
Original Article

Social Inequality, Local Leadership and Collective Action: An Empirical Study of Forest Commons

Bhim Adhikari^{a,*} and Salvatore Di Falco^b

^aSchool of Natural Resources and Environment, University of Michigan.

^bLondon School of Economics and University of Kent.

E-mail: bhim_adhikari@yahoo.com

Abstract Previous research has identified a range of variables conducive to the self-organization of user groups for participatory resource management, including the physical and technical attributes of the resource, the characteristics of user groups and the nature of institutional arrangements. This paper focuses on household characteristics such as caste and income, and analyzes their impact on the probability of membership in the decision-making unit of local forest management institutions, drawing on primary data from a survey of eight community forest user groups in the mid-hills of Nepal. It shows in particular that members of households belonging to lower-caste groups have a lower probability of being elected as members of the executive committee of user groups. The participation of such households in village meetings, however, also increases the probability of membership within the executive decision-making unit, suggesting that household participation can help to achieve fairer forms of village-level collective action.

La recherche sur les groupes participatifs de gestion des ressources a identifié un large éventail de variables favorisant leur émergence, y compris les attributs physiques et techniques des ressources en question, les caractéristiques des membres utilisateurs, ainsi que la nature des arrangements institutionnels. Cet article se focalise sur certaines caractéristiques des ménages dont sont issus les membres utilisateurs de ces groupes, telles que la caste et le revenu, et analyse leur impact sur la probabilité d'adhésion à l'organe exécutif de groupes locaux de gestion de ressources forestière, en se basant sur des données primaires tirées d'un recensement de huit groupes dans des communautés de la zone des collines du Népal. Il est démontré que les membres de ménages appartenant aux groupes de caste inférieure ont une probabilité moindre d'être élu au comité de direction. Cependant, la simple participation de ces ménages aux réunions de leur groupe augmente la probabilité d'adhésion d'un de leur membre à l'organe exécutif, suggérant que la participation elle-même peut intrinsèquement promouvoir des formes d'action collective plus justes au niveau local.

European Journal of Development Research (2009) **21**, 179–194. doi:10.1057/ejdr.2008.16

Keywords: community forest; caste; decision-making; local leadership; social exclusion; collective action

Introduction

A flourishing body of literature has suggested that community management of common-pool resources (CPRs) can be a viable way to achieve economic, environmental and social development goals (Jodha, 1986; Wade, 1988; Ostrom, 1990; Baland and Platteau, 1996). A significant body of theoretical literature shows that communities can develop institutional mechanisms limiting unregulated extraction from CPRs (Sethi and Somanathan, 1996). CPRs encapsulate both public and private goods characteristics. It is difficult to

exclude anyone from their use, and the benefits are subtractable. However, these institutional solutions suggest that it is possible to create defined user groups for the use of CPRs where free riding can be avoided. Multilateral environmental bodies, including the 1992 Earth Summit and the United Nations Conference on Environment and Development, have taken the position that 'sustainable development' requires community management of resources (Leach *et al.*, 1999). An increasing number of scholars advocate that decentralized collective management of CPRs by their users would be an appropriate and more effective system for governing natural resources in developing countries (Agrawal and Ribot, 1999; Agrawal and Ostrom, 2001).

In Nepal, as in other developing countries, the development of community-based resource management has led to the devolution of forest management from centralized government control to local user groups. This process has been developing since the mid-1980s, when national forests were progressively handed over to forest user groups (FUGs). According to a recent National Database record, there are already about 14 500 FUGs managing approximately 124 000 ha of forest, which cover more than 35 per cent of the population of the country (NPC, 2007). The new policy emphasized the handover of all accessible hill forests to local communities so that all government forests in the hills are managed as community forests, and all of the benefits from such forests go to the community. This became an integral component of the poverty reduction strategy in rural Nepal, as community forests are contributing significantly to local livelihoods in terms of daily essential supplies such as fodder, fuel wood, agricultural tools and other forest products. Based on a study of 1788 FUGs from Terai, mid-hills and mountains, Kanel and Niraula (2004) estimated that these forests contribute significantly to household income in terms of timber (69 per cent), fuel wood (19 per cent), and fodder and leaf litter (10 per cent), as well as a supply of a large amount of non-timber forest products. They further estimated that the annual income from Nepal's community forestry (CF) would be a total of Nepalese rupees 913.8 million (USD 14 millions), which could be even higher if properly valued.

Despite this success, in recent years issues related to the equity aspects of forest management (for example, distribution of costs and benefits and access to decision-making process) have been scrutinized. These issues are identified as second-generation challenges of CF in Nepal (Kanel, 2008). Of special interest to the study of this governance evolution are socially constructed differences such as the caste system, which often dominates discourses related to access to resources and social exclusion in Nepal. There is evidence that households belonging to lower-caste groups are disproportionately represented in decision-making authority and in benefit-sharing, which results in marginalization and social exclusion (Hobley, 1990; Hughes, 1993; Baker, 1997; Lama and Buchy, 2003; Dhakal, 2006; Tiwary, 2006). Caste is a hereditary socioreligious ranking often associated with occupation (Ostwald and Baral, 2000). Although the Nepalese government has declared the caste system 'non-existent' and social barriers between higher and lower castes are gradually breaking down, this system still remains influential.

The caste system is a significant social institution in Nepal and India; however, there is a difference when comparing caste systems in these two countries. For instance, India has much stronger affirmative action programs and preferential politics, as the government provides reservations for government jobs and university seats in programs of higher education for people from lower castes and other under-privileged communities. At the same time, the effects of caste are only slowly being eradicated, as changes are met with stiff resistance in many parts of the country. Nepal has been much slower in

pursuing change, although this situation is beginning to alter following recent political developments.

This paper addresses the issue of caste and exclusion in collective action, using data from eight different community forests in the middle hills of Nepal. Researchers have argued that lower-caste people are excluded or prevented from participating in CF programs (Hobley, 1990), and that powerful individuals tend to capture local management institutions by excluding socioeconomically under-privileged groups (Hughes, 1993). In this study, we are particularly interested in exploring whether caste correlates with the household membership of the executive committee of community forestry user groups (CFUGs). This issue deserves particular attention because the government of Nepal is currently in the process of writing a new constitution for the country, which aims to address the persistent legacy of interconnected caste-, ethnic- and gender-based exclusions along with restructuring the state as a democratic federal Republic. In particular, this analysis looks at whether there is any relationship between caste and the probability of households having an elected member of the executive committee (forest management decision-making body) of CFUGs. The findings of this paper seek to contribute to the general understanding of caste and social exclusion, and to identify opportunities that will move the development agenda in this area forward.

This paper builds upon earlier work on local heterogeneity and distributional implications of community-based forest management in Nepal to explore how attributes of households, with a focus on caste, influence the access and the management of the local community forests. Adhikari (2005) analyzed the distributional implications of CF on different socioeconomic groups, with a particular emphasis on group heterogeneity. Adhikari *et al* (2004) estimated three different regression models in order to understand the relationship between key household characteristics and the dependency on community forests. Finally, Adhikari and Lovett (2006) take a slightly different stance and look at the issue of group heterogeneity and the performance of collective action using qualitative analysis. This paper aims to complement this existing literature by quantitatively analyzing the relationship between caste and local leadership. We use the same data set as in these three published papers. To our knowledge, there exists no rigorous quantitative study explicitly analyzing this relationship in the context of community-based forest management, despite the widespread recognition of the role that caste plays in South Asian society.

Our study begins by estimating a probit model to assess the role that being lower caste and the other explanatory variables played in the probability of individuals becoming members of the executive committee of the CFUGs. In addition to the focus on caste, the model controls for the role of participation of households in community gatherings. Participation is here 'proxied' by meeting attendance. We therefore included in the set of explanatory variables the number of attended meetings regarding community development issues at the village level. We found a significant and negative correlation between being lower caste and the probability of households having individuals elected as members of the executive committee. We also found that relatively richer and more educated households are more likely to have members. This indicates that local elites can retain much control over all aspects of decision-making.

The paper begins with a section that provides an account of the role of caste and access to decision-making, with a special emphasis on community-based development intervention and resource management. Methodological issues, survey design and data collection are then discussed in a third section, while the subsequent section reports on the

econometric models, and the penultimate section provides the results obtained from the analysis. The final section provides the major conclusions.

Caste, Forest Commons and Collective Action: Insights from the Literature

Like other parts of South Asia, Nepal demonstrates a distinct social stratification based on the caste system, and also encompasses a wider socioeconomic heterogeneity (Adhikari and Lovett, 2006). The dogma of the caste system, though, still remains a contentious issue; it continues to act as an obstacle in the development of communities belonging to the lower social classes. An important part of the caste system is that lower-caste people often face a multitude of disadvantages in land endowment, socioeconomic marginalization, participation in decision-making processes and employment opportunities (Lawati, 2005). The caste system and its attendant practices have been outlawed and declared punishable offenses for quite some time, but these laws are difficult to implement, and the caste system continues to exist, to varying degrees, in the hills and mountains and in the urban areas of the country. A number of ethnic groups and lower-caste people still live in conditions of great poverty and social disadvantage, forming the most impoverished segment of society. Approximately 42 per cent of the population of the country lives below the poverty line; of these 35 per cent belong to so-called 'untouchable' caste groups. This is largely due to the economic marginalization of these groups, which is further aggravated by their lack of access to political decision-making institutions.

The origins of the caste system in the Indian subcontinent go back to the Aryan invasions around 1500 BC. The Aryans came from south Europe and north Asia, and were lighter skinned compared to the darker natives (Dirks, 2001). A pyramidal caste system rapidly developed, which legitimated the dominance of the Aryans, with their priestly and warrior classes at the apex of the pyramid, respectively the Brahmans and the Rajayana (a category that later became the Kshatria). A third group was the Vaisia (farmers and craftsmen). Most of the native communities of the Indian subcontinent were integrated into a fourth category, the Sudra, or were made outcasts, depending on the professions they were associated with (Dirks, 2001). Communities that professed non-polluting jobs were integrated as Sudra, whereas communities associated with polluting professions were considered 'untouchable'.

The caste system in Nepal can be traced back to the migration of immigrants from the Gangetic plains and the ascendancy of the Hindu religion. These events occurred during the early Christian era. The caste system was, however, modified to accept within its fold ethnically Tibeto-Burman groups, and furthermore, although caste groups were initially closely related to the division of labor, as was also the case elsewhere, they became increasingly associated with a range of different professions. For instance, untouchables – also known as *Dalits* – can be engaged in a range of professional activities, as is well exemplified by the proliferation of *Dalit* sub-categories such as *Kamis* and *Lohars* (both blacksmiths), *Sunars* (goldsmiths), or *Sarkis* (cobblers), for example. Indeed, Pradhan and Shrestha (2005) posit that there is no agreement concerning the exact number of *Dalit* castes in Nepal, making it difficult to estimate the exact population. For example, the National Dalit Commission lists 28 *Dalit* castes, whereas the 2001 Census lists only 16 *Dalit* castes. The largest *Dalit* group is the *Kamis* (blacksmiths), who make up 30 per cent of the *Dalit* population, followed by the *Damai* (tailors as well as musicians, 13 per cent), the *Sarkis* (cobblers, 11 per cent) and the *Chamar* (sweepers, 9 per cent).

Although a number of development initiatives try to address the issue of caste and social exclusion, the access to the broader political and economic system by socially and economically backward communities in Nepal is still considered to be inadequate. Poorer households usually affiliated to lower-caste groups do not necessarily benefit as much as the relatively richer households from higher-caste backgrounds in deriving benefits from local development interventions. For instance, ethnic minorities and indigenous people, who represent a significant number of landless households marred with poverty, have tended to lag behind in benefiting from any community-based development initiatives (Dhakal, 2006).

Caste discrimination is a strong determining factor for exclusion in various forms of collective action. In particular, it is often asserted in the context of natural resource management that households belonging to higher-caste groups often have privileged access to village leadership and decision-making processes of the local commons (Beteille, 1983). For instance, in his study of 39 traditional canal systems in India, Baker (1997) concluded that upper-caste farmers are always in a better position to use more water, as they are located at the head-end of irrigation water supplies. Tiwary (2006), for his part, systematically explored water resources access structures, and highlighted the cumulative inequality that low-caste groups face in rural India (see also Singh, 2004). Hildyard *et al* (1998) describe a similar dominance, with specific reference to joint forest management systems in India, arguing that effective participation would require wider processes of social transformation and structural change to the system of social relations through which inequalities are reproduced, and that without this marginalized caste groups cannot obtain enhanced access to the resource base (see also Poffenberger, 1996; Sundar, 1997). They are echoed by Dhakal (2006), who highlights in his study of community-based organizations (CBOs) and local democracy in Nepal that, 'the males and high caste groups are, for instance, dominant in terms of number and influence in CBOs compared to low caste groups and women and that the CBOs, which are usually considered to be a key mechanism for social inclusion, can be liable to elite capture'.

In general, as Bhatia (1997) has pointed out in his study on power, equity and conflicts in South Asia, 'while some conflicts in community-based resource management are caused by disagreements related to access and distribution of community forestry resources, in many cases the causes are actually based on class, caste, gender, and power but manifest themselves in the guise of community forestry'. For this reason, Graner (1997) has argued that the shift in forest management from state control to community ownership in Nepal has not necessarily helped the poor people, but has often worked to their disadvantage. In many cases, the poor have not been included in new forest management decision-making body (that is, forest users committee), principally because fuel wood sellers and other occupations associated with particular (generally lower) castes have not been effectively represented within the new operational regime. Thapa *et al* (1998) posit that even when a person from a lower-caste group is represented on the committee, their views are often disregarded and they have less bargaining power at community meetings and assemblies (see also Joshi, 1997).

At the same time, however, many of these claims are contested by other scholars. For instance, a study conducted by Sharma (2002) that examined the use of forest products from the community forests according to wealth and caste difference failed to reveal any discrimination against the poor or lower-caste people. He further argued that CF still remains a viable strategy for securing basic needs as it can contribute to poverty reduction because the poor and low-caste households have easy access to forest products. Although

this study did not find any significant differences between forest products harvested by different wealth groups, the paper acknowledged that the exclusion of lower-caste and economically disadvantaged people during the formation of CFUGs was not included in the analysis, making it difficult to conclude whether caste does matter in CF programs (Sharma, 2002).

Pokharel's (1997) work on CF in Nepal highlighted the role of community-based approaches as a vehicle for bringing social change such as empowering the poor and disadvantaged members of the community. The CF program he examined was able to raise awareness among marginalized members of the group in matters related to inequality, social injustice and their exclusion from social and political processes, including a fairer distribution of the benefits of mainstream development. In terms of participation, the CF program was a significant contributor to increasing participation of many marginalized sections of the community due to increased representation on users committees. As a result, many of such marginalized communities have begun to voice their concerns in meetings and assemblies through their representatives. However, this review study was based on an assumption that CF should enhance the institutional capacity of FUGs through awareness-raising among disadvantaged and marginalized members of the group without actually analyzing whether this noble objective was achieved on the ground from an empirical perspective.

A general perception from these different studies is that caste, social exclusion and access to natural resources are still contentious issues with regard to community-based resource management. Though caste aspects of rural development and issues of social exclusion have been well studied in India, no systematic effort has yet been undertaken in Nepal other than a few studies on historical aspects of the caste system. Although some studies touched upon the broader questions of caste inequality and the distribution of benefits from forest commons (Adhikari *et al*, 2004; Adhikari, 2005), or else the contradictory laws and uncertain policy concerns surrounding such issues (Chapagain *et al*, 1999), very little has been written about the ongoing local-level struggles of lower-caste communities to exert control over local resources. In particular, scant attention has been given to the role of caste in local leadership, and the part played by social policies and institutions in the organization of the social relations of access to and control over local commons. In part, this is because of the seeming intractability of these questions, where a community-based approach to natural resource management is often seen as a panacea. In this context, it is interesting to examine how the caste system influences the participation of rural households in managing the local commons. The focus of this paper is concentrated around how caste influences the probability of any given households being represented in the decision-making authority of forest management institutions and in the structured form of common property resource management.

Survey and Variables

Data for this paper were drawn from a survey conducted in 2000 of two districts in the middle hills of Nepal, Kavre Palanchok and Sindhu Palanchowk. The mid-hills comprise the central area of Nepal, with a mixture of agricultural and forested land. The majority of the population in this area is composed of subsistence farmers, depending on the surrounding agricultural and forested land, with livestock playing an important role in their livelihood options (Adhikari, 2005). The mid-hills run from east to west across the

center of the country, sandwiched between the low-lying Gangetic plains (Terai) and the snow-capped Himalayan Mountains. Altitude in the mid-hills ranges from 300 m in river valleys to 5000 m on hill-tops. Land uses in this region are categorized as cultivated land, non-cultivated inclusions, grasslands, forestland, shrub lands and other types of land use.

The choice of two middle-hill districts does not imply that the problems of forest management in the low-lying Terai region are of less importance. This latter region differs, however, from the mid-hills significantly in terms of socioeconomic, biophysical and issues related to natural resource management, and is moreover being developed very differently agriculturally and industrially. Moreover, the sheer magnitude of the problem and extent of national and international CF interventions in the mid-hills also prompted the choice of districts for this study. A number of bilateral and multilateral donor agencies such as the Nepal–Australia Community Forestry Project, the FAO (Food and Agriculture of the United Nations), UNDP (United Nations Development Programme) and other donor agencies are working in these two districts on CF and leasehold forestry programs, while the fact that CF has been in existence in these districts for up to 20 years provides a suitably lengthy timeframe within which to study the resource use patterns by gender and caste. At the same time, as there is a fair degree of variability within the two districts in terms of biophysical and socioeconomic characteristics, this deliberate selection of sites was considered likely to yield more information on the nature of project impact for a minimum level of study resources than a strictly random selection of districts would have (on this issue more generally, see Collett *et al.*, 1996).

The next task was to select FUGs from the two districts under consideration. The focus of the field survey was to evaluate the contribution of forest products to the household economy and assess the distributional implications with reference to socioeconomic inequality. In this respect, it was necessary to select only those FUGs that have already reached a mature stage in terms of benefit distribution (they must be at the stage of providing forest products to the community) and properly operating in accordance with the forest management plan. As some FUGs (or community forests) in a village are at a very young stage (the forests, which are highly degraded, having just been handed over to the local community, and the community having planted tree seedlings that were still very young), these FUGs were already excluded during the FUG selection process. From the remaining FUGs in the village, the following criteria were considered for the selection of FUGs: (1) the age of FUGs (that is, FUGs officially handed over to the community at least 5 years before the study); (2) the nature of forest resources (representative forest types); (3) the FUGs at the stage of substantial harvesting and benefit-sharing; (4) ethnicity/caste representation; (5) FUGs representing different income groups; (6) the apparent degree of success of interventions; (7) the apparent degree of success of user groups; and (8) the distance from the market.

Furthermore, the selection was also made on the basis of the magnitude of institutional build-up that had taken place over the past 5 years in these villages. In order to address the research questions, four FUGs in Kavre Palanchowk district – Saradadevi FUG, Jyala Chiti FUG, Mahavedsthan FUG and Thuli Ban FUG – and four FUGs in Sindhu Palanchowk district – Gaurati FUG, Shree Chhap FUG, Janghare FUG and Karki Tar FUG – were selected. In Kavre Palanchowk, Saradadevi and Thuli Ban FUGs were closer to the district headquarters and the remaining two were located relatively farther. Except Gaurati FUG, all remaining FUGs in Sindhu Palanchowk were far from the district headquarters. The villages were also different in terms of their accessibility. Of the eight villages (FUG), only three, Thuli Ban, Jyala Chiti and Janghare, were connected by

Table 1: Number of sample households in each FUG and income group

<i>FUGs</i>	<i>Income group</i>		
	<i>Poor</i>	<i>Middle</i>	<i>Rich</i>
Saradadevi	9	18	3
Jayala Chiti	14	19	10
Mahadevsthan	5	13	13
Thuli Ban	11	28	19
Gaurati	5	8	16
Shree Chhap	4	23	15
Janghare	29	12	6
Karki Tar	4	15	10
Total	81	136	92

an all-weather road, and hence by bus service. Three villages, Karki Tar, Mahavedsthan and Shree Chhap, were situated more than 5 km from the nearest market. Although all villages had one primary school, health infrastructure was uniformly underdeveloped in all villages.

Within these FUGs, a sample of households was selected randomly for interviews based on their wealth ranking. This wealth ranking was constructed after carrying out a participatory rural appraisal exercise that ranked households according to criteria that the villagers themselves considered important in assessing a household’s position within the village (Adhikari, 2005). Livelihood activities in the mid-hills of rural Nepal are quite diverse. People are engaged in a variety of income-earning opportunities to sustain subsistence livelihoods. As it is very difficult to categorize households into different income groups based on a single criterion such as continuous income, households were divided into three income groups – poor, middle and rich based on the amount of land owned, the amount of off-farm income, food sufficiency and the quality of land ownership within each household. Fox (1983) and Richards *et al* (1999) have used similar criteria for categorizing households according to different income groups. This categorization should be understood in relative terms, as all households in the study area were subsistence farmers, with few households having outside earning opportunities other than agriculture and forest-based incomes. A total of 330 interviews were conducted, with 21 questionnaires being excluded from the final analysis because they were incomplete. The survey focused on obtaining demographic information, land holding and tenure information, use and management of the community forest, participation and membership of households in FUG by caste group and awareness of decision-making aspects of FUGs. Table 1 presents the number of sample households in each FUG and income group .

From the survey, a set of variables was selected for inclusion in the econometric model. The variables used in this analysis are summarized in Table 2, which defines the explanatory variables incorporated in the econometric analysis.

Analysis

We analyzed the role of lower-caste status, other socioeconomic variables and the level of participation, regarding the probability of specific households having one of their members on the FUG committee. To this end, we adopted a Probit model. The estimated

Table 2: Definitions for summary statistics for the explanatory variables

<i>Variables</i>	<i>Definition</i>	<i>Mean</i>	<i>Std. deviation</i>	<i>Min</i>	<i>Max</i>
Participation	Attendance in meetings in village meeting related to the management of the forest	4.32	5.04	1	36
Lower caste	Household belonging to the untouchable caste (if untouchable caste = 1, 0 otherwise)	0.120	0.326	0	1
Income	Total household income in rupees	85 519	76 404	0	488 150
Membership	Household belonging to the FUG committee (if yes = 1, 0 otherwise)	0.18	0.86	0	1
Education	Average education of adult family members (in years)	4.640	3.918	1	16
Age	Age of the household head (in years)	43.708	12.900	22	84
Labor	Units of labor per household	1.15	0.77	0.07	5.7

equation is called the ‘membership equation’. Therefore, the socioeconomic characteristics – income, education, age, caste, participation and labor units – of households are also assumed to be determinants of membership in the common property forest. The membership equation is given as

$$M_i = \beta_1 \text{Income} + \beta_2 \text{Education} + \beta_3 \text{Age} + \beta_4 \text{Lower caste} + \beta_5 \text{Labor} + \beta_6 \text{Participation} + \eta \quad (1)$$

where M_i is a binary variable that is equal to 1 if the household has a member in the FUG committee and 0 otherwise, and η is the error term.

We considered whether the model would be subject to endogeneity bias. This would occur if some of the explanatory variables were choice variables. In such a situation, these explanatory variables would be correlated with the error term. For example, if participation were correlated with the error term η in (1), the estimate of the effects of participation on the probability of membership in the FUG would be biased. In other words, the estimated coefficient would not be reliable. To tackle endogeneity, our estimation strategy is threefold. First, we included FUG-specific fixed effects. This removes FUG-specific unobserved heterogeneity such as institutional and other unobservable FUG effects, thus possibly reducing the correlation between explanatory variables and the error term (see Hsiao, 2003). This implies that endogeneity bias may be less severe.¹ Second, the explanatory variables were tested for endogeneity by using a Wald test.² We found evidence of endogeneity for both participation and income. Thus, these two variables should be considered choice variables, and are correlated with the error term. Third, we switched to an instrumental variables (IV) approach. Screening our database, we found five possible instruments: the number of trees on the household’s private land, household size, whether members of a household have migrated, cattle and land endowment. The appropriate implementation of the IV estimator required that the set of explanatory variables that was used as instruments would not be correlated with the error term in the equation (1), but correlated with the endogenous variables. To scrutinize our choice of instruments, we therefore tested for their relevance by using an F test of the joint significance of the excluded instruments. We rejected the null hypothesis, indicating that the instruments were relevant. Thus, these variables were correlated with participation and income.

Table 3: Estimation results probit and IV probit

Variables	Probit		IV Probit	
	Coeffs	Standard errors	Coeffs	Standard errors
Participation	0.164***	0.032	0.22***	0.07
Lower caste	-0.74***	0.2	-0.37**	0.2
Age	-0.014*	0.008	-0.014**	0.0067
Education	0.029**	0.01	0.015	0.016
Labor	0.0105	0.198	0.097	0.21
Income	0.0000003****	0.00000002	0.000005*	0.000003
Constant	-1.31***	0.41	-1.82	0.31

N: 285; FUG Fixed effects inserted. Pseudo R^2 0.25; Wald test of exogeneity: $\chi^2(2) = 11.6$; $\text{Prob} > \chi^2 = 0.003$. Hansen J statistic (over identification test of all instruments): 0.96; $\chi^2(3)$ P -val=0.8. Test of excluded instruments for Income: $F(5268) = 17.18$ $\text{Prob} > F = 0$; Test of excluded instruments for Participation: $F(5268) = 3.9$ $\text{Prob} > F = 0$. Significance levels are denoted by one asterisk (*) at the 10% level, two asterisks (**) at the 5% level, three asterisks (***) at the 1%.

We also tested the over-identification restrictions using a Sargan Hansen test of over-identifying restrictions. This was implemented for our model estimated with IV in which the number of instruments exceeded the number of covariates, and therefore we had an over-identified equation. The joint null hypothesis is that the excluded instruments are valid instruments. We failed to reject the null hypothesis, so the instruments appeared to be uncorrelated with the error term and correctly excluded from the estimated equation.³ The results of the test are reported at the bottom of Table 3. We also tested for severe co-linearity (that is, strong correlation among regressors) via the computation of the variance inflation factors (VIF). This method detects the severity of co-linearity by assessing the extent to which every single explanatory variable can be explained by the other explanatory variables in the model. While there is no table of critical values for the VIF, a common rule of thumb is that if $VIF(\beta_i) > 5$, co-linearity is severe. The results were VIF values of all the explanatory variables of between 1.03 and 1.2. Thus, no evidence of severe co-linearity was found.

Empirical Results

Table 3 reports the econometric results of the membership equation for both Kavre Palanchowk and Sindhu Palanchowk districts. We hypothesized that the probability of a member of any given household being elected to the executive committee of FUGs was related to caste and other socioeconomic characteristics of participating households. This relation can be specified as follows:

$$\text{Prob}[Memtype = 1] = F(\text{constant}, \text{lower caste}, \text{income}, \text{age}, \text{education}, \text{participation}, \text{labor}) \tag{2}$$

After controlling for missing values and outliers, 285 households remained. For these households belonging to the eight different FUGs that managed a specific forest, the allowed observations were not independent within groups (although they were still independent between groups). Therefore, the observations were independent across groups (clusters), but not necessarily within the group. Table 3 reports both the standard probit

and the IV probit estimation. The results are qualitatively quite similar. Focusing on the results obtained by the consistent IV probit approach, we found that the probability of an individual becoming a member of the FUG committee was sensitive to some socio-economic variables. The estimated coefficient for lower caste is negative and statistically significant (at 5 per cent level). This implies a negative relationship between being lower caste and the probability of being elected as a member of the FUG executive committee. This supports the argument discussed earlier that lower-caste households are less likely to take part in the decision-making and governing body of the FUGs. Relatively better-off households, instead, have a positive estimated coefficient (statistically significant at the 5 per cent level). This observation is similar to that of Singh (2004), who argued that leadership in water management issues is exercised by the senior group from the dominant caste in India.

Age negatively affects the probability of membership. The estimated coefficient for labor units per household was found to be insignificant in both standard probit and IV probit, whereas the estimated coefficient for education is positive and statistically not significant only in the IV probit case. On the other hand, the level of attendance at community meetings (meetings related to various aspects of forest management) seemed to play an important role in determining the probability of being elected to the executive committee of the FUG. Indeed, the estimated coefficient is positive and highly significant. In other words, households that allocate time to participate in community meetings that relate to forest management have better chances of having a member elected to the decision-making body.

The calculation of the marginal effects highlighted the relative importance of the variable lower caste. This was found to be the variable with the largest impact on the probability of membership, displaying a marginal effect equal to -0.07 . The second-most influential variable was participation (with a marginal effect of 0.05). These results stress the importance of both household participation in community meetings and caste in collective action. The model prediction is satisfactory, as 81 per cent of the cases were predicted correctly. The most important variables that affect the probability of being elected to a decision-making unit in our models are thus caste and how often a household member participates in a variety of meetings on forest-related activities.

Disaggregating data to the district level may yield more detailed information to understand how FUGs from one district differs from another in terms of caste representation in the executive committees. Table 4 reports the results of the disaggregated analysis. The

Table 4: Estimation results for Kavre Palanchowk and Sindhu Palanchowk districts (IV Probit)

<i>Variables</i>	<i>Coeffs</i>		<i>Standard errors</i>	
	<i>Kavre Palanchowk</i>		<i>Sindhu Palanchowk</i>	
Participation	0.28***	0.092	0.24***	0.037
Lower caste	-0.85**	0.43	-0.57***	0.213
Age	-0.0135	0.01	-0.00624	0.012
Education	0.011**	0.006	0.003	0.025
Labor	0.45	0.41	-0.125	0.201
Income	0.00000159	0.00000735	0.0000051	0.000007
Constant	-1.18	1.13	-0.61953	0.645674

$N = 133$ and 152 respectively. Fixed effects were inserted.

results are very consistent with the analysis undertaken on the whole sample. In addition, the calculated marginals are very similar. For example, the caste variable is negatively associated with the probability of being elected as a member of the FUG executive committee, as predicted by the aggregated model. The remaining variables showed a similar correlation with the dependent variable.

The findings from this study are therefore different from other studies, such as those of Pokharel (1997) or Sharma (2002), who both observed that caste was not the dominating factor, ostensibly because CF programs are supposed to be bringing about social change by empowering the poor and disadvantaged members of the community. Pokharel's analysis, however, makes a number of unfounded assumptions. First, he assumes that CF will inevitably contribute to the improvement of the livelihoods of the rural people regardless of their wealth and caste status, as everyone in the village uses forests directly or indirectly. However, Adhikari *et al* (2004) have shown that income from CF is distributed unevenly among caste and income groups. Moreover, Pokharel also assumes that because a community is inevitably constituted of various groups of people from different classes, castes, genders, ethnicities and political affiliations, any community-based initiatives towards resource management will automatically involve people with different socio-economic backgrounds. This is not necessarily the case, as the fact that there are different types of resource users, who have different economic and social status, perspectives, knowledge systems, values, understandings, power and objectives, will inevitably be reflected in the formation of CFUGs (see Anderson *et al*, 1998). This means that some sub-groups within the community – owing to their initial socioeconomic endowments and operational modalities of prevalent institutions – will not be able to appropriate benefits (both in terms of resource extraction and leadership) from CF.

Pokharel's findings are, however, similar to other studies that have focused mainly on communities as opposed to households in describing the success of CPR management. This literature assumes that communities will collectively manage local resources, and distribute costs and incentives equally because of the substantive benefits to be derived from these resources. It does not examine the role that inequality plays both in accessing and distributing benefits from such community initiatives. Sharma's (2002) study, to some extent, shows some variations in forest products appropriation in two districts of mid-hills Nepal – Kabhrepalanchok and Lalitpur. Although the study was particularly designed to assess distributive aspects of CF among different income and caste groups, it actually showed the inequity in product distribution, without necessarily proposing a proper explanation. For instance, poor and lower-caste households in Lalitpur were found to use more firewood, grass fodder and leaf litter than their richer and higher-caste counterparts, but this was not the case in Kabhrepalanchok. Although different caste structures are a likely explanation, it is an issue that was left out of the scope of the paper, although Sharma acknowledges the importance of caste exclusion in the process of forming CFUGs.

By contrast, the analysis proposed in this paper has shown that there are distinct patterns in relation to both caste participation and leadership in collective action, wherein households belonging to higher castes were consistently better represented in the decision-making units of CF than lower-caste households. Although further analysis is needed to understand why lower castes are not represented in the committees, the differences in leadership in common property institutions by caste groups is likely to be an effect of the low levels of influence that lower-caste households have in village-level political spheres. Although some lower-caste and occupational households have adopted

agricultural livelihood strategies and have increased their use of forests, it remains questionable whether lower-caste groups have actually gained any political control over the village commons. Even when encouraged to sit on FUG committees, lower-caste individuals often do not have the considerable skills and other support mechanisms to make their representation meaningful, as a result of the decades of exclusion that their social group has suffered. It would be interesting, however, to conduct a research program around this to scrutinize the finding of this study on the impact of caste on local leadership, as this analysis is more suggestive than conclusive.

Conclusions

Community-based management of CPRs has been gaining momentum in many developing countries owing to their positive contributions to rural livelihoods, biodiversity conservation and local-level economic development. However, the equity aspects of CPR regimes are still contested, particularly with regard to whether a community-based approach to CPR management is necessarily equitable in heterogeneous society, exhibiting a number of socioeconomic differences among its members (Varughese and Ostrom, 2001; Adhikari and Lovett, 2006). Doubts are also strongly voiced as to whether such resource management regimes are able to increase the access of marginalized and poorer sections of the society (Campbell *et al*, 2001). Previous research on the success of community efforts in managing local commons has mainly focused on institutional and biophysical issues, and less on the cultural context of the community where these institutions are actually crafted. Ostrom's (1990) very influential work on design principles⁴ for robust CPR institutions offer a much needed framework for analyzing the success of CPR management, but – to the best of our knowledge – there is no study that takes into consideration the underlying cultural context in which community-based approaches to resource management are embedded.

This is particularly true of the issue of caste and participation in collective action in South Asia, and the study presented in this paper has focused empirically on these issues in the Nepalese context in order to infer whether the probability of being elected into decision-making authority is correlated with the caste of an individual. The findings suggest that caste may play an important role in local-level collectives, as represented by membership to the governing body of a FUG.⁵ In particular, our analysis shows that lower-caste households are less likely to be represented. This analysis complements our earlier studies on socioeconomic heterogeneity and the distributional implications of CF in Nepal, which found that both annual gross and net income from community forests are higher for richer households than that for poor ones, who are usually lower-caste (Adhikari, 2005).

Though the poor are more dependent on CPRs, better-off households are actually benefiting more from them in absolute terms. This can be plausibly related to the fact that lower-caste households often extract fewer forest products – such as trees, grass fodder and leaf litter – because they have fewer animals and land holdings, which are driving forces for biomass demand. At the same time, however, the findings also reveal an inverted U-shaped relationship: low levels of wealth are inextricably associated with higher dependency on CPR, but as income increases, CPR incomes peak and then gradually decline. Adhikari *et al* (2004) conclude that some socioeconomic variables such as education and caste are negatively related to extraction of forest products from the community forests,

but this study has found that household wealth, education, and, most importantly, caste, actually exert a significant influence on household labor allocation decisions for forest product collection, rather than the process of extraction itself.

In this regard, caste aspects of CF management turned out to be crucial, not only for the appropriation of benefits from the community forests, but also for local leadership in commons management. Caste is a social construct, and there is no silver bullet to instantly eliminate it from society. Although affirmative actions aimed at promoting equal opportunity may well produce some positive outcomes with regard to re-balancing the unequal participation of lower- and higher-caste households in the decision-making authorities of FUGs, numerous studies suggest that this is generally not necessarily the case. In their study of the cost-effectiveness of anti-poverty outlays such as the Rural Public Works and the Integrated Development Programme in India, for example, Gaiha *et al* (2001) observed that the targeted interventions of anti-poverty efforts were no different from those of a random selection from the aggregate rural population. They further noted serious targeting failures, implying substantial leakages to the affluent.

It would be useful to examine what aspects of affirmative action programs such as empowerment through training and education, or income support, manage to address the underlying structural inequities, and which do not, particularly with regard to the management of village commons. There are inherent problems with participatory processes in contexts characterized by high levels of pre-existing inequity, which have to be made more explicit. As has been shown in this paper, caste dominance for example often undermines the success of community-based approaches to resource management, leading to inequitable poverty-alleviation outcomes. Ultimately, what this arguably means with regard to CF initiatives is that they must become more explicitly focused on enacting social change, rather than forest conservation alone (Lama and Buchy, 2003).

Acknowledgements

We thank Arun Agrawal, Jan McAlpine, Nadeem Samnakay and Meeta Sainju Pradhan for their comments and advice. We thank two anonymous referees for their critical comments. The first author would like to acknowledge the research fellowship of the International Forestry Resources and Institutions program, under which this paper was prepared. The earlier version of this paper was presented at the 16th Annual Conference of the European Association of Environment and Resource Economists, 24–28 June 2008 in Gothenburg, Sweden.

Notes

1. We also considered implementing eight separate regressions corresponding to the eight different FUGs and locations. This empirical strategy is not, however, suitable in this setting. Pooling the data together, in addition to the advantage of inserting a fixed effect and tackling the endogeneity bias, allows us to use 283 observations. The number of observations per FUG ranges from 29 to 58.
2. See Wooldridge (2002, pp. 472–477) for details of this testing procedure.
3. The testing procedure is implemented on a linear probability model estimated with Two-Stage Least Squares. Although equivalent procedures for non-linear models were not at hand, the above results should provide reassurance that the instruments pass all the usual tests for the linear case.
4. Ostrom (1990) formulated eight design features for the successful CPR management of CPRs, or essential conditions that help to account for the success of local institutions. These design

principles are clearly defined boundaries, congruence between appropriation and provision rules and local conditions, collective-choice arrangements, monitoring, graduated sanctions, conflict-resolving mechanisms, minimal recognition of rights to organize and nested enterprises.

5. It should be noted that the empirical evidence presented in this paper relies on a cross-section analysis. Future effort is needed in collecting data with a time dimension. This would allow for the insertion of greater dynamism into the model, and also for the assessment of the way that past levels of household participation affect current involvement in FUGs. A time dimension would also control for unobserved households' heterogeneity.

References

- Adhikari, B. (2005) Poverty, property rights and natural resource: Understanding distributional implications of common property resource management. *Environment and Development Economics* 10: 7–31.
- Adhikari, B., Di Falco, S. and Lovett, J.C. (2004) Household characteristics and forest dependency: Evidence from community-based forest management in Nepal. *Ecological Economics* 48(2): 245–257.
- Adhikari, B. and Lovett, J.C. (2006) Institutions and collective action: Does heterogeneity hinder community-based resource management? *Journal of Development Studies* 78(1): 5–15.
- Agrawal, A. and Ostrom, L. (2001) Collective action, property rights and decentralization in resource use in India and Nepal. *Politics and Society* 29(4): 485–514.
- Agrawal, A. and Ribot, J. (1999) Accountability in decentralization: A framework with South Asian and West African cases. *Journal of Developing Areas* 33(Summer): 473–502.
- Anderson, J., Clement, J. and Crowder, L.V. (1998) Accommodating conflicting interests in forestry: Concepts emerging from pluralism. *Unasylva* 194(49): 3–10.
- Baker, M. (1997) Persistence, Transformation and Demise within the Gravity Flow Irrigation Systems (Kuhls) of Kangra Valley, Himachal Pradesh, India. Workshop on 'Co-operative Management of Water Resources in South Asia' Centre for India and South Asia Research (CISA), University of British Columbia, in Vancouver, Canada, 15–17 December 1997.
- Baland, J. and Platteau, J. (1996) *Halting Degradation of Natural Resources: Is there a Role of Rural Communities?* New York: FAO, Oxford University Press.
- Beteille, A. (ed.) (1983) *Equality and Inequality: Theory and Practice*. Delhi, India: Oxford University Press.
- Bhatia, A. (1997) Power, Equity, Gender, and Conflicts in Common Property Resources in the Hindu Kush-Himalayas: Issues in Mountain Development. Kathmandu, Nepal: ICIMOD. Technical report 1997/7.
- Campbell, B., Mandando, A., Nemarundwe, N., Jong, W., Luckret, M. and Matose, F. (2001) Challenges to proponents of common property resource systems: Despairing voices from the social forests of Zimbabwe. *World Development* 29(4): 589–600.
- Chapagain, D.P., Kanel, K.R. and Regmi, D.C. (1999) Current Policy and Legal Context of the Forestry Sector with Reference to the Community Forestry Programme in Nepal: A Working Review. Kathmandu, Nepal: Nepal–UK Community Forestry Project.
- Collett, G., Chhetri, R., Jackson, W.J. and Shepherd, K.R. (1996) *NACFP: Socio-Economic Impact Study*. Canberra, ACT, Australia: ANUTECH Pty Ltd.
- Dhakar, S. (2006) *Politics Beyond the Political Sphere: Community Based Organizations and Local Democracy*, Proceedings of the 19th European Conference on Modern South Asian Studies (ECMSAS); 27–30 June 2006, European Association for South Asian Studies (EASAS): Leiden, Amsterdam, the Netherlands.
- Dirks, N.B. (2001) *Caste of Minds: Colonization and the Making of Modern India*. New Jersey, USA: Princeton University Press.
- Fox, J.M. (1983) Managing Public Lands in a Subsistence Economy: The Perspective from a Nepali Village. Unpublished PhD dissertation, University of Wisconsin-Madison: Madison-Wisconsin.
- Gaiha, R., Imai, K. and Kaushik, P.D. (2001) On the targeting and cost-effectiveness of anti-poverty programme in rural India. *Development and Change* 32(2): 309–342.
- Graner, E. (1997) *The Political Ecology of Community Forestry in Nepal*. Saarbrücken: Verlag für Entwicklungspolitik.

- Hildyard, N., Hegde, P., Wolverkamp, P. and Reddy, S. (1998) Same Platform, Different Train: The Politics of Participation. Corner House Briefing 04, The Corner House Station Road Sturminster Newton Dorset DT10 1YJ UK.
- Hobley, M. (1990) Social Reality, Social Forestry: The Case of Two Nepalese Panchayats. Unpublished PhD thesis, Australian National University, Canberra.
- Hsiao, C. (2003) *Analysis of Panel Data*. Cambridge, USA: Cambridge University Press.
- Hughes, E. (1993) Status, property and forest management: Women's role in community forestry in Nepal. *TRI NEWS* 12(2): 46–49.
- Jodha, N.S. (1986) Common property resources and the rural poor in dry regions of India. *Economic and Political Weekly* 21(27): 169–181.
- Joshi, A.L. (1997) Empowering local users in forest management in Nepal. *Banko Janakari* 7(2): 32–38.
- Kanel, K. (2008) So Far So Good: Next Steps in Community Forestry. In: R. Ghate, N.N. Jodha and P. Mukhopadhyay (eds.) *Promise Trust and Evolution: Managing the Commons of South Asia*. New York: Oxford University Press Inc.
- Kanel, K.R. and Niraula, D.R. (2004) Can rural livelihoods be improved in Nepal through community forestry? *Banko Janakari* 14(1): 19–24.
- Lama, A. and Buchy, M. (2003) Gender, class, caste and participation: The case of community forestry in Nepal. *Indian Journal of Gender Studies*, 2002 9: 27.
- Lawati, M. (2005) *Towards a Democratic Nepal Inclusive Political Institutions for a Multicultural Society*. New Delhi, India: Sage Publication.
- Leach, M., Mearns, R. and Scoones, I. (1999) Environmental entitlements: Dynamics and institutions in community-based natural resource management. *World Development* 28(4): 225–247.
- NPC. (2007) *Interim Plan: 2007*. Kathmandu, Nepal: National Planning Commission.
- Ostrom, E. (1990) *Governing the Commons*. Cambridge, UK: Cambridge University Press.
- Ostwald, M. and Baral, R. (2000) Local forest protection, gender and caste: Dhani Hill, Orissa, India. *Human Geography* 82(3): 115–128.
- Poffenberger, M. (1996) Valuing the Forest. In: M. Poffenberger and B. Mcgean (eds.) *Village Voice, Forest Choice – Joint Forest Management in India*. New Delhi, India: Oxford University Press.
- Pokharel, B. (1997) Community forestry and people's livelihoods, <http://www.livelihoods.org/post/Docs/Pokharel.rtf>.
- Pradhan, R. and Shrestha, A. (2005) Ethnic and Caste Diversity: Implications for Development. Working paper series no. 4, Asian Development Bank, Nepal Resident Mission, Kathmandu.
- Richards, M., Kanel, K., Maharjan, M. and Davies, J. (1999) *Towards Participatory Economic Analysis by Forest User Groups in Nepal*. London, UK: ODI, Portland House, Stag Place.
- Sethi, R. and Somanathan, E. (1996) The evolution of social norms in common property resource use. *American Economic Review* 86(4): 766–788.
- Sharma, A.R. (2002) *Community Forestry from Wealth and Caste Perspective: Elvira Graner in The Dock*, In: The Ninth Conference of the International Association for the Study of Common Property; 17–21 June 2002, Victoria Falls, Zimbabwe. International Association for the Study of Commons (IASC): Indiana, USA.
- Singh, N. (2004) *Water Management Traditions in Rural India: Valuing the Unvalued*. Sweden: Department of Land and Water Resources Engineering, Royal Institute of Technology.
- Sundar, N. (1997) *Subalterns and Sovereigns*. New Delhi, India: Oxford University Press.
- Thapa, S., Shrestha, R.N. and Yadav, K.P. (1998) Socio-Economic Aspects of the Follow-up Forest Resource Assessment Study. Kathmandu, Nepal: Nepal–UK Community Forestry Project Report B/NUKCFP/55.
- Tiwary, R. (2006) Explanations in resource inequality: Exploring scheduled caste position in water access structure. *International Journal of Rural Management* 2(1): 85–106.
- Varughese, J. and Ostrom, E. (2001) The contested role of heterogeneity in collective action: Some evidence from community forestry in Nepal. *World Development* 29(5): 747–765.
- Wade, R. (1988) *Village Republics: Economic Conditions for Collective Action in South India*. Cambridge: Cambridge University Press.
- Wooldridge, J. (2002) *Econometric Analysis of Cross Section and Panel Data*. Massachusetts, USA: MIT Press.