill capacity is about 150 cu ft of round logs per day based on an 8-hour day. Total capacity based on 250 days per year is 37,500 cu ft log input or of 18,750 cu ft of sawn timber, based on 50% recovery. The sawmill generally operates a maximum of 8 months per year with harvesting occurring over 4 months in the dry season. This means that annual capacity of the mill is more realistically 20-25,000 cu ft of log input or a sawn timber output of around 10-12,000 cu ft per annum.

The bulk of timber produced was in the early years when the mill was operating closer to its capacity. However, the mill has operated in only 5 of the 7 years since its construction. In the last year, only 7,000 cu ft of timber were produced and this has not yet been sold. The cessation of production for two years was, apparently, due to policies implemented by the DFO and security issues. In relation to the former, restriction on cutting of green trees, imposed by His Majesty's Government of Nepal (HMG/N) was the basis for stopping the harvesting of trees. However, it is now clear that this law is not applicable to FUG forests in the mid-hills.

It is difficult to get precise figures on the profitability of the mill but it seems that the early years of operation were more profitable than the recent years in which the mill has either made a loss or broken even. It appears that the mill has only made a profit in two of the five years in which it has operated. In more recent times profitability was adversely affected by increasing harvesting and transporting costs for logs and by lower timber prices. The security situation has also adversely impacted on sales and the general operating environment. A meeting with the sawmill committee and FUG representatives indicated that, for the recently completed fiscal year, the sawmill 'broke even' although the mill is currently holding 7,000 cu ft of sawn timber that it has not sold. The representatives also expressed concern that the mill was likely to make a loss in the coming financial year.

Acharya et al (2001) identified that the development of the Chaubas sawmill was part of an evolutionary process of FUGs. There is further evidence to suggest that the sawmill committee and FUGs involved in the mill are beginning to consider financial plans for the sawmill. Acharya also points out that the mill has returned a substantial increase in income for the FUGs involved. However, the analysis does not consider net income and relative benefits of the sawmill compared with log sales. For instance, much of the income derived is due to log sales to the sawmill which could have been generated simply by log sales to another party, and net income from the sawmill appears to be very small. These issues are considered later as part of a general discussion of the relative returns from sawmilling compared with log sales.

Another commonly cited factor as a major benefit of sawmills is the potential to utilise sawmill residues for local uses in building and furniture manufacture and for fuelwood. As noted above, the volume of timber sales to local communities has been small. In addition, the sale of fuelwood from the sawmill has only been at low prices and the local community has not been able to absorb all available firewood. In particular, logs below 16" girth felled as part of thinning operations are left in the forest. While it would be beneficial if this timber could be sold, this practice is consistent with forest management plans to produce higher quality sawlogs in the future.

A key factor motivating investment by the FUGs involved in the Chaubas sawmill was the potential to generate surplus income for investment in community development activities. While there have been some surpluses, there have also been losses. More consideration is required as to whether the Chaubas sawmill represents a long term viable business. Notwithstanding that consideration, as Acharya (1998) points out, there is also a need to improve the transparency of account keeping and for wider involvement in identifying priorities for investing surplus funds. For instance, the Chaubas sawmill re-invested some of its surplus funds in a local school, a decision that appears not to have been subject to adequate consideration by all relevant parties.

2.1.2 Shree Chhap Sawmill

The Shree Chhap sawmill was constructed around 2 years ago and commenced operation around 18 months ago. The motivation for the sawmill came from the desire to generate income for poor communities in the local area. Following a tour of sawmilling operations in the western areas of Nepal, the FUG members developed ambitions to have a sawmill in their own area. A proposal was developed and it was decided at the General Assembly of the FUG to proceed. The mill was financed by the FUG's own funds that had been generated from the sale of logs and with some assistance from the previous Nepal-Australia forestry project in the form of training and some associated capital expenses. It seems that no detailed feasibility study or

business plan was completed prior to investment in the mill. The mill was established by two FUGs but one later withdrew. The mill has processed logs from two surrounding FUGs on a contractual basis. Since its establishment, the mill has processed a total of 18,300 cu ft of logs. This includes around 3,800 cu ft from the mill's own FUG with the remainder coming from surrounding FUGs, Gaurati (8,000 cu ft) and Lampati (6,000 cu ft). Where contract sawing has been undertaken this has been on the basis that the FUGs were themselves responsible for delivery of logs and sale of the sawn timber product.

While the financial performance of the Shree Chhap sawmill itself appears to have provided a positive income to the owning FUG, it has caused the Gaurati and Lampati FUGs to lose money. It appears that the major contributing factors to the losses incurred were:

- **Harvesting and transport costs were much higher than planned.** As the FUG's forests were located further from the sawmill and transport of logs was by hand, the costs of delivered logs was much higher than expected. Cost of Rs35-40/cu ft were reported.
- **Recovery rates were low.** A total of 8,000 cu ft of logs from Gaurati produced only 3,200 cu ft of sawn timber – a recovery rate of 40%. In the case of Lampati 6,000 cu ft of logs produced only 2,200 cu ft – a recovery rate of 37%.
- **Most importantly, the timber produced was not sold until a long time after it was produced.** This was because the FUGs found it difficult to find buyers. When it was eventually sold, some 15 months after production, the timber had deteriorated in quality and only very low prices of about Rs100-150/cu ft were received. It should also be noted that the quality of the timber sold was influenced by the need to transport logs by hand which meant that logs were generally cut to a maximum of 6 feet in length which constrained the length of timber produced and so reduced prices received. Larger girth logs were also split down the middle. This severely restricted the recovery rate of timber.

However, when the Shree Chhap mill utilised its own forest, the cost of logs delivered to the mill was considerably lower because of the proximity of the forest. In addition, at that time, the timber market was more buoyant and the price received for the timber was considerably higher – Rs 250/cu ft delivered in Kathmandu or the equivalent of Rs220/cu ft at the sawmill gate. For contract sawing for other FUGs, the sawmill charged Rs18/cu ft which was only sufficient to cover marginal operation costs. Actual costs of sawing are considerably higher.

It should also be noted that in the case of the Lampati FUG, the decision to have the mill process logs was influenced by a directive from the DFO that the logs should be sent to the sawmill. This followed one unsuccessful call for tenders for logs where no bids were received. Following that tender a second notice for bids was made but on the last day before bids were due to close the DFO issued the directive that all logs should be sent to the sawmill.

The Gaurati and Lampati FUGs have since decided that they no longer want to sell sawn timber and will, in the future, look to sell logs. The committee members at Gaurati have also changed and it has decided not to proceed with any log sales pending considerations relating to the proposed 40% tax on income from sales of timber products.

Future plans for the Shree Chhap mill are not clear. The Chairman of the Sawmill Management Committee indicated that the mill was going to concentrate on sawing logs from its own forests, but it was not clear what volume would be available from those forests or whether this would be sufficient for economic operation of the mill.

2.2 Lessons Learnt

The development of the Chaubas and Shree Chhap sawmills provides valuable experience for possible future development of sawmills based on community forests. Key lessons identified are:

- **Running a sawmill requires careful business planning with specialist skills both in production as well as marketing.** This includes financial planning and reporting. These skills take time to develop and both sawmills appear to have suffered from a lack of experience in these areas. Understanding market demand is part of these skills and is vital to the success of sawmill operations. In particular, mills need to understand the end uses of timber and ensure that its output matches requirements for those markets. There is a need to generate increased demand so that the sawmills are not reliant on only one or two buyers as has occurred to date. At the moment it appears as though only one sawmill is purchasing sawn timber but interviews with sawmills in Kathmandu suggested there is scope to expand the number of customers. This is despite plantation pine timber not being highly regarded in the market.
- **Focus on quality of output.** Ensuring that sawmill outputs are of the best possible quality standard is also part of marketing skills. The limited understanding of the existing sawmill managers in these areas is illustrated in the lack of focus on quality. In both sawmills timber is not graded or dried, which reduces the overall price received. There is scope for grading of timber into larger and smaller pieces for sale at different prices to add value to the output of community sawmills.
- **Harvesting and transport costs need careful management.** As already noted, increases in harvesting and transport costs have had a significant adverse impact on the profitability of community sawmills. The Chaubas sawmill has had some success in reducing costs by contracting some activities to FUGs rather than directly employing labourers.
- **Policies can have an important influence on the viability of processing operations.** There is a range of issues that can impact negatively on sawmill operations including cumbersome approval processes, national forest policies designed to protect natural forests being applied unnecessarily to plantations, and taxation issues. These issues are discussed in Section 4.4. There is a need to ensure that the Government and DFOs are aware of the implications of forest sector policies on community forest operations.
- **Timber marketing is more effective if done by the sawmill.** The experience at Shree Chhap where FUGs took responsibility for selling their own timber was that this was not successful. Marketing requires specific skills and the sawmill is in the best position to develop market relationships and understanding.
- **There is need for greater clarity of how the profits from sawmills are distributed** This should be part of the sawmill business plan and endorsed by all relevant parties. Both sawmills have expressed interest in using profits from sawmilling for community development. For example, at Chaubas, an investment was made in the local school. However, there is a need to ensure that any such decisions are subject to democratic consideration by the FUGs that have contributed to the sawmill operation.

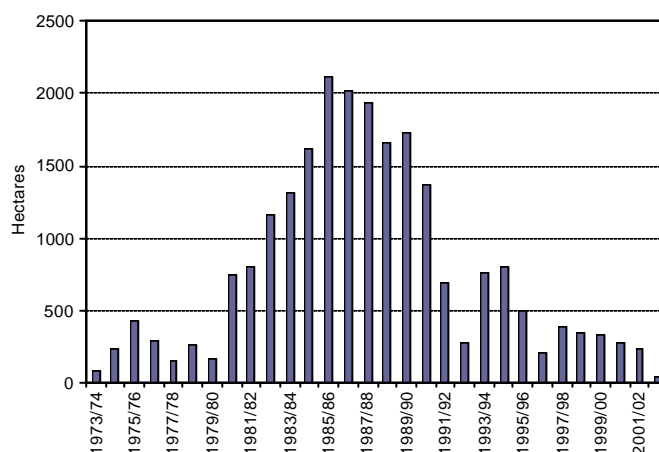
3 Supply, Demand and Prices for Plantation Timber

3.1 Potential Timber Supply from FUG Pine Plantations

Understanding the potential volume of timber that could become available from pine plantations is important when assessing the capacity of sawmills required for processing and the potential for additional volume to impact on the existing market.

It is commonly stated that around 22,000 ha of pine forests have been established by earlier Nepal-Australia forestry projects that were commenced in the 1970s in Kabhre Palanchok and Sindu Palchok. Figure 3.1 shows the age class distribution of the forests established. Standard silvicultural prescriptions for pine plantations have included heavy initial stocking with thinning to around 1,100 stems/ha commencing at year 10. Subsequent thinnings in later years should gradually reduce stocking to around 150 stems/ha at final clear fall. This should be at no more than 40 years for *P. patula* and 50 years for *P. roxburghii*. The implication of standard silvicultural prescriptions is that most of the forests planted under Nepal-Australia forestry projects would be ready for final harvest between 2020-2030.

Figure 3.1: Age Class Distribution of Pine Plantations Established by Nepal-Australia Forestry Projects



Source: Collett et al (1996), NACRMLP project records

Practical management of the forests has varied considerably from standard management prescriptions. In particular, thinning has generally not occurred and account is not taken of different site qualities, which produce different growth rates due to soil type and other biophysical characteristics. While this means that the forests generally have not been managed optimally (at least in classical silvicultural terms), it also provides an opportunity, as outlined in Dangal and Arentz (2002), to introduce different management strategies. These different management strategies could be implemented to stagger the final harvest to both minimise potential adverse environmental impacts from clear felling operations and to provide more regular woodflows to the market. In the words of Dangal and Arentz (*ibid.*), the aim of such a plantation management strategy would be to develop a plantation estate “with a mosaic of ages spanning a complete rotation of the crop”.

In developing possible plantation management strategies there are a number of constraints that need to be dealt with in considering sustainable woodflows and the associated capacity for sustainable income generation. These constraints include:

- **Difficulties in identifying plantation areas and volumes.** It is difficult to get a definitive picture of plantation areas and the potential supply of wood that could be derived from forests managed by FUGs in NACRMLP areas. This is because there has not been any systematic inventory of forests managed by FUGs. In addition, as noted above, the plantations have not been managed according to silvicultural prescriptions for wood production and there is considerable variation in the quality of plantations. The condition of plantations is related to differences in site quality that are not well understood for the plantation areas. Similarly, it is not clear how much of the 22,000 ha of plantations reported as established to date continue to survive as commercially viable resources. This is recognised by Dangal and Arentz (*ibid.*), who suggest the need for a rapid assessment of forests to identify forest condition, soil productivity and area.
- **Uncertainties in operational plans developed by FUGs.** For FUGs to be active they must have an operational plan that sets out management approaches and activities for the forests concerned. This includes any plans for harvesting and thinning operations including wood that will be produced. The operational plans are subject to the approval of DFOs. The plans generally cover a 3-5 year period and there is currently a considerable backlog in producing up-to-date plans.

The quality and consistency of information in the operational plans is unclear. As part of this study, a review of selected operational plans was undertaken to identify, for relevant FUGs, the areas of forest planned for thinning, and volumes that were to be produced in areas judged to be accessible over the next five years. These data are presented in Table 3.1. The review indicated that there was considerable variation in the scope and quality of information presented in the plans. Uncertainty over volumes identified in the plans was echoed in discussions with one FUG associated with the Chaubas sawmill that indicated when thinning commenced volumes produced were much lower than those set out in the operational plan. Discussion with FUG members in Gautari also indicated widespread lack of knowledge or understanding of operational plans.

- **Remoteness of some plantation areas.** It appears that many of the plantations have been established in areas that are not readily accessible. This limits the ability for commercial harvesting operations. For example, Chaubas is considered an accessible forest but logs and timber must be transported by hand across a suspension bridge with associated costs. It appears as though many other forests are considerably more remote and this will make it difficult to successfully market wood products from these forests. From the analysis of areas and woodflows in operational plans it was estimated that only 1,850 ha in Kabhre Palanchok and 1,373 ha in Sindhu Palchok were identified as accessible forests for timber marketing. This raises very important issues for NACRMLP about management and potential production of timber products from those forests that are not readily accessible¹.
- **Coordination of individual FUGs.** The timing of harvesting is important to ensuring that logs delivered to sawmills are consistent with production and marketing capacities. However, forests are managed by separate FUGs that can have different objectives and priorities. A degree of coordination across FUGs is therefore required to ensure efficient sawmill operation. It is also expected that equity issues will be important in timing of woodflows. In the case of the Chaubas sawmill this appears to have been effectively

¹ It should be noted that judgements regarding accessibility were made by Project staff and are subjective.

managed by the four FUGs cooperating in management of the sawmill. The FUGs appear to be happy with the management to date. This also includes another FUG that supplies logs to the mill but is not an owner. It is more difficult to judge how woodflows have been managed by the Shree Chhap sawmill because while it is clear that some FUGs are not happy with the operation of the sawmill this is mostly related to financial performance rather than coordinating supply. Nevertheless, if community based processing is to proceed on a larger scale, coordination of supplies will be an important management issue. Harvesting generally occurs over a shorter period than sawmilling so it is common that some time passes between harvesting and processing. This can lead to deterioration in log quality through fungal growth, however, it does not appear as though this is a major issue given that most timber is used only for low value construction purposes.

As noted above, estimates of areas and volumes to be produced from thinning operations in FUGs where forests were considered to be accessible were derived from operational plans. Table 3.1 provides the outcomes of those estimates.

Table 3.1: Estimated Thinning Areas and Volumes

Region	Unit	2004	2005	2006	2007	2008
Kabhre Palanchok volume	cu ft	89,539	62,536	59,737	29,982	28,217
Sindhu Palchok	cu ft	24,518	24,267	30,379	28,844	26,079
<i>Total</i>	cu ft	<i>114,057</i>	<i>86,803</i>	<i>90,116</i>	<i>58,826</i>	<i>54,295</i>
Kabhre Palanchok volume	ha	398	319	340	210	256
Sindhu Palchok	ha	196	196	203	214	191
<i>Total</i>	<i>ha</i>	<i>594</i>	<i>515</i>	<i>542</i>	<i>424</i>	<i>448</i>
Avg volume per ha	m ³ /ha	192	168	166	139	121

These data raise a number of issues for consideration:

- **Volumes planned for harvesting in Kabhre exceed sawmill capacity.** It is estimated that community sawmills of the type already constructed have an annual log input capacity of around 20,000 cu ft. Approximately 90% of the volume planned for harvesting from economically accessible areas in Kabhre would be potentially available to the Chaubas sawmill. The existing sawmill therefore does not have the capacity to absorb available volume, at least in the next few years. This suggests that if thinning is going to occur there is a need, in the absence of further sawmill investments, to consider log sales regardless of the sawmill plans. It also suggests that there may be scope to smooth woodflows from thinnings to facilitate harvesting over a longer period.
- **Accessible volumes in Sindhu Palchok are lower than in Kabhre Palanchok.** These volumes could be absorbed by a sawmill but it seems that harvesting and transport costs to get to Shree Chhap would prohibit economic production.
- **Not all areas are scheduled for thinning over the next 5 years.** The reasons for this are unclear. It may be that some FUGs are reluctant to harvest their forests or it may simply be that areas have not been reported in operational plans.
- **The potential supply of logs and timber from both regions is relatively small.** However, the size of the Kathmandu timber market also is only small and this needs to be considered in marketing strategies.

3.2 Timber Supply in the Kathmandu Valley

As already noted, local markets for logs and timber from community forests are generally small and, given the supplies available, FUGs will need to look to Kathmandu for sales of timber. The following provides some observations on that market.

Most of the logs and timber supplied to Kathmandu are Sal, a natural forest hardwood mostly sourced from the Terai. These are large logs taken only from fallen or dead trees. Harvesting of living trees is not permitted from natural forests. Much of this supply comes from operations in which government agencies collect timber and then auction the logs. After sale, the logs are either transported to Kathmandu for sawing or sawn prior to transport. Natural pine (mostly *P. roxburgii*) is also supplied in large logs mostly from the west of Nepal. Natural pine has only developed a significant market presence over the last 10 years but sawmills reported that it now accounts for an estimated 25% of timber sales in the Kathmandu market. The major uses of these natural forest timbers are in construction, appearance and furniture manufacture.

Table 3.2 shows the volume of timber supplied and average royalty (excluding costs of collection and sale) from government forests in the Terai in recent years. If these volumes represent 70% of the Kathmandu market, in recent years that market is likely to have consumed around 3-4 million cu ft of timber per annum, equivalent to about 85-115,000 m³ per annum. This represents a very small market in international terms. It is not certain what proportion of the market is accounted for by government supplies but it would be the vast majority.

Table 3.2: Supplies of Natural Forest Timber from Terai in Nepal

	Volume (cu ft)	Royalty (Rs)	Average Revenue (Rs/cu ft)
2000	2,700,998	416,023,117	154
2001	1,834,210	347,786,422	190
2002	2,162,317	429,834,877	199

Note: Includes sales of all species and average revenue is after harvesting costs
Source: Department of Forests (2003)

It is expected that supplies of hardwood and pine from natural forests will increase over the next 5-10 years as natural forests become more accessible through increasing road construction. There is also the likelihood that the government will lift the five-year ban on cutting green trees which was implemented three years ago. In the longer term, the potential for sustainable supply of timber from Nepal's natural forests is unknown.

The government sets minimum prices for log sales and for Sal this is currently Rs400/cu ft for logs. The minimum price for natural pine logs is Rs250/cu ft and the minimum price for plantation pine is Rs40/cu ft. This effectively represents the reserve price for auctions but actual sale prices can be considerably higher than this. It is understood that the government is currently considering raising the minimum prices, particularly for Sal.

3.3 Supply of Plantation Timber to Kathmandu

The supply of plantation timber to Kathmandu is currently small. Sawn timber supplied by the Chaubas and Shree Chhap sawmills over the last seven years has only been about 37,000 cu ft with a maximum of around 15,000 cu ft pa. In addition to this there have been logs sold from FUGs but it is estimated that this was less than 5,000 cu ft of logs or 2,500 cu ft of sawn timber. This suggests that, in recent years, the maximum volume of pine plantation timber supplied to the Kathmandu market was around 20,000 cu ft pa and in most years it was considerably less. On these figures, pine timber would represent less than 1% of the timber market.

In discussions with timber brokers and Kathmandu sawmills a number raised the issue of reliability and regularity of supply from community based sawmills. They pointed out that there is capacity to sell more pine timber but that it is important to ensure a regular flow of material. To date, the sawmills have generally been unable to supply regular volumes and have attempted to sell timber as it is produced. The timber brokers and sawmillers also emphasised the importance of timber quality highlighting that there is considerable price differentiation for timber of larger size. However, to date, the sawmills had only supplied timber in quantities of mixed lengths that meant it had to be sorted once purchased and that prices offered were reduced accordingly.

3.4 Demand for Plantation Timber

As already noted, only limited data are available on the timber market in Nepal. Market demand for timber was also assessed in the interviews with timber buyers and sawmillers in the Kathmandu Valley. The key conclusions relating to timber demand from the visits to sawmills were:

- **The Kathmandu Valley dominates the timber trade in Nepal.** It accounts for the vast majority of timber sales but, as already noted, the size of that market is very small in international terms indicating that sawn timber consumption per capita is low. This is consistent with observations of building sites and housing in Kathmandu where there is little use of timber with heavy reliance on concrete and brick construction. When sawn timber is used in building, it is generally used for window frames and doors. Sal is the most commonly used species for these purposes. Timber is also used widely for furniture production and there appears to be a market preference for darker timbers such as Sal although pine has become more popular in recent times.
- **Hardwood from natural forests accounts for the greatest volume of sales.** The most important species in the market is Sal although a variety of species can be found. Most of this wood is sourced from the Terai region.
- **Over the last ten years, demand for pine from natural forests has become established in the market.** Pine originally entered the market at a time of high prices for Sal and timber consumers were looking for lower price alternatives. Since that time natural pine has become established. It is used for construction purposes as well as furniture production and is much higher quality than plantation pine. Most of the natural pine in the Kathmandu market is sourced from the west of Nepal.
- **Plantation pine is not highly regarded in the market.** Logs currently being produced from plantation pine are comparatively small making them unattractive to sawmillers and demand is weak compared with Sal or natural pine. There is some plantation pine used for furniture production but it requires seasoning (drying) and this market is very small and not

regarded as having major potential for the sale of thinning material. Discussions with sawmills suggested that the major market for plantation pine will be at the bottom end where it will compete with lower quality species that are used mainly in construction as supports and formwork. The major competitors for plantation pine in this market are lower value natural forest species such as Utis.

Use in construction means that demand for plantation pine is subject to economic circumstances which can be highly variable. In particular, demand will be related to new building and housing investment and will also be influenced by the implementation of large projects in Nepal such as housing construction for mines. At the time of the survey, all sawmills suggested the market was depressed with demand limited by security problems and a consequent lack of large-scale development projects.

The major implication of the demand analysis is that the primary market for plantation pine at the current time lies with timber for construction purposes in Kathmandu. There appears to be a number of sawmills that would be interested in this product. This suggests that, at least for thinning material, prices for plantation pine will be at the lower end of the market. This means that costs of production have to fall within the limits of this market.

3.5 Prices

Prices for logs and timber vary considerably depending on type and quality. The major products are Sal, natural pine, and then a range of other species of which plantation pine is one. Prices for logs and sawn timber vary with size with larger logs and larger dimension sawn timber receiving higher prices. Table 3.3 illustrates the price ranges prevailing in the Kathmandu Valley at the time of writing for these three major species.

Table 3.3: Prevailing Prices for Logs and Sawn Timber

Species	Logs at roadside for transport (Rs/cu ft)	Sawntimber ex mill gate (Rs/cu ft)
Sal (<i>S. robusta</i>)	500	950-1200
Natural pine (<i>P. roxburqii</i>)	250-300	400 - 500
Plantation pine (<i>P. patula</i>)	70-80	200-250

While the size of timber markets in Nepal is relatively small, prices of logs and sawn timber are consistent with international benchmarks. For example, dark red meranti from Malaysia represents a benchmark price for tropical forest hardwoods and currently sells for around US\$170/m³ which is the equivalent of around Rs 353/cu ft. While this appears to be considerably below the prevailing Sal price it may reflect differences in log size and quality. The prevailing price for Sal sawn timber is the equivalent of around US\$475/m³ which compares with a prevailing price for dark red meranti sawn timber of \$US \$US530/m³ FOB.

Domestic prices for pine are similar to prevailing log prices in New Zealand, which is a large exporter of pine logs. Lower quality pine logs from New Zealand currently sell for about US\$50/m³ FOB equivalent to around Rs105/cu ft which, allowing for quality differences and export costs, would be generally equivalent to Nepal roadside prices for pine.

It could be expected that the ban on export of timber from Nepal would depress domestic prices for timber as local markets would be over supplied. However, the ban on cutting green trees probably works to balance this by making wood and timber considerably more scarce than it would otherwise be. It is possible that, should the ban on cutting green trees be lifted, increasing supplies of natural forest timber may make the market for pine logs even more competitive by depressing local prices. However, these effects could be balanced by reducing the 130% export tax on timber from Nepal.

4 Future Approaches to Marketing Sawn Timber from Plantations

4.1 Financial and Economic Returns from Sawmilling

The development of sawmills by FUGs has been based largely on their potential to provide increased economic and social benefits to local communities. Jackson et al (1995) and Ladley (1995) proposed that sawmills could:

- increase financial returns to communities from forest utilisation by increasing the value added at the local level; and
- provide increased income and employment in locally based sawmilling operations.

However, the experience of investments in the Chaubas and Shree Chhap sawmills to date has been that the sawmills have not returned the planned benefits and their ability to do so on a long term sustainable basis has not been established. The financial returns from both sawmills have been erratic depending on prevailing circumstances, in particular prices, harvesting and transport costs, and recovery rates. This also illustrates the risks associated with sawmilling.

The financial returns from the sawmills can be measured by the surplus of funds that are left for distribution after all expenses including taxes and other charges. In an economic analysis, taxes are considered to be transfers, that is they affect the overall distribution of the benefits but are not costs of production.

To assist consideration of long-term sustainability and options for the future a simple residual price model has been constructed for both the Chaubas and Shree Chhap sawmills. These models show the net financial benefit from sawmilling activities (Table 4.1). The data in the table represent the best judgement as to the likely income and costs for each mill. The costs of production including transport, harvesting and the conversion rate have been estimated from information on the operations of each of the mills. The sawn timber price is based on estimates derived from sawmill and market interviews.

The residual price analysis indicates that the financial return from processing of timber in FUG sawmills is Rs10-20/cu ft. This can be thought of as the maximum stumpage price that could be paid if the sawmilling operations were going to break even (after tax). If the sawmills paid Rs50/cu ft for sawlogs by the roadside ready for transport to the mill, and this price incorporates a stumpage of Rs25/cu ft, the financial returns to the sawmill would be negative.

The financial return includes deduction of taxes which in economic terms, is not a cost of production but rather a transfer. The imposition of tax effectively means that some potential economic return to communities is distributed, via the government, to others. If value added tax (VAT) is excluded the economic returns from sawmilling increase to Rs14-23/cu ft. This estimation of economic returns does not separately value the employment generated in the sawmill and in harvesting and transporting of logs. From available evidence it appeared that the opportunity cost of labour used in the sawmill was close to zero. In this case it is reasonable to value the economic benefit of employment as the value of wages paid (generally about Rs100/day). When this is taken into account, the returns to the community from milling employment would be an additional Rs15-20/cu ft. This assumes that local community members

fill all of the jobs. It should also be noted that this may underestimate the economic benefits of employment, including intangible factors such as community vitality and social well-being created by employment. However, in the absence of data from which these values could be derived it is suggested that the value of wages is a reasonable representation of the economic value of employment. If the alternative to community sawmills is the sale of logs then only the value of employment generated by the sawmill should be considered a net economic benefit. Thus the total economic benefit from sawmilling logs would be around Rs30-45/cu ft.

It should also be noted that this analysis does not value the future benefit from increased quality of trees facilitated by thinning of the forest. However, this is a separate investment decision and should be subject to a separate analysis.

Table 4.1: Potential Financial Returns for FUGs from Sawmill Operation

Component	Shree Chhap Sawmill		Chaubas sawmill	
	Rs per cu ft	Details	Rs per cu ft	Details
Price of sawntimber	200	Delivered to roadside for transport to Kathmandu. Assumes 50% price of Rs220/cu ft and 50% Rs 180/cu ft. Currently planation mill struggling to produce premium size sawntimber from thinnings. Actual sales by FUGs have been less than this price	200	Price in store at Dholalgaat. Estimate derived from interviews with Chaubas sawmill Committee, ex Chairperson and groups. Previous prices had been higher - aim for Rs 220/cu ft
Value added tax	12	Based on buying logs for transport to mill at Rs 50/cu ft. With 60% conversion this translates to a cost of Rs83/cu ft. If timber sold for Rs200/cu ft, value added is Rs 117 or VAT of Rs11.7. If VAT was calculated on 48% conversion rate VAT payable would be Rs9.6/cu ft.	12	Based on buying logs for transport to mill at Rs 50/cu ft. With 60% conversion this translates to a cost of Rs83/cu ft. If timber sold for Rs200/cu ft, value added is Rs 117 or VAT of Rs11.7. If VAT was calculated on 48% conversion rate VAT payable would be Rs9.6/cu ft.
Transport of timber from mill to roadside	10	Includes transport from the forest to sealed road and maintenance of a check point. Would be less if sawmill located close to main road	20	Estimate derived from interviews with Chaubas sawmill committee and FUG representatives. Also data from No Frills (2002)
Price of sawntimber ex sawmill	178		168	
Cost of timber processing	40	Per cu ft of sawntimber. Detailed costs not available from sawmill beyond opening costs (Rs20/cu ft). Other costs based on Chaubas mill. Based on Chaubas more comprehensive data may be underestimate	60	Including administration and maintenance, marketing, salary of manager, committee costs etc. Derived from No Frills (2002)
Residual from cost of sawntimber and transport	138		108	
Conversion factor 39%. Sawntimber residual in roundwood equivalent	54	Conversion of 39% based on information from Chaubas and Shree Chhap sawmill averages	52	Conversion of 48% based on information from Chaubas and Shree Chhap sawmill averages
Transport of logs from forest to sawmill	15		10	Cost of transporting logs by tractor - No Frills (2002)
Felling and sectioning of logs	30	Based on costs provided by Shree Chhap sawmill	25	Estimates provided by sawmill committee and FUG representatives
Potential residual for return to FUG members	9		17	

Another way of valuing the net returns from investment in the sawmill is by estimating the internal rate of return (IRR) from the flow of costs and benefits over time. This can also be done in financial and economic terms. In the financial analysis VAT is included. In the economic analysis VAT is excluded as it is a transfer and the value of employment is included. An analysis of IRR was conducted for a “typical” community sawmill. This was based on average costs and returns estimated from the experience of Chaubas and Shree Chhap. Copies of the estimates are provided at Annex 2. Table 4.2 summarises the results.

Table 4.2: Summary of Economic and Financial Returns from Community Sawmills

Basis of analysis	IRR (Royalty Rs 25/cu ft)	IRR (Royalty Rs 40/cu ft)
Economic	61%	NA
Financial	NA	NA

The economic analysis indicated a very high IRR of 61%. This reflects the relatively low cost of establishing a sawmill and so that once net benefit flows are positive returns are attractive. However, the financial analysis, once the VAT was included and the value of the benefits of local community employment removed, indicated that the mill would make a loss in all years and so an IRR was not able to be calculated. This suggests that the sawmill investment is attractive in terms of economic benefits, particularly for local employment generation. However, in financial terms once the VAT is imposed and the economic value of local employment in the sawmill is removed then the mill is no longer an attractive investment. This reflects the situation that community sawmills can be considered worthwhile if local employment is valued appropriately, or if Government or some other body representing the region and its community is the financier rather than the owner/operator of the mill itself. It also suggests that private business interests would not be attracted to running the sawmill but also that it would be of economic benefit to subsidise the operation of a private sawmill if this was a preferred option.

Another very important point is that the economic and financial analyses both valued stumpage prices at Rs25/cu ft. This reflects the lower end of the economic value of total returns from the residual price analysis. As would be expected, if this royalty is increased to more than Rs25/cu ft even the economic returns from the sawmill investment are dissipated. The minimum royalty for pine plantation logs is currently Rs40/cu ft. At this price the mill is not an attractive proposition in either financial or economic terms.

Given that the estimation of economic benefits from the sawmill operations are subject to some uncertainty it is also useful to consider what level of economic benefit would be required to produce an acceptable internal rate of return. This “threshold” analysis suggests that additional income of Rs110,000/year would be sufficient to provide a financial IRR of 11%. For example this could be readily achieved by making community based sawmills exempt from VAT (valued at Rs115,200/yr). In the economic analysis (at a stumpage price of Rs25/cu ft) additional benefits of less than Rs1000/year would be sufficient to provide an economic IRR of 11%.

4.2 Comparison of Returns from Timber Processing Versus Log Sales

Comparing the residual price that can be derived from log sales compared with that from timber processing provides a picture of the relative value (in economic terms) from harvesting and processing of logs.

From discussions with FUGs, DFOs and log purchasers it appears that, at the time of writing, a typical price for harvested logs was around Rs70-80/cu ft. For FUGs with easier access to roads there is evidence from recent transactions that log prices could be higher. Sawmills in Kathmandu also consistently reported a prevailing price of Rs100-120/cu ft delivered to the mill.

With harvesting and transport (to roadside log dump) costs of about Rs35-45/cu ft the potential residual log price from selling logs is about Rs35-45 (Table 4.3). If residual stumpage is used in the financial analysis the investment in a sawmill is unattractive.

Table 4.3: Returns from Sale of Logs

Component	Rs/cu ft	Comments
Price received for logs	70	At roadside collection point
Felling and sectioning and other harvest costs	25	
Transport to road edge	10	
Potential residual for return to FUG members	35	

This suggests that communities will receive greater returns from log sales than investment in sawmilling. Also, under the price and cost conditions outlined, sawmilling does not add value to logs but rather reduces their value.

This situation reflects the highly risky nature of sawmilling pine logs. It is also most likely a reflection of the greater efficiency of sawmilling conducted by Kathmandu mills than community sawmills located in remote areas as well as the greater propensity for Kathmandu sawmills to manage risk. In particular, Kathmandu sawmills utilising pine, only do so as a relatively small part of their overall business while the community sawmills are forced to concentrate on lower value plantation pine as their major resource.

The comparison of community based sawmilling and log sales suggests that, at the very least, FUGs should carefully consider these issues before making any investments in sawmills. To assist this consideration the following section outlines factors that are likely to influence and/or increase returns from sawmills.

4.3 Factors Influencing Returns from of the Sawmills

The experience of the development and implementation of the Chaubas and Shree Chap sawmills illustrates those factors that have contributed to the marginal financial situation of the sawmills. It also allows consideration of the major risk factors associated with sawmills.

4.3.1 Key Risk Factors

Key risk factors for community sawmills are:

- **Sawn timber prices are low and subject to volatility.** In particular, the use of *P. patula* mainly as a low value timber for supports in construction work, limits scope for value adding. While there is some scope for it to be used in the production of furniture this requires seasoning and only relatively small volumes are likely to be in demand as plantation pine is not regarded as a preferred species for furniture. Also, as the resource being

harvested is mostly thinnings (typically small, young and fast grown) it receives a price discount compared with larger logs. Being reliant on demand from construction also means that market prices vary with economic conditions. At the time of writing the timber market was depressed due to the security situation and the related lack of large development projects. In the future, there is potential for market development of pine timber for use in housing construction associated with large development projects.

- **Lack of markets for residues.** Residues from local sawmills consist of lower quality planks that can be used for local housing or furniture construction, timber for fuelwood and sawdust that can also be used for fuel. However, local markets for residues are small and cannot absorb all of the material produced. The limited capacity of local community members to pay also means that prices for residues are low. In general, returns from residues can be an important component of income for wood processors but in the case of the community sawmills this revenue is not significant. In economic terms, the provision of this fuelwood represents a benefit to local communities and it may be appropriate to simply give it away. However, the sale of residues is another financial advantage of Kathmandu based sawmills compared with community sawmills.
- **Increasing harvesting and transport costs.** This has occurred in both the Chaubas and Shree Chhap sawmills with considerable adverse impacts on the viability of the sawmills. The Chaubas sawmill has addressed this issue by contracting out its harvesting, demonstrating an opportunity to reduce costs.

These factors have contributed to the variable returns from sawmills. However, other factors have also contributed. To illustrate these it is useful to examine the mills performance compared with original feasibility studies relevant to mill development.

4.3.2 Factors Contributing to Low Returns from Sawmills

The Shree Chhap and Chaubas sawmills have not delivered the benefits for local communities as originally planned. While the mills have generated some employment and income and also some benefits in terms of availability of timber and fuelwood for local communities, it is not clear that the production of sawn timber by community sawmills will provide long-term sustainable economic and social benefits to communities.

With the benefit of hindsight it is useful to examine key factors that have contributed to this. They include:

- **Markets were not adequately understood.** This meant that prices received were less than planned, particularly in recent years as the timber market has been weak. It appears that there was inadequate investment in market research prior to sawmill investments. The major uses of plantation pine timber were not adequately researched, in particular that pine's main end product use is in lower quality construction timber with lower prices than other pine products.

As part of this, timber size and quality requirements were also not well understood. Timber produced by the mills is sold in lots of mixed quality and random sizes with the consequence that prices received were lower than planned.

Longer, wider timber receives a price premium. For example, discussions with timber brokers and sawmillers in Kathmandu indicated that 6" x 6" and 8' length pine timber can currently expect a price of Rs 220/cu ft and for dimensions less than this the price falls rapidly to Rs 125-160/cu ft. This is a very important aspect of sawmill production that does not appear to be well understood by either the Chaubas or Shree Chhap sawmills.

- **Costs of harvesting and transporting logs were higher than planned.** The higher than planned cost of logs delivered to the mill adversely impacted on profitability. For example, the actual cost of felling, sectioning and transport of logs to the sawmills is about Rs35-45/cu ft compared with Rs15-20/cu ft estimated in feasibility studies and subsequent analysis eg, No Frills March 2002, and these costs have been increasing over time.

At Shree Chhap, transport of logs by hand also meant that the size of logs delivered to the mill was smaller than planned with the result that timber lengths were shorter. In turn, this reduced the price of timber produced. In addition, logs were cut to maximum 6' length, and if logs were too large in girth they were split down the middle thereby severely reducing the size of timber that could be produced from the log.
- **Recovery rates were lower than planned.** Original estimates of recovery were based on 60%. However, in practice recovery rates have been much lower – around 39 to 50%. Sawmills in Kathmandu typically produce much higher recovery rates from other species because they are working with much larger logs. Recovery rates for plantation pine in Kathmandu sawmills are generally around 50%. The lower recovery rate in community sawmills is generally a result of sawing smaller logs.
- **No business plans were developed for the sawmills.** There is a general lack of financial planning in FUG activities and the sawmills appear to have no firm business plans. While the Chaubas sawmill is now demonstrating an interest in planning for the future of the mill, this is only as at an early stage. The promise of financial returns from the sawmills without clear business plans meant that expectations of FUG members were raised but the complexity of running a sawmill business was not adequately understood.
- **Management of the sawmills was production oriented.** The mills have concentrated on producing sawn timber with insufficient consideration of potential markets. While there has been some attempt at forward contracts, in practice the mills have produced a volume of timber and then approached customers to buy it. This approach places them at a disadvantage in negotiating and delays in sale can lead to deterioration in the timber and so its value. This was especially the case at Shree Chhap where FUGs marketed their own timber and long delays in finalising sales saw the quality of timber decline dramatically with final sale prices of only Rs100-150/cu ft.
- **Sawmill owners/managers are not familiar with managing marketing.** There appears to be a lack of understanding for the need to balance risk in selling timber. For example, the Shree Chhap sawmill committee made a decision to only sell timber at a certain price with the risk that it was left holding deteriorating timber. Similarly, there is a reluctance in the management of both sawmills to commit to long-term contracts for sale of timber for fear that prices may increase and some potential gain would be lost. While this reluctance is understandable, particularly given the reputation of some timber brokers, it also limits the management of risk and return. This is an area where there is potential for training to assist business skills development.
- **Policy environment has adversely impacted on operations.** There are instances of government policy and its implementation that have added considerable cost and risk to the sawmill operations. These issues include the role of DFOs, the impact of taxes and security issues and are discussed in the following section.

4.4 Policy Impacts on Sawmill Operations

Government policy in Nepal is implemented through district offices and village development committees. For FUGs the DFO plays a key influence in day-to-day operations and the implementation of government policies. It appears as though the DFOs exhibit considerable variance in the local implementation of policies relevant to harvesting and sale of products from community forests. Key factors that have impacted on the viability of the sawmills are outlined below.

- **DFO approvals and activities create unnecessary complication and delay.** Approvals by the DFO for harvesting and transporting logs as well as sale and transport of sawn timber add considerable time and cost to timber production and marketing. In addition, these approvals create opportunities for unnecessary interference by the DFO in the production and marketing process. They also create considerable costs for DFOs. Table 4.4 illustrates the number of approvals typically required in the production process.

It is suggested that the number of approvals required cements dependency between FUGs and the DFO. It seems that much of the logic for the required approvals is derived from the government's legislation focussed on the control of logging from natural forests. In the case of plantations, particularly where they are managed according to an annual operating plan that is approved by the DFO, there should be room to reduce the number of other approvals required. It is suggested that fewer controls/approval points would be consistent with emphasising self-reliance and management by FUGs. NACRMLP training could assist with this. Further, fewer approvals could make harvesting and log transport and/or sawn timber production more efficient. The requirement for collection of data on forest production could be achieved by FUGs informing DFOs of performance against the operational plan. This would also provide a basis for self-monitoring among FUGs.

Table 4.4: DFO Approvals Required in Production of Logs and Sawntimber

Component requiring approval	Nature/purpose	Comment
Operational plan	Required for FUG to be legal entity	Useful to ensure understanding of community plans
Marking of trees for removal	Ensure correct practice in tree removal and volumes removed match operating plan	Community should be trained to do by themselves. DFO involvement not necessary
Cutting of trees	DFO provides tree cutting permit. To ensure that trees are not cut without approval.	Decision to cut trees is up to the FUG and specified in the operational plan. Room for self monitoring rather than DFO
Marking of logs for transport to end use site	Occurs at log dump outside of forest. Estimating of log volumes and marking of logs with another hammer	Aims to ensure no illegal harvesting. Not a big issue for FUGs. FUGs should be able to measure volume of logs. Approval by DFO not required.
Transport of logs	Requires DFO permit that is checked at points along transport route.	Also appears to be related to control of illegal harvesting in natural forests. Not relevant to plantations.
Sawntimber production	DFO approval required for establishment and operation of sawmill. DFO monitors production of timber.	Approval helps keep track of number of sawmills operating. Monitoring not required - production data could be supplied by mill to DFO for statistical purposes
Timber marking for transport and sale	DFO facilitates marking of timber produced so that can be checked along transport route	Not required.

- **Government policy to stop removal of green trees.** This policy introduced by HMGN was to restrict cutting of natural forests particularly in the Terai and it appears as though it was not the intention that it be applied to plantations. However, at least in Chaubas, the policy was interpreted in the region to apply to community forest plantations and, as a result, meant that the sawmill did not operate for two years. This also illustrates that interpretation of how policies are implemented by DFOs can have a major impact on forest and processing operations.
- **Restrictions on the number of trees that can be removed.** It is HMGN policy that a maximum of 25% of the number trees can be removed from a forest area. For FUG plantation forests that can be very heavily stocked implementation of this directive can contradict most effective management practices and potentially reduce volumes available for processing. Once the DFO has approved an operational plan – as long as management of the forest is consistent with that plan – there should be no need for such restrictions in plantations.
- **Estimation of the VAT disadvantages plantation sawn timber production.** Actual recovery rates of saleable sawn timber from community based plantation sawmills are between 39-50%. However, for the purpose of collecting VAT a standard 60% recovery factor is used. By way of example if a plantation sawmill pays Rs50/cu ft for logs and sells timber Rs200/cu ft it pays VAT of Rs12/cu ft based on a 60% conversion rate. But, using an actual conversion rate of 40%, it should only pay Rs7.5/cu ft. It is suggested that the method of calculating VAT particularly for plantation thinning be reviewed.

In general, it appears as though a considerable effort in forest policy is directed towards ensuring Nepal's natural forest resources, particularly in the Terai, are managed on a sustainable basis. These policies are not necessarily appropriate to community forests, particularly plantations. It is recommended that NACRMLP work with the Department of Forests to facilitate effective policy for community forestry.

4.4.1 Proposed Income Tax

A major issue raised by FUGs, community sawmills and Kathmandu sawmills in consultations undertaken as part of this study was the announced introduction of a 40% tax on the production of sawn timber and logs. This announcement has been the source of considerable confusion and concern for FUGs. For instance, in discussions with Gaurati FUG members it was reported that they had decided not to harvest any logs from their forest until the position with regard to the 40% tax was clear.

When first introduced it was announced that the tax was to be implemented on total income. Based on the figures presented earlier in this chapter it is clear that such an imposition would make both timber production and even sale of logs unattractive to communities. The government has since attempted to clarify some aspects of the tax. In particular, it has stated that it will be applied only to timber and log sales made outside local communities, that is, it will not be applied to logs and/or timber for local consumption. It also seems that the tax is to be levied on net income and not gross income, although this latter point is still the subject of some confusion within the Department of Forests. Table 4.5 illustrates the impact on net returns from imposition of the 40% tax on net and gross incomes for sawmilling and Table 4.6 illustrates the impacts on log sales.

Table 4.5: Impact of 40% Tax on Community Forest Returns from Sawmilling

Component	40% tax on gross income (Rs per cu ft)	40% tax on net income (Rs per cu ft)
Price of sawntimber	200	200
Value added tax	12	12
40% tax	80	7
Transport of timber from mill to roadside	20	20
Price of sawntimber ex sawmill	88	161
Cost of timber processing	60	60
Residual from cost of sawntimber and transport	28	101
Conversion factor 48%. Sawntimber residual in roundwood equivalent	13	49
Transport of logs from forest to sawmill	10	10
Felling and sectioning of logs	25	25
Potential residual for return to FUG members	-22	14

Table 4.6: Impact of 40% Tax on Community Forest Returns from Log Sales

Component	40% tax on gross income (Rs/cu ft)	40% tax on net income (Rs/cu ft)
Price received for logs	70	70
40% tax	28	14
Felling and sectioning and other harvest costs	25	25
Transport to road edge	10	10
Potential residual for return to FUG members	7	21

It is clear that the imposition of the 40% tax would provide a major disincentive to community forestry enterprise development. If the tax was levied on gross income it means that the sawmills would be driven to make large losses and returns from log harvesting would be only around Rs7/cu ft. If levied on net income while financial returns remain positive they are reduced considerably. It is suggested that the reductions, even if levied on net income, would be sufficient to discourage FUGs from any harvesting activities for commercial purposes.

It should be noted that, in all cases, the residual stumpage is much lower than the minimum stumpage set by the Government of Rs40/cu ft. If this stumpage was achieved with the tax imposed on net income, sawn timber would need to sell for Rs255/cu ft by the roadside and logs for Rs90/cu ft by the roadside if positive returns were to be made. These prices are not currently achievable.

Applying the tax only to sales outside local communities has little impact on its negative impacts on community forestry operations. This is because domestic utilisation of sawlogs and timber is relatively low and local communities do not have the capacity to absorb available volumes. The vast majority of timber harvested from plantations is sold outside local communities.

4.4.2 Security

The other overriding issue adversely impacting on income generation from community forests is the security situation due to Maoist rebels. This is limiting production and planning and is a very strong constraint on any investment from private sources such as Kathmandu timber processors.

5 Future Options for Community Development from Marketing Timber Resources

5.1 Conclusions from Timber Marketing Analysis

Three main conclusions flow from the preceding analysis:

- **Community based sawmills are not financially viable.** The financial viability of community based sawmills is limited by prevailing prices for timber, the nature of timber products that can be produced from thinning, and the costs of logging and harvesting. The experience of Chaubas and Shree Chhap sawmills illustrate this. It is possible that increasing prices for timber, more efficient and effective production and marketing of sawn timber as well as reduced costs could change this. However, it is not clear that all of this is achievable, particularly because of the risky nature of sawmilling. It is not clear that community based sawmills are capable of delivering long-term sustainable financial returns.
- **Economic returns from community based sawmills depend on the value of employment (and other social impacts) generated by community sawmills.** These returns are most readily illustrated in the extent to which sawmills train and employ local community members and the value of residues to supply firewood to local communities. Local communities will determine whether or not these benefits are sufficient to balance financial losses. Measuring this can be difficult. However, one indicator is what economists call “revealed preference” i.e., what communities actually do in this situation. In the case of the Shree Chhap mill “revealed preference” is evidenced by the decisions of the Gaurati and Lampati FUGs to opt for the independent sale of logs rather than selling logs to the sawmill. In other words, the non-market benefits from the sawmill for these communities are not sufficient to justify the financial losses. On the other hand, the economic analysis illustrated that taking account of the value of employment and transfers has the potential to make the investment attractive. This raises the issue of who is willing to fund the financial loss for the economic return. The “revealed preference” of communities suggests that they are not willing. Another possible alternative would be for government to provide an exemption to community sawmills for VAT that would make the financial returns from the sawmills positive. However, it is likely that log sales will still remain a more attractive option.
- **Sale of logs provides greater returns than community based sawmills.** Evidence from sale prices of logs suggests that both economic and financial returns are higher for log sales. Nevertheless, the sale of logs from plantations has not been undertaken on a large scale and there is scope for NACRMLP to assist local communities in addressing relevant issues. It also leaves the issue of what to do for inaccessible forests unanswered.

It should be noted that these conclusions relate to the sawing of thinning material. As this thinning occurs and the forests produce higher quality logs it may that community based sawmills will present viable investment options. Similarly, completing thinning programs for the pine plantations is very important if increased incomes are to be earned from pine plantations in the future. This is an issue common to all forest plantation developments the world over. It is common for thinnings from plantations to be utilised as pulpwood for board and paper manufacturing. Poles are also produced from small straight logs for utilisation as fence posts and similar uses but this generally requires treatment to ensure durability. Depending on the age of thinnings small sawlogs are also commonly produced. There appears to be little scope for pulpwood uses for the FUG plantations largely because of a lack of production facilities in

Kathmandu and in any case prices for pulpwood are usually low compared to sawn timber and would most likely be considerably lower than the prices currently received for sawlogs. It seems, therefore, that sawlogs are one of the highest values available for utilisation of thinnings.

At the same time it appears that demand for plantation pine, particularly logs from thinning operations, is likely to remain at the lower end of the market. It is unlikely that marketing efforts can change this. Plantation pine is simply a different product compared with natural forest timbers, particularly Sal and also natural pine. It is therefore suggested that efforts at maximising returns from plantations be directed at the construction timber market and in ensuring competitive markets in the sale of logs.

5.2 Recommended Actions for Future Development

The following is recommended as preferred approaches for NACRMLP in relation to marketing of thinnings from pine plantations:

- **At this stage new or further investments in community sawmills should not be undertaken.** Given the uncertainty over the financial and economic viability of community sawmills it is recommended that it will not be the interests of local communities for NACRMLP to invest in further community sawmill developments at this stage. If such investments are to be made it is more effective if the real costs are understood. This is more likely to be the case if the costs of investments are met and managed by local communities themselves. Further any such investments should only be made on the basis of well developed business cases that include examination of economic and financial benefits/costs and after comparing these with the option of log sales.
- **Work with the Chaubas FUGs and sawmill committee to undertake an assessment of the viability of ongoing operation of the sawmill compared with log sales and develop a business plan for the future utilisation of wood from community forests.** It is suggested that the Chaubas mill has been more successful than Shree Chhap and that to explore the potential for more effective operation NACRMLP should assist the Chaubas sawmill committee and FUGs to develop a business plan for the next 3-5 years that provides a reasonable return. There is evidence that the committee and groups have been thinking along these lines but, to date, a financial plan for future operation of the mill has not been prepared.

The development of the plan should include consideration of options for decreasing costs and increasing income eg, contracting out harvesting and transport of logs. It should also examine returns from specific marketing initiatives designed to attract more buyer interest. These include grading of sawn timber, long term contracts for at least a portion of timber sales, and production of information on pine species and uses. If it cannot be demonstrated in the business plan that the mill can provide adequate returns to the local communities, alternative models should be developed as is suggested below or the focus shifted to log sales. The focus of project activities should be on developing market understanding, developing skills to produce business planning (linked to the operational plan), identifying and addressing issues confronting the long-term future of the sawmill and managing risk.

- **Assist the Shree Chhap mill to develop a more effective model for operation and examine the scope for returns from log sales compared to sawmilling.** NACRMLP should work with communities to develop the skills in business planning to make a definitive

decision on the future of the mill. This process should be similar to that for Chaubas but, given that a number of FUGs supplying the Shree Chhap sawmill have already decided not to sell logs to the mill, there is an imperative to focus on alternative options and to compare returns from sawmilling with log sales.

5.2.1 Alternative Options for Community based Sawmill Development

The decision of whether or not to invest in a community sawmill will rest with local FUGs, and it is these groups that are best placed to weigh up the potential tradeoffs that might have to be made between financial and economic returns. However, it is important that the expectations of FUGs are soundly based and there is a role for NACRMLP to assist in equipping FUG members to make their decisions and that the interests of the poor are taken into account.

As has also been illustrated, the construction and management of a sawmill business based on pine plantation thinning material is a risky business. Often small communities do not understand this and, accordingly, the business is not managed appropriately and returns can be less than expectations. On the other hand, this is the role of the private sector. Private sawmill entrepreneurs understand risk associated with production and trading (market risk) and manage the business accordingly. Private entrepreneurs seek a return for taking this risk. This is not always appreciated and capturing those returns is sometimes seen as profiting from the community's resources. This is often proposed as the basis for community based development but it is not understood that risks are associated with the potential returns. A lack of understanding and management of such risks has contributed to the variability in returns from the Chaubas and Shree Chhap sawmills. In these circumstances it is considered that options for private sector development and management of sawmills could provide more viable options. Some potential models are:

- **Selling the sawmill to a private entrepreneur.** The current security situation in Nepal is a major constraint on this option and it is unlikely it would be a viable option without considerable improvement in the security situation. This option shifts the risk of the sawmill operation to the entrepreneur in return for the chance to make a profit from operating the mill. One potential danger in this option is that a single private sawmill could exploit some monopoly power over FUGs selling logs. However, this is easily overcome by ensuring that the option of log sales remains available to FUGs.
- **Tendering out operation of the sawmill.** This option has many of the advantages of outright sale option but maintains a higher level of control for the community with little risk. However, this option is also likely to be limited by the current security situation. There is also the possibility in this situation to provide a profit incentive package for the selected operator as part of risk management strategies.
- **Attract joint venture private operators for the sawmills.** This model shares the risks/returns associated with sawmill investments with local communities. It would allow the community to benefit from the production and marketing experience of a private entrepreneur. However, joint ventures can be difficult to administer and there is considerable risk of conflict of interest if not very tightly managed.
- **Relocation of the mill to a more central location.** It is proposed that this option could be considered in conjunction with one of the options for private sector involvement. This may assist in attracting log sales from other areas and also in minimising log harvesting and transport costs.

- **Seeking an exemption for community based sawmills from VAT.** This would help make the sawmills financially viable and help capture the economic benefits potentially available from sawmills.

It is difficult to judge the level of interest of the private sector in potential community based sawmill investments. It is suggested that this may be a longer term option and that, in the meantime, expanding log sales may be a way of generating interest in the market potential of plantation pine and the scope for processing investments. A number of sawmills and timber brokers interviewed as part of this study expressed an interest in such investments. This at least suggests that these models are worthy of further consideration.

Options for development and management of sawmills need to be developed in association with FUGs. The project should assist communities to develop the skills required for assessing viable alternatives and it should also ensure that all aspects of timber marketing and sawmill investments are understood.

5.2.2 Potential for more Effective Marketing of Plantation Pine

Markets for plantation pine thinnings from community forests are limited to lower value construction markets by virtue of the quality of the wood. There is some potential for use in furniture but this requires seasoning and is likely to remain a small market. This market reality should be accepted and timber sales managed accordingly. To date, there have been relatively few buyers of plantation pine. Discussion with sawmillers and timber brokers in Kathmandu indicated those mills that have purchased logs and timber are familiar with the potential availability of additional volumes and the role of plantation pine in the market. However, beyond those mills there was little understanding of plantation pine.

It is in both the short- and long-term interests of plantation growers to increase understanding of potential volumes of plantation pine that are available for harvest as well as building familiarity with the product. In the short term this will assist in creating more competitive markets for log sales and in the longer term will help establish familiarity with plantation pine as the quality of logs improves.

Another potential development for improved marketing of timber produced by community sawmills suggested by FECOFUN is the establishment of a cooperative marketing agency for pine sawn timber. A concern with this approach is that it leads to the establishment of another institution with associated costs that is unlikely to be appropriate to selling lower value timber. In addition, such an organisational structure would require considerable coordination among FUGs. It is also not clear that such an organisation could attract the necessary experience and skills required in marketing. It is therefore suggested that private sector buyers can perform this function more efficiently providing a competitive environment can be maintained.

Log Sales

It is suggested that one of the most effective means of expanding familiarity with plantation pine is to expand sales of logs. It is also in the short-term interests of FUGs to ensure competitive markets for logs are developed as this will help maximise returns from log sales.

Auction and/or sealed tender bids are already used to sell logs from FUGs. However, discussion with FUGs and DFOs indicated that log sale markets could be distorted by collaboration between log buyers. For example, one instance was cited in Gaurati where logs were advertised for sale and there was quite a lot of interest from log buyers. However, only one bid was received as buyers had colluded. In general, it was reported that there is considerable interest in plantation log sales.

One option for limiting the scope for log buyers to collude is for log sale processes to be as transparent as possible. One option for achieving this suggested by FECOFUN is for it to assist FUGs in the sale process though managing the collection and opening of bids in conjunction with FUGs. It may also be useful to use the Sawmilling Association of Nepal to advertise log sales among its network of Kathmandu sawmills. In this way, it is important to make existing market structures work to the advantage of FUGs rather than set up alternative distribution organisations that would be subject to considerable cost and risk.

Reliability of supply of both logs and sawn timber is also important to establishing plantation pine as a viable alternative in the timber market. If logs sales are to be the primary form of sale it is important to ensure that they are undertaken on a regular basis and in quantities that suit the needs of buyers. This consideration needs to be incorporated into FUG operational plans and it may be appropriate for FUGs within similar areas to cooperate on this issue.

5.2.3 Improving the Policy and Legal Framework – Preventing Market Distortions

The policy and legal framework in Nepal provides a number of distortions that work against the development of efficient and effective timber marketing from community forests. NACRMLP can assist HMGN to address these issues. Key issues that are worthy of attention include:

- **Impact of the 40% tax on community forestry.** As already discussed this policy, especially when combined with the VAT, provides a strong financial disincentive for FUGs to utilise their forests. It runs the risk of discouraging thinning operations that could also cause considerable loss of value to be derived from community forests in the future.
- **Calculation of VAT for plantation timber and potential for exemption from the VAT.** The current means of calculating VAT based on a 60% recovery disadvantages plantation processing compared with natural forest processing because recovery rates from plantation timber are much less than 60%. In addition, there is a case for the removal of VAT to offset financial losses from community sawmills in lieu of the economic and social benefits that they create, particularly where there are few alternatives for employment.
- **Simplify approvals required for harvesting and sales of logs and timber.** There is a need to reduce the administrative cost and time taken for approvals along the product chain for log and timber production and sale.
- **Minimum royalty.** The basis on which minimum royalties are set is not clear and there is potential for minimum royalties to inhibit price competition for logs and discourage sale of lower value logs. It is suggested that FUGs are in the best position to decide reserve prices for auctions and providing FUGs have sufficient skills to understand the business (costs and returns) then they should be able to set reserve prices for their own sales.

- **Controls on tree removal.** The limit on 25% of trees being removed could be a constraint on effective plantation management though restricting thinning. It is suggested that this need not be applied to community forests where an approved operational plan is in place.
- **Business registration.** It is not possible to register sawmill enterprises in the name of FUGs and they must be registered either in the name of individuals under the Cottage Industry Act or shareholder companies under the Companies Act. These arrangements can cause issues of conflict among community members and such structures do not necessarily match the management structures for community enterprises. An option to allow FUGs to register as businesses is worthy of consideration.

5.3 Proposed Project Activities

The preceding sections have highlighted the main issues for the development of more effective marketing of timber from community forests and particularly pine plantations. NACRMLP can assist in a number of these areas. These actions are consistent with Component 2 of NACRMLP the objective of which is “to develop and promote income generating activities for forest users throughout Nepal through an action learning approach which addresses the priority concerns of the poor and marginalised”.

Table 5.1: Proposed Project Activities for Development of Community Returns from Timber Marketing

Theme	Activity
Strategies developed to ensure equitable sharing of costs and benefits within FUGs and other community based organisations and reflected in FUG constitutions (Output 2.1)	<ul style="list-style-type: none"> • Establishment of self-monitoring to assess impact of sawmill investments in Chaubas and Shree Chhap • Establishment of self-monitoring systems for log sales if developed • Establishment of self-monitoring systems for timber marketing business plans
Market research undertaken and support mechanisms developed for timber and non-timber forest product marketing and enterprise development (Output 2.2)	<ul style="list-style-type: none"> • Training to equip communities with skills for assessing returns from log sales versus community sawmills • Training for FUGs in implementing competitive tenders for sale of logs • Support for widening understanding among Kathmandu sawmills of pine plantation timber and its availability
FUG commercial activity management systems strengthened (Output 2.3)	<ul style="list-style-type: none"> • Training to provide Chaubas and Shree Chhap FUGs and sawmill committees to assess options for future operations of the mills • Facilitation of process to identify future options for the mills and assess alternatives • Training with Chaubas and Shree Chhap FUGs and sawmill committees to prepare business plans for timber marketing activities • Facilitation of processes to prepare business plans for timber marketing activities
A range of commercial FUG-based enterprises developed as pilot activities and their replication supported (Output 2.4)	<ul style="list-style-type: none"> • Training for FUGs in implementing commercial approaches to log sales • Training for FUGs in skills relevant to assessing alternative options for timber sales
NRM policy development strengthened and processes for implementation supported (Output 1.4)	<ul style="list-style-type: none"> • Preparation of discussion papers on forest policy issues relevant to community forestry development • Facilitation of processes for consideration of policy changes

Table 5.1 presents key activities proposed for action in accordance with the planned outputs of Component 2 and policy outputs under Component 1.

It is suggested that in developing these proposed actions the following principles should be adopted:

- The role of NACRMLP should be to **facilitate action by local communities** in their own interests and not to impose external solutions;
- NACRMLP should **not directly invest in milling activities**;
- Approaches to income generation from timber need to have a strong basis in **market realities**; and
- Any project activities should be consistent **with reducing poverty and enhancing equity of distribution** of benefits from processing activities.

Within the proposed activities for NACRMLP a number of themes have been developed to guide action. These are:

- Building **competitive markets** that will assist in maximising returns from log and timber sales;
- Developing **entrepreneurial and business management skills** relevant to assessing alternative options for generating income from log and timber sales;
- Utilising **action learning and self-monitoring** to assess impacts of timber marketing activities and alternatives on the communities and the poor in particular; and
- Promoting an **enabling policy environment** for community forestry and income generation from timber sales.

5.4 Implications for Poverty Alleviation

There is an emerging concern across Nepal that the formation and development of FUGs has not provided significant benefits to the poorest of the poor. Two major approaches to dealing with this appear to be emerging:

- **Action learning and self-monitoring.** This technique aims to work with small sub groups of poor people within FUGs to identify impacts of FUG activities. NACRMLP is working with Forest Action – a Nepali NGO – to develop these approaches. It is recommended that in order to monitor impacts on the poor that such an approach be built into the timber marketing activities.
- **Alternative models for business activities.** An existing development assistance project being funded by the Swiss Government is developing a business enterprise model that aims to build entrepreneurial skills at the local level and share returns from NTFP processing investment through a company structure that provides returns specifically to poor households within FUGs. It is recommended that this model be monitored to assess its success and relevance to organising FUG timber marketing activities.

6 References

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Annex 1

Terms of Reference

Annex 1: Terms of Reference

Nepal Australia Community Resource Management and Livelihoods Project Timber Marketing Specialist (Australian)

Location: Kathmandu, Nepal

Duration: 90 days

Timing: August-September 2003 (30 days); March 2004 (30 days); November 2004 (30 days).

Duties: Working closely with the Forest Management, Community Forestry and Small Business/Micro-credit Specialists, the Timber Marketing Specialist (Australian) will:

- Undertake an analysis of possible management structures for timber harvesting and processing operations (August 2003);
- Undertake an analysis of the economic parameters which indicate whether milling, value adding, or round log sales are likely to be the best option for individual FUGs or clusters (August 2003);
- Explore marketing options and systems for sawn timber from community forests (August 2003);
- Explore marketing options and strategies for timber products other than sawn timber (March 2004);
- Undertake an overall analysis of the timber market in Nepal and adjoining countries (March 2004);
- Undertake an analysis of current policies and laws relating to community forests as small industries (particularly relating to income generation from communal property and taxation) and their potential effect on marketing of products from community forests, with appropriate recommendations for change (November 2004); and
- Undertake an analysis of the potential for timber commercialisation of high altitude forests (November 2004).

Reporting Relationship: The Timber Marketing Specialist (Australian) will report to the Australian Team Leader.

Deliverables:

2003

- Strategy paper of management options for timber harvesting and processing;
- Analysis paper on economic options for plantation log utilisation; and
- Strategy paper on testing and implementation of different marketing systems for sawn timber from community forests.

2004

- Strategy paper on marketing options and strategies for other timber products (March);
- Analysis paper of Nepal's domestic and international timber markets (March); and
- Analysis paper of current policies and laws governing commercialisation of common property resources, particularly in community forests (November).

Annex 2

Economic and Financial Analysis

Annex 2: Economical and Financial Analysis

Community Base Sawmill Investment - Financial Analysis

	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Income													
Volume of timber produced	cu ft		9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600
Income from timber sales	Rs		1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000
Sale of residual and firewood	Rs		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Total income	Rs	0	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000
Costs													
Capital cost of sawmill	Rs	100,000											
Capit cost of preparation for sawmill site	Rs	180,000											
Training	Rs	50,000											
Cost of production - logs													
Volume of logs	cu ft		20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Royalty	Rs		500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Felling and harvesting	Rs		300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Transport to mill	Rs		400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
Cost of production - timber													
VAT	Rs		115,200	115,200	115,200	115,200	115,200	115,200	115,200	115,200	115,200	115,200	115,200
Tranport of timber to pick up point			96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000
Cost of timber processing	Rs		576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000
Total costs	Rs	330,000	1,987,200	1,987,200	1,987,200	1,987,200	1,987,200	1,987,200	1,987,200	1,987,200	1,987,200	1,987,200	1,987,200
Net cash flow	Rs	-330,000	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200
Other econonmic benefits													
Net cost/benefite	Rs	-330,000	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200	-57,200
Internal rate of return	%	#NUM!											

Community Base Sawmill Investment - Economic Analysis

	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Income													
Volume of timber produced	cu ft		9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600	9,600
Income from timber sales	Rs		1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000	1,920,000
Sale of residual and firewood	Rs		10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Total income	Rs		1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000	1,930,000
Costs													
Capital cost of sawmill	Rs	100,000											
Capit cost of preparation for sawmill site	Rs	180,000											
Training	Rs	50,000											
Cost of production - logs													
Volume of logs	cu ft		20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Royalty	Rs		500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Felling and harvesting	Rs		300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Transport to mill	Rs		400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000
Tranport of timber to pick up point													
	Rs		96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000
Cost of timber processing													
	Rs		576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000	576,000
Total costs	Rs	330,000	1,872,000	1,872,000	1,872,000	1,872,000	1,872,000	1,872,000	1,872,000	1,872,000	1,872,000	1,872,000	1,872,000
Net cash flow													
	Rs	-330,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000	58,000
Other economic benefits													
Employment in mill	Rs		144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000
Net cost/benefit	Rs	-330,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000	202,000
Internal rate of return	%	61%											

Limitations

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The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of work and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

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