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Small forests, big ambitions and a hard reality - Community Forestry in Nepal

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Small forests, big ambitions and a hard reality - Community Forestry in Nepal[1]

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Abstract

Community forestry in Nepal is intended to reduce poverty by sustainable management of forests. Timber is one of the most high-value forest products, especially in the case of Sal (*Shorea robusta*) forests in the Terai region of Nepal. Despite having several advantages, including high value forests on fertile land, connection with transportation networks, and being close to regional markets, community forests in the Terai region produce little or no timber from their Sal forests. This research looks at what is affecting the production of Sal timber from community forests. Three aspects of community forest user groups (CFUG) are examined using institutional economics, transaction cost economics and micro-economics. First, the scale of CFUG operations is examined in terms of their ability to profitably carry out logging and organise market sales. Second, the capacity of CFUGs to carry out logging in terms of internal physical and human resources, and property rights is examined. Finally, barriers to vertical integration with the market in terms of contracting and cooperation with other CFUGs are investigated. To answer these questions, data was collected from 85 CFUGs and interviews were carried out with 39 key respondents from CFUGs, government agencies, and private firms. The results show that the size of the forest was not an issue for harvesting and marketing logs. However, the organisational capacity of CFUGs was found to be weak because of a lack of financial resources, limited property rights over timber, control over decisions by the District Forest Office, policy constraints, and corruption. In terms of vertical integration, a lack of legal rights to enter into contracts, a high degree of uncertainty about policy and property rights, small and irregular amounts timber harvest, and the interpretation of CFUG rules by the District Forest Office were found to be barriers for the formation of long-term contracts between CFUGs and private firms, and of cooperative developments between CFUGs.

Keywords: Community forest user group, institutional economics, transaction cost economics, cooperatives, contractual arrangement, Nepal

Introduction

The Community Forest (CF) programme in Nepal is considered to be one of the most successful community resource management programmes, particularly in terms of social and ecological outcomes (Kanel & Dahal, 2008). However, from an economic perspective, community forestry in the Terai, a fertile plain, appears to have failed. The Sal forests of the Terai region have a high potential to reduce poverty and in

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principle, this has been a main objective of CF through sustainable forest management. However, the economic potential of community forestry is largely unrealised, despite having many comparative advantages such as high value forests with Sal (*Shorea robusta*) and Khair (*Accacia catechu*), fertile land, relatively good road access, and the existence of local markets (Bampton & Cammaert, 2006; Oli, 2003). There is concern that high local demand for Sal timber is being fulfilled from illegal logging in public forests rather than from community forests (Chakraborty, 2001; Kanel & Dahal, 2008). Therefore, an analysis of timber production from community forests in the Terai region of Nepal is very important.

Historically, management and ownership of forest resources in Nepal has been a continuous battle between local people and the state. Before the Forest Nationalisation Act 1957, all forests were under either private ownership or indigenous management systems, and generally well-managed. The Forest Nationalisation Act 1957 brought all forests under government ownership and resulted in extensive deforestation and degradation due the loss of property and management rights. In order to reduce the heavy forest destruction caused by the Forest Nationalisation Act 1957, the government decided to return management and control of forests to local communities. It did this by introducing the community forest policy in 1989 which established the community forest user group system (Kanel & Dahal, 2008; MPFS, 1989). The CF programme became one of the most prioritised programmes of the state and was further strengthened through legal backing of the Forest Act 1993 and the Forest Regulation 1995.

Based on the Forest Act 1993 and Forest Regulation 1995, a CFUG is an autonomous and perpetual organisation (Acharya, 2005; Agrawal & Ostrom, 2001; Chakraborty, 2001; Grosen, 2000). Grosen (2000) argues that based on these legal frameworks, a CFUG is free to produce, process, and trade timber within Nepal. The Forest Act 1993, however, bans the export of timber. A CFUG can take the management responsibility of any portion of state's forest on the condition it undertakes sustainable management. According to the legal framework, ownership of forest land remains with the state, however, ownership of stocks and flows of timber and other products remain with the CFUG.

The district forest office (DFO) represents the state when dealing with CFUGs. The DFO has technical advisory as well as monitoring roles with a CFUG to ensure sustainable forest management (Mitchell, Bajracharya, & Baral, 2001). In the case of forests that remain under state management, the DFO also has policing and judicial roles. These additional roles can create problems for CFUGs because although it is unclear whether these roles are also applicable to CF, they may be exercised (Grosen, 2000). Some scholars argue that the DFO has withdrawal power over CFs as well as semi-judicial power (Mitchell et al., 2001).

The research issue in this paper is why there is little or no Sal timber being produced for the market from CFs in the Terai. The main reason for studying this issue is that CFs in this region have several advantages in terms of producing Sal timber, and thus a high potential generating revenue and reducing poverty. This research increases the understanding of timber production and organisational or institutional barriers affecting CFUGs. This understanding will help CFUGs, government agencies, and

market agents such as log buyers, sawmillers, and timber wholesalers to develop the Sal timber business, increasing CFUG income, and reducing poverty.

Literature Review

Collective action in common property resources (CPRs), such as fishery, forestry, and irrigation, is a new paradigm in sustainable management. It emerged after the seminal paper, "The Tragedy of the Commons" by Garrett Hardin in 1968 (Agrawal, 2001; Dolsak & Ostrom, 2003; Ostrom, 1990; Pomeroy, Katon, & Harkes, 2001). It was argued that collective action through an institution of local resource users can take better care of CPRs when backed by the state and with favourable policies. The success of collective action depends on clearly defined property rights over resources, financial assistance, and resource governance institutions. Community forestry is a widely used form of collective action, especially in developing countries (Agrawal & Ostrom, 2001; Antinori & Bray, 2005; Birner & Wittmer, 2000; Bray, Antinori, & Torres-Rojo, 2006; Kanel & Dahal, 2008; Zhang, 2001).

Several theories have been put forward about what factors are constraining CFs from realising economic benefit from their Sal forests in the Terai (Bampton & Cammaert, 2006; Kanel, 2006; Oli, 2003; Timsina, 2007). The first is that individual forests are too small to profitably organise harvest and market sales. For example, the average size of a CF is only 75 hectares (Kanel and Dahal, 2008). For organising harvest and market sales as a business, economies of scale is very important (Pratten, 1971; Timsina, 2007). Sakurai *et al*. (2004) studied timber production in CFs and private forests in Nepal, and found that CFs in the Terai had lower protection costs and higher silvicultural costs than other regions. However, the minimum efficient scale of timber harvest is not known.

Profitability includes an analysis of factors that affect imput costs, output prices, and productivity. This can be done using partial budget models or estimation of production and cost functions (Cubbage, Wojtkowski & Bullard, (1989) Carter & Siry, (2003)Siry & Newman, (2001). For production and cost functions, important factors for studying harvesting systems are typically tract size, stand volume, tree size, equipment configuration, production rate, or input prices. In the case of community forestry, Misra & Kant (2004) found that the conventional factors such as forest land size, forest quality, user group size were important for production as well as the non-conventional factors such as the heterogeneity, dependence of user group on forest products, village leadership, role of women, knowledge of the government orders, existence of non-government organisation (NGO), distance to the market and time.

Another possible constraining factor may be organisational or institutional problems in terms of arranging harvests for external sale. Oli (2003) found that the wood products market in Nepal was highly inefficient because of low stumpage value and high transaction costs. These were in turn caused by an unsatisfactory government regulatory role, a complicated auction process, and policy uncertainty. The transaction cost economics (TCE) considers production not only the process of transformation (production function), but also the process of carrying out business that includes additional costs, such as the cost of information, and the cost of making and enforcing negotiation (Dorward, 2001; North, 1990; Williamson, 1998). These

costs depend on the formal rules of property rights of resources and the performance of the polity, bureaucracy, and judiciary. Thus, TCE looks at the governance structure of markets, whether is is the spot market, contracting, hierarchy, or public bureau. Based on TCE, an organisation decides whether to use "buy-it" (spot market) or "make-it" (hierarchy) as a business strategy. The contracting/cooperative mode of governance structure lies between these two alternatives.

The third possible constraining factor may be institutional barriers to entering into contracts, or forming larger cooperatives for logging, processing and market sales of timber. Production studies in the case of non-timber forest products has indicated some major constraints to market development, such as remoteness, lack of market information, small amounts of forest products, and no collaboration between CFUGs and market agents (Dhungana & Dahal, 2004; Kayastha, Pradhan, Rasaily, Dangal, & Arentz, 2002). It is possible that vertical integration for an individual CFUG might be too costly because of small forest size and low timber production. This means that vertical coordination with market agents and horizontal coordination among CFUGs are potential alternatives.

The organisational capacity of a CFUG depends on factors such as the size and quality of the forest resource, the extent of property rights, access to financial resources, and support from government organisations (Antinori & Bray, 2005; Torres-Rojo, Guevara-Sangines, & Bray, 2005), and corruption (Nair, 2007). These factors are dependant directly or indirectly on economic, political, and legal environments, technology and attributes of common resources (Dolsak & Ostrom, 2003). Cooperative arrangements between small producers can be an effective means to increase bargaining power and create business opportunities. However, a number of barriers to forming cooperatives, such as insufficient capital, unskilled management, transaction costs of contracts and negotiation, weak contract enforcement, weak public infrastructure to support markets, information asymmetry, and poorly functioning factor markets (Brennman, 2004; O'Connor, 2003; Staal, Delgado, & Nicholson, 1997). Timsina (2007) reported that the only one CFUG-Cooperative sawmill of Nepal was on loss because of low human capital of management committee and constraints for timber harvesting, processing, transport and marketing because of ad hoc interpretation of policy by the DFO.

Antinori & Bray (2005) and Zhang (2001) argue that a community forestry user group can be considered as a social firm which fits between a public firm and a private firm. The community forestry enterprises of Mexico (Antinori & Bray, 2005; Bray et al., 2006) and fishery communities of New Zealand (Yandle & Dewees, 2003) are examples of social firms carrying out businesses with sustainable management of a resource. It is the context of being a social firm that creates a particular focus for studying community forestry. In particular, there is a need to understand the impact of CFUG structure and institutions on their ability to operate efficiently and profitably. In this study, these aspects are examined using a combination of profitability analysis, transaction cost economics, and instiutional economics.

Methods

Nepal consists of four main ecological regions – Terai, Siwalik or inner-Terai, Hill, and Mountain (Gautam, Shivakoti, & Webb, 2004; Pokharel & Amatya, 2000). The Terai and inner-Terai are fertile plains that range between 70 and 1200 m above sea level and extend from east to west. This region occupies roughly 20 percent of the geographical area of Nepal, but is home for about 45 percent of the population. The Rupandehi and Udayapur districts were selected from the Terai and inner-Terai regions respectively for this study. Both of these districts have relatively extensive Sal forests under community forest management, as well as long term support from international organisations for the community forestry programme.

General characteristics of the study areas and national data for comparison are given in Table 1. The two study districts are different to one another in terms of population, forest area, number of CFUG, and CF area. Population is concentrated in the Rupandehi district, whereas forest and CFUGs are concentrated in the Udayapur district. The Rupandehi district has only 23.4 percent of land area in forest, whereas Udayapur has 56.8 percent of land area in forest. Out of a total of 274 CFUGs and 59,800 hectares of forest area under community management in the two study areas, only about 20 percent of CFUGs, covering about 14 percent of community forest area, are located in the Rupandehi district. Generally, these districts are good representatives of the Terai and inner-Terai regions, and the differences in forest endowments and population in the two districts provides scope for extending the analysis to wider range of districts.

Table 1: General characteristics of study area.

Description	Unit	National	Study district *	
		Total #	Rupandehi	Udayapur
Area (’000)	Hectare	14,718	136.8	206.3
Population (‘000)	Number	26,427	708.4	287.7
Forest area (’000)	Hectare	4,800	32	117.3
CFUG	Number	14,000	56	218
CF area (‘000)	Hectare	1200	8.2	51.6

Source: *District Forest Office Rupandehi and Udayapur 2007; # Kanel 2005; CBS Government of Nepal 2007.

For the production analysis of timber, cross sectional data for 85 CFs for the year 2006/07 were collected from mainly secondary sources. These data included forest area, amount of annual harvest, logging cost, amount of labour, logging rate, transportation cost, and revenue. For the analysis of organisational capacity and contracting/cooperative barriers, qualitative data in the form of personal interviews were collected from 39 key respondents representing CFUGs, government agencies, and private firms.

The characteristics of sample CFUGs are presented in Table 2. The characteristics include household number, forest area, forest endowment per household, year of operation, annual harvest, and market sale. The snapshot view of characteristics of sample CFUGs is given in Table 2. Like the District-level statistics, the characteristics of sample CFUGs in Rupandehi are poor in terms of forest resources, and those in Udayapur are better off. For example, in Rupandehi the sample CFUGs

have large household numbers (mean 1277 households) and small forest areas (mean 168 ha), resulting in a small forest endowment (mean 0.21 ha per household), similar with the district level mean of 0.208 ha per household. In contrast, in Udayapur the sample CFUGs have relatively small household numbers (mean 217 households) and small forest (mean 268 ha) resulting into a good forest endowment (mean 1.5 ha/ household) – similar with the district level mean (1.51 ha per household).

Table 2: Summary of sample CFUGs.

Characteristics	Unit	Rupandehi district			Udayapur district		
		Min	Max	Mean	Min	Max	Mean
Household	No.	19	5480	1277	26	848	217
Forest area	ha	1.47	1558	168	4.6	824	268
Forest endowmt.	ha/HH	0.02	0.68	0.21	0.17	4.82	1.5
Operation	Year	2	14	6.5	1	14	5.8
Annual harvest	m3/group	8.2	204	49*	2.3	161	75**
Market sale	m3/group	0	65	4	12	157	38

Source: District Forest Office and Department of Forest 2008.
Note: * timber from dead/fallen trees; ** 25 m3 out of 75 m3 consists of timber from dead/fallen trees

In terms of the number of years CFUGs have been operating ('operation' in Table 2), both districts were similar. The average annual harvest of timber per CFUG was 49 m3 in Rupandehi and and 75 m3 in Udayapur. The annual harvests in the Rupandehi district were made only from dead and fallen trees because of a virtual logging ban by the DFO. However, in the Udayapur district, timber was extracted from both green and dead trees. This has flow on effects for market sales where the average market sales of roundwood per CFUG was only 4 m3 in Rupandehi and 38 m3 in Udayapur.

The production-related quantitative information were analysed using OLS. As the focus of this study was on the regular harvest of timber from green trees the production related data only from them were included in the statistical analysis. The qualitative information from interview of respondents were analysed using NVivo software and simple frequency count to extract themes of organisational capacity of CFUG and institutional barriers for contracting/cooperatives.

Results

Timber production analysis

The first objective of this study was to estimate the economies of scale of logging. The initial plan was to estimate Cobb-Douglas production and cost functions, however this proved to be impossible because logging was done through contracting and it was not possible to get useful production and cost data. In addition, as was discussed earlier, the data for this part of the analysis comes only from the Udayapur district because in Rupandehi district all harvested timber was from dead trees.

The logging in CFUGs was found to be labour intensive and using basic, local tools. On average, only 65% of the annual allowable cut (AAC) was harvested. One reason for this was that CFUGs were primarily interested in Sal timber and while they harvested that portion of the AAC, they might not harvest the AAC of other species.

Another reason for not harvesting full AAC could be an institutional. The minimum size of market sales was found 12 cubic meters. In contrast, for internal sale any small amount was found harvested.

The contract rate for logging was examined to determine whether the size of a forest had any correlation with contractd logging cost. There was found to be no link between scale and logging cost (Figure 1). The main reason for this appears to be that the piece rate for logging was determined on the basis of only logging difficulty related to topography and road access. The logging cost was lowest in flat areas (Plain) and increased with slope (Hill 1 and Hill 2) (Figure 1).

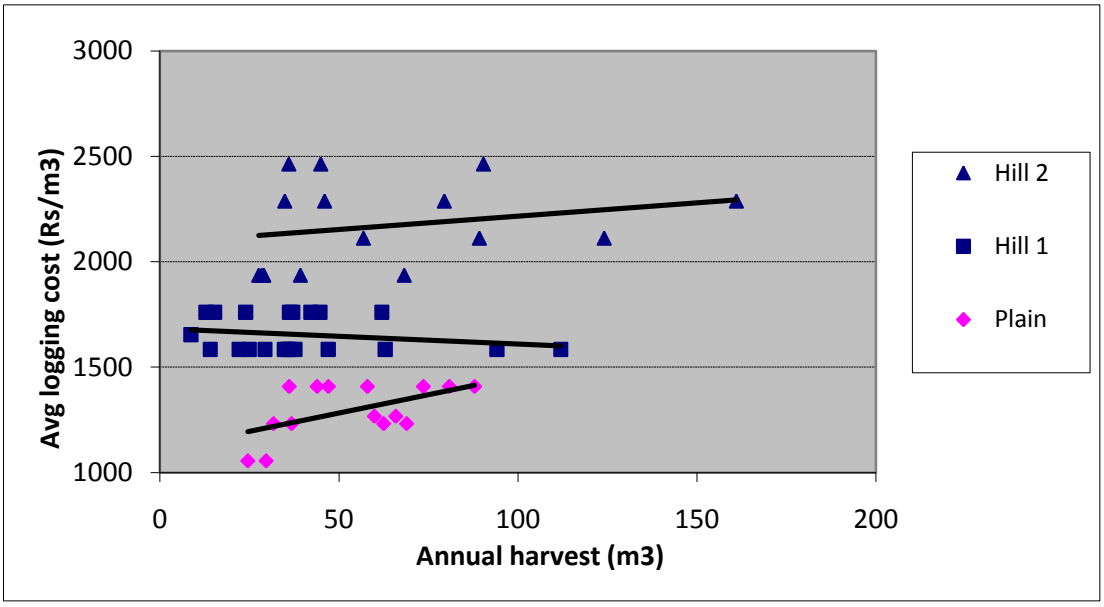


Figure 1: Effect of size on logging cost by topography of community forests

Despite the differences in logging cost between different terrain types, from the survey timber production was found to be profitable irrespective of topography. The reasons for this are that in the Nepalese context the management costs of market sales are relatively small compared to the revenue from Sal timber, and logging costs are borne by the log buyer instead of the CFUG.

Despite the profitability of timber production from CFs not all CFUGs harvested timber for market sales. Furthermore, there was variability in net revenue of CFUGs despite of having similar topography and logging costs. There might be some issues related to organisational capacity and associated transaction costs. These issues are discussed in the next section.

Although a production or cost function could not be estimated, an analysis of the factors determining the level of annual harvest (AH) was examined using OLS. A number of factors were tested, including contract logging cost, annual allowable cut of Sal, forest area, road accessibility as dummy variable, and forest location as dummy variable. The significant determining factors were found to be annual allowable cut of Sal (AACsal) and forest area (FA). The determinants of annual

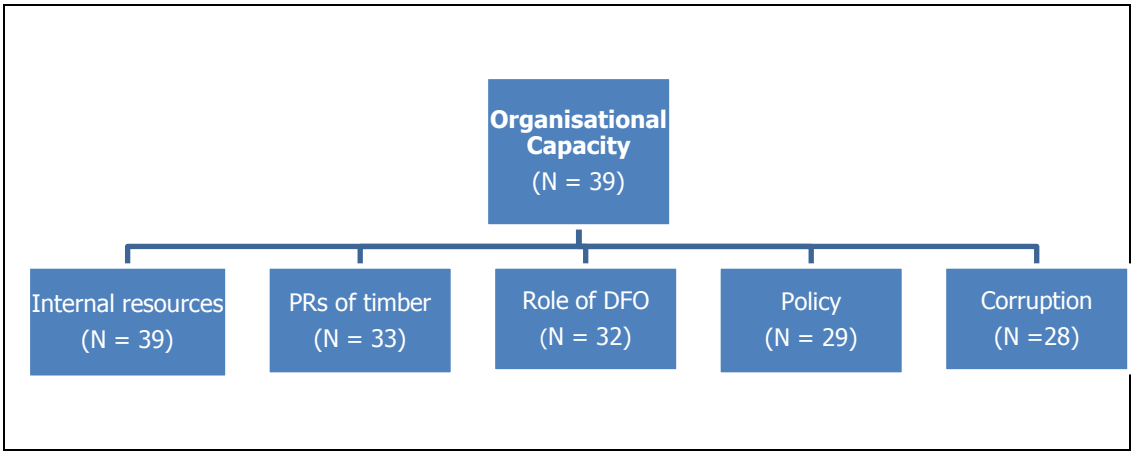
harvest of CFs similar with previous studies of Siry & Carter (2003), Mishra and Kant (2004), and Siry & Newman (2001).

$$AH_i = 5.43105 + 0.68992\ AACsal_i + 0.04503\ FA_i$$
$$t_{0.05} \quad (1.3188) \quad (11.6644) \quad (2.8820)$$
$$r^2 = 0.778 \quad d.f. = 60$$

Organisational capacity of CFUGs

The second focus of this study was whether the organisational capacity of CFUGs created a problem in organising logging or integrating vertically with the market. The organisational capacity of CFUGs were examined by asking a range of open-ended questions about internal resources such as human and financial capital, property rights over timber, relationships with external parties such as the DFO, private firms (log buyers and sawmillers) and NGOs, and policy constraints. The key themes about organisational capacity which emerged from this analysis are shown in Figure 2.

Figure 2: Organisational capacity themes



Note: N is number of respondents

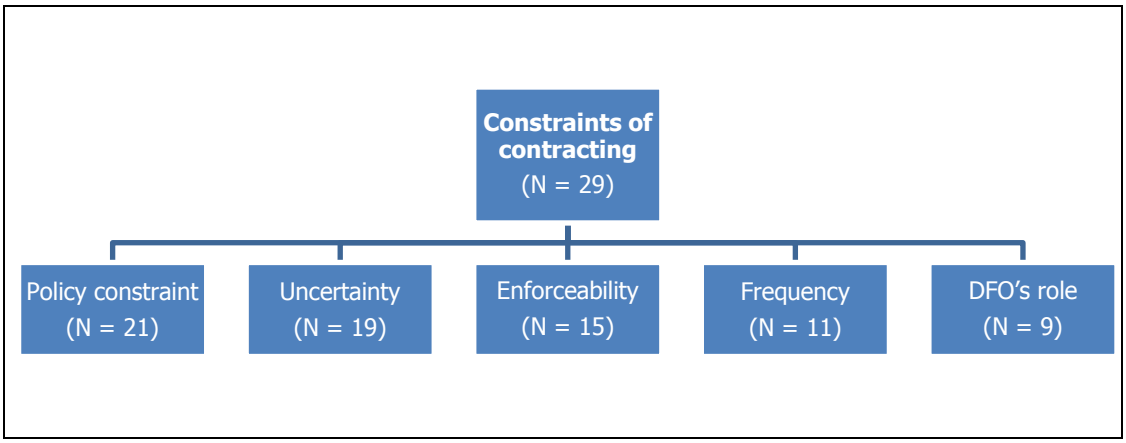
The organisational capacity of CFUGs was found to be weak because of a lack of human and financial capital, weak property rights over timber, the controlling role of the DFO, selling constraints as interpretation of CF policy for internal use of forest products, and corruption. These findings were similar with the studies of Antinori & Bray (2005), Behera & Engel (2006), Bray et al. (2006), Dolsak & Ostrom (2003), and Mishra & Kant (2004).

Contracting and Cooperative barriers

The third focus of this study was whether there are barriers to contracting and formation of cooperatives that would prevent or limit vertical integration with market. The contacting and cooperative barriers were examined by asking a range of open-ended questions about external barriers, policy constraints, different types of uncertainties, enforcement mechanisms. The results are shown in Figure 3. Respondents identified a number of barriers for both contracting between a CFUG and private firms, and for cooperative arrangements between CFUGs. There were also many constraints to making a formal contract between two parties. These

constraints include a lack of policy regarding contracts, legal restrictions against the ability to contract, uncertainty over behaviour of private firms, timber market, quality and measurement of timber, lack of enforceability, small quantity and irregular production of timber, and the controlling role of the DFO. A majority of respondents believed that the contracting form of vertical integration could be beneficial to CFUGs as well as to private firms. However, it appears that formal contracting between a CFUG and a private firm for vertical integration of timber production and marketing is a difficult task. In Udayapur district, some CFUGs were found to be entering into informal contracts with private firms for logging and sales.

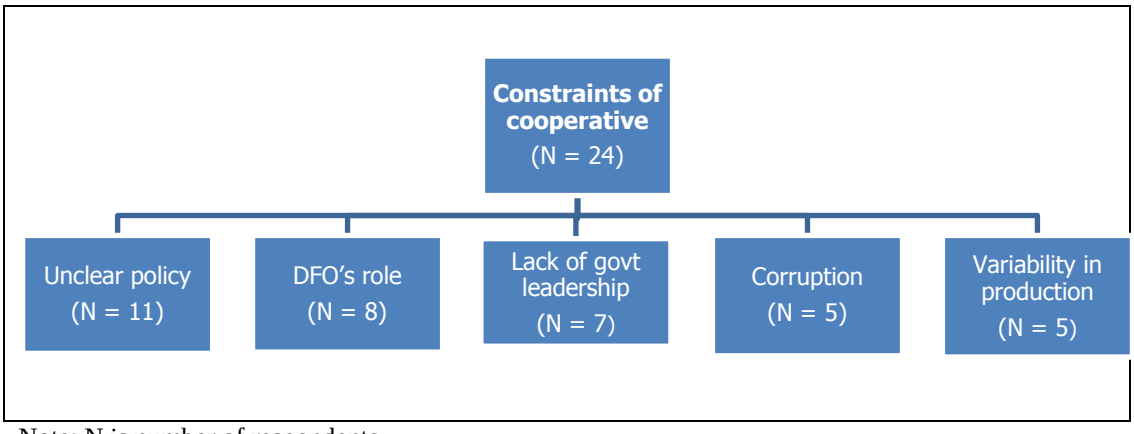
Figure 3: Contracting barriers themes



Note: N is number of respondents

Figure 4 shows the results of a similar analysis of the potential and constraints to cooperative arrangements between CFUGs. Almost all of the 29 respondents interviewed believed that cooperative arrangements could benefit CFUGs. In fact, some CFUGs have already initiated preliminary forms of cooperation. However, for a formal cooperative arrangement, there are some constraining factors. The constraints were found to be an unclear policy, the DFO's unsupportive role, lack of government leadership, corruption, and variability in the quantity of production. Respondents generally considered a cooperatively operated sawmill when asked about possible cooperatives.

Figure 4: Cooperative barriers themes



Note: N is number of respondents

Compared to contracting, cooperative arrangements between CFUGs seem to be less constrained. Initially, CFUG cooperatives, even informal, could give bargaining power while selling logs to private firms. At later time this could be further developed for sawmilling, value added processing, and selling finished products like furniture. These latter types of production must be registered formally at the District Cottage and Small Industry Office. It became clear that the cooperative arrangements between CFUGs could be done by putting detail scheme of cooperatives formation in the work plan of CFUGs. However, to make this happen, it appeared to be a challenging task to convince the DFO.

Conclusions

The purpose of this study was to investigate why little or no Sal timber was being supplied to the market from community forests of the Terai and Inner-Terai regions of Nepal. The three specific objectives of this study were to investigate whether the size of an individual community forest created problems in the efficiency of timber production, to examine whether the organisational capacity of a CFUG was a problem for organising logging and market sales, and to determine whether there were barriers to contracting between a CFUG and market agents, or to cooperative arrangements among CFUGs for logging, processing and market sales.

The results show that terrain and road access were the key factors in determining contract logging costs, and that economies of scale did not have any influence due to the low level of capital investment in logging and log transportation. The level of annual harvest of a CFUG was found to be correlated only to the annual allowable cut of Sal and the area of forest. The organisational capacity of CFUGs to manage timber harvests and market sales was also found to be weak. The organisational capacity in terms of internal resources such as human capital and financial capital, property rights of timber, the role of the DFO, variations in the interpretation of policy, and corruption were found to be the key problems. In terms of the ability to undertake vertical integration through contracts or cooperative arrangements, there are a number of institutional and other barriers. A lack of legal rights to enter into contracts, a high degree of uncertainty about policy and property rights, and the interpretation of CFUG rules by the DFO were found to be the key institutional barriers. The small and irregular amounts timber harvested were also found to be a barrier to the formation of long-term contracts between CFUGs and private firms, and of cooperative arrangements betweem CFUGs. The institutional barriers to contracting were found to be stronger compared to the development of cooperative arrangements.

The study shows that the organisational capacity of CFUGs could be increased by developing mechanisms to provide financial assistance to prepare for and undertake logging, ensuring clear property rights over timber, and reducing the control of the DFO. In addition, policy constraints or confusion regarding timber processing and market sales need to be removed. CFUGs need to be allowed to establish contractual arrangements with sawmillers and wholesalers, and supported in the development of cooperative arrangements. Lastly, the recurrent them of curbing or removing the potential for corruption needs to be addressed.

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