

Equity in community forestry management: A case of Lhuentse and Mongar Dzongkhags, eastern Bhutan

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(Left) A young boy carries fodder from the community forest



(Right) Author conducting household survey for this study

Abstract

In resource dependent rural areas of Bhutan, community forestry management is promoted as a viable option for poverty reduction, enhancement of local economic development and biodiversity conservation. While there have been an impressive number of community forests established in Bhutan since the early 2000s, there are many concerns including the degree to which benefits of community forests are equitably distributed within the community forestry management groups. This paper presents the findings of a study investigating economic equity (distribution of financial benefits) and social equity

(participation in decision making) from three community forest management groups in two eastern Dzongkhags. The comparisons among socioeconomic groups (rich, middle income and poor), committee vs. regular members, and by gender on livelihood assets and utilization of the forest products (timber, firewood, fodder, leaf litter and non-wood forest products) from community forests were conducted based on information determined from household surveys. The findings suggest that the community forest members had obtained most of their forest products requirements from community forests and inequity was insignificant amongst the different socioeconomic groups, between committee

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and regular members and between male and female members. However, economic equity (access to and distribution of forest products) from community forests was dependent on various household characteristics such as availability of land, livestock holdings, trees on private lands, food sufficiency, and income status of households. These factors exert a strong influence on determining the social equity and benefits from community forests. In general, economic equity and social equity were found comparatively higher than reported in neighboring countries. This may possibly be attributed to socio-cultural homogeneity, gender equality, supportive policies and rules, and appropriate resource endowment in community forests.

Keywords: Community forests, equity, forest products, local benefits

Introduction

Over the years, there has been an increasing trend of devolution of governance from government to communities for management of forest parcels in national forests as community forests (CFs) worldwide (Agrawal & Ostrom 2001; Carter & Gronow 2005; Hobley 2005; Pokharel & Paudel 2005; Lawrence 2007; Schreckenberg & Luttrell 2009). In Bhutan, CFs are reported to make positive contributions to gender equity, poverty reduction, biodiversity, and forest resources management (Temphel & Beukeboom 2006a, 2006b). The first study on equity in CFs of Bhutan found high levels of equity compared to neighboring countries (Buffum et al. 2005). However, a study conducted by Sonam and Namgay (2006) identified inequity in both CF membership and CF executive committees in forest product distribution due to imbalance in gender representation. However, this conclusion was based on their observations of a single CF.

In some countries—including the United States, United Kingdom, Africa, Nepal and India—CF programs do not provide equal benefits to all social groups within community forestry management groups (CFMGs) and may even exacerbate inequality (Hobley 2005;

Schreckenberg & Luttrell 2009). CFs should target the poor and marginalised in order to benefit them. However, the positive goal of contributing to livelihoods is often neglected in favour of a focus on improving forest management (Schreckenberg & Luttrell 2009).

Equity in community forestry management

The issue of equity in CFs has been the focus of considerable research around the world, since providing forest products especially to the poorest households is a key objective of most CF programs (Carter & Gronow 2005; Hobley 2005; Lawrence 2007). Equity is a concept of “fairness” in the economic sense and not essentially of “equality”. Equality denotes everyone is at the same level with equal sharing and exact division. The fairness or “fair share” can vary according to different situations and cultures (Fisher 1989). “Fair” requires a value judgment to determine impartiality and a CF is equitable if benefits and costs are fairly divided among different participants (Schreckenberg 2010). Poteete (2004, 4) argues “what is equitable cannot be divorced from the specific cultural contexts in which rules are made. Even within a single culture, different principles of equity apply in different circumstances”. For example, the emergence and implementation of a CF generally requires a supportive culture, training, resources and policies of forest and related agencies, to enable government officers to be effective partners to communities.

Schreckenberg (2010) examines equity in CFs under two dimensions: economic equity (access to and distribution of resources) and social equity (participation in decision making). Poteete (2004) further explains social equity in terms of political equity, as representation of the relevant groups, participation in group activities, and level of influence in decisions. A definition by Poteete (2004) stresses participation in decision-making as the basis of social equity. Factors that don't permit social equity—such as organization of CFMGs in terms of membership, authority, power, leadership, rules and regulations, customs and laws and membership rights—need to be considered.

The other forms of equity can be between social groups within a locality or stakeholders at different levels, between different localities and between generations (Schreckenber 2010).

Research objectives

Benefit sharing in CFs has been a crucial concern in Bhutan and there are limited data available to quantify the situation, including actual benefits. The rapid development of communities supported by the decentralization policy raises the question of how the benefits of development are distributed among CFMGs. Often, poor households cannot afford to participate in CF activities and have difficulties making their voices heard in CF public meetings (Agrawal 2003). This trend raises concerns over the capacity of CFs and its contribution to empowerment, decision-making, and equitable sharing of benefits from CFs.

CFs should actually benefit the poor who continue to struggle with marginalization and exclusion. Equity is directly linked to good governance, local politics and corruption, livelihood, and poverty reduction programs. Hence, one important problem dealt with in this study is how to strengthen the contribution of CFs to improving the livelihoods of the poor. Further, Social Forestry and Extension Division (2010) argues that for the success of CFMGs in Bhutan, user satisfaction is important and society should remain peaceful and harmonious through equity-based policies and programs. This study addressed two main research questions related to CFs in Bhutan:

1. Is there equity in access to and distribution of forest products in CFs?
2. Is there equity in representation in key positions and livelihood assets among CFMG members?

Study sites and methods

The study sites for this research included the three oldest CFs in two studied Dzongkhags of eastern Bhutan (Fig. 1). At these sites,

CFMGs were experiencing different stages of community forestry management with respect to harvesting timber and other non-timber forest products (NTFPs).

Through focus group discussions, the CFMGs were divided into three different socioeconomic groups (rich, middle income, and poor) based on criteria (landholdings, livestock holdings, ownership of private trees, type of house, household incomes, food sufficiency, and possession of farm machineries) for assessing a household's socioeconomic status in the village (Table 1). A stratified random sample of households from the CFMG members was chosen from a census record. The sample size was determined using Yamane's (1967) method from each socioeconomic group at 5% level of precision. The household survey was implemented in July 2011, using pre-tested and structured survey questionnaires, preferably with the head of the household. The survey was conducted by the same group of persons in all three CFs.

Indicators for economic equity based on access to and distribution of forest products (timber, fuel wood, fodder, leaf litter and NTFPs) was compared among socioeconomic groups (rich, middle income, and poor), between committee (executive post holders) vs. regular members (general members), and by gender (male vs. female). Access to timber was analyzed from the percent of households that received permits for timber extraction within the CF, while distribution of timber was analyzed from the average number of trees harvested by CFMGs. These data were verified through permit records for three consecutive years from 2008 to 2010.

Second to timber, fuel wood is a vital product from CFs. Fuel includes all plant biomass used as energy for domestic cooking and heating purposes. Fuel wood includes two categories: standing trees and dry firewood (small branches and twigs). Crop residues such as maize stalks and cobs are also collected and used by CFMGs, but in small quantities. Therefore, crop residues were not included for quantification in this study. Household members provided

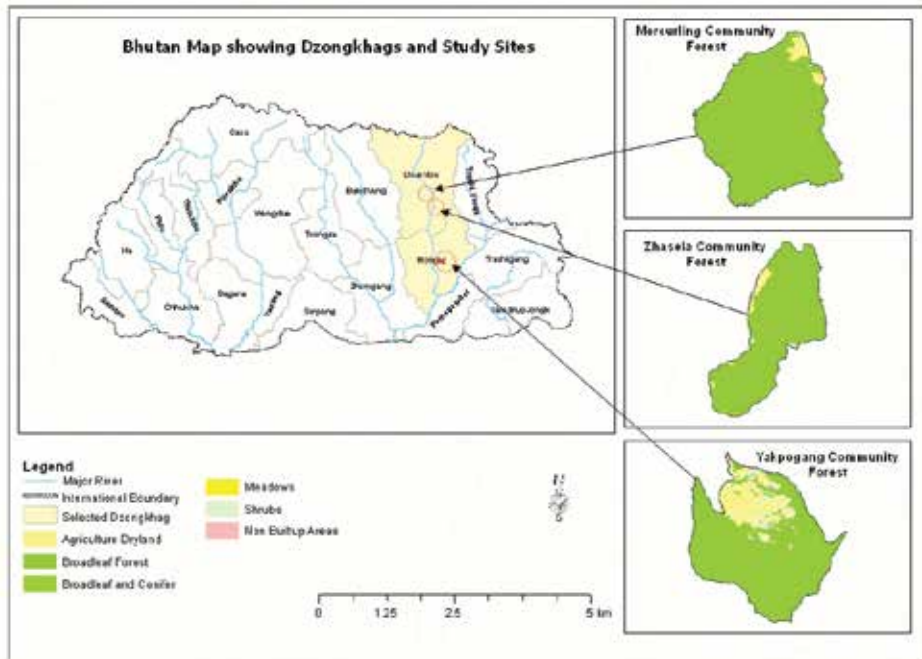


FIGURE 1 Map showing the study sites.

TABLE 1 Criteria and indicators of socioeconomic rank across study sites.

| Criteria | Indicators of Socioeconomic Rank | | |
|---------------------------|---|---|--|
| | Rich | Middle Income | Poor |
| <i>Land holdings</i> | > 3 acres | 2–3 acres | < 1 acre |
| <i>Livestock holdings</i> | > 10 heads | 5–10 heads | < 5 heads |
| <i>House conditions</i> | Two-storied houses with tin roofs (CGI sheets) | Medium-sized houses, not in good condition | Small houses and huts |
| <i>Sources of income</i> | Maximum income from sale of agricultural and livestock products | Limited income from sale of agricultural and livestock products | No income from sale of agricultural and livestock products |
| <i>Food sufficiency</i> | > 12 months with surplus for sale | Just or almost sufficient food for 9–12 months | 3–6 months or less food production |
| <i>Farm machineries</i> | Power tiller, chain saw, flour mills and related farm machines | Limited to one or none | No farm machineries, lack of labour to work on farms |

information on the numbers of standing trees and head loads of dry firewood used for fuel.

As with fuel wood, data on the remaining types of forest products were obtained from household members via the questionnaire surveys. Fodder (to feed livestock) includes grasses, tree branches, leaves, and crop residues such as rice paddy, millet straw, maize stalks and sheaths, and vegetable wastes. Leaf litter is primarily used for livestock bedding and as compost (fertilizer) by mixing it with animal manure. NTFPs include bamboo, mushrooms, and other forest products used by rural households.

Equity in representation in CFMG committees (i.e., executive post holders) was compared by socioeconomic group. Evaluation of livelihood assets such as landholdings, livestock holdings, sources of household income, trees on private lands and food sufficiency of the CFMGs were based on household survey questionnaires.

All data were analyzed in MS Excel and SPSS (Statistical Package for Social Scientists, Version 16). T-tests, one-way ANOVA and Pearson's correlation tests were performed as per need.

Results

Basic characteristics of respondents

The overall coverage of the survey was 85%, and a total of 135 households (Table 2) were sampled across socioeconomic groups (Table 3). The percent of female and male respondents were 69% ($N = 93$) and 31% ($N = 42$) respectively. The composition of gender by socioeconomic group showed a higher proportion of female respondents for all socioeconomic groups across the three CFs (Table 4).

At the sampled households, 84% ($N = 114$) of respondents were of working age (15–59 years), with the remaining 16% ($N = 21$) of

elderly age (>60 years). Children (up to 14 years) were excluded as respondents. The mean age of Zhasela, Markuling and Yakpugang respondents was 36, 48 and 40 years respectively. The age range of respondents was 16 to 72 years.

A total of 18 respondents took adult literacy classes conducted in the three CFs. Another 17 respondents were school dropouts who supported parents in household works. Only nine respondents had obtained formal education up to undergraduate level, and two respondents up to graduate level.

Farming was the primary occupation of 85% ($N = 115$) of respondents. Students (including lay monks) made up 5% ($N = 7$) of respondents. Wage labour and cattle herding each made up 4% ($N = 5$) of respondents. Construction workers, government civil servants and private service represented 1% ($N = 1$).

Equity in access to and distribution of forest products

a) Timber

CFMGs had harvested timber both for domestic and commercial purposes, in the form of *drashing*², *cham*³, *tsim*⁴ and *dangchung*⁵. None of the CFMGs had extracted fencing posts from their CFs. By socioeconomic group, 40% of rich households and 37% of poor households had obtained permits for *drashing*, while only 30% of middle income households had received these timber products (Table 5). This pattern was similar across the three CFs. By membership status, 36% of the regular members had obtained permits for harvesting *drashing* compared to 27% of the committee members. By gender, males received 38% of timber permits and females received 37% of permits for *drashing*. The data suggest that economic equity exists

² trees of at least 50 cm dbh which are used for sawn timber

³ trees of 30-50 cm dbh which are used for beams

⁴ trees of 20-30 cm dbh which are used for large poles

⁵ trees of 10-20 cm dbh which are used for small poles

TABLE 2 Number of households in each socioeconomic group for three community forest management groups (CFMGs). The figures in parentheses represent the percent of households sampled for this study from each socioeconomic group.

| CFMG | Rich | | Middle Income | | Poor | | All Categories | |
|-----------|-------|----------|---------------|----------|-------|----------|----------------|-----------|
| | Total | Sampled | Total | Sampled | Total | Sampled | Total | Sampled |
| Zhasela | 4 | 4 | 7 | 7 | 4 | 3 | 15 | 14 |
| Markuling | 8 | 8 | 17 | 17 | 3 | 3 | 28 | 28 |
| Yakpugang | 23 | 21 | 54 | 42 | 38 | 30 | 115 | 93 |
| TOTAL | 35 | 33 (94%) | 78 | 66 (85%) | 45 | 36 (80%) | 158 | 135 (85%) |

TABLE 3 Number and percent of community forest management group (CFMG) members by socioeconomic group.

| Socioeconomic Group | Zhasela CFMG | | Markuling CFMG | | Yakpugang CFMG | | All CFs Combined | |
|---------------------|--------------|-----|----------------|-----|----------------|-----|------------------|-----|
| | N | % | N | % | N | % | N | % |
| Rich | 4 | 27 | 8 | 28 | 23 | 20 | 35 | 22 |
| Middle Income | 7 | 46 | 17 | 61 | 54 | 47 | 78 | 49 |
| Poor | 4 | 27 | 3 | 11 | 38 | 33 | 45 | 29 |
| Total | 15 | 100 | 28 | 100 | 115 | 100 | 158 | 100 |

N = Number of sampled households

TABLE 4 Percent of community forest management group (CFMG) members by gender.

| Socioeconomic Group | Zhasela CFMG (N = 14) | | Markuling CFMG (N = 28) | | Yakpugang CFMG (N = 93) | | All CFMGs Combined (N = 135) | |
|---------------------|-----------------------|----|-------------------------|-----|-------------------------|----|------------------------------|----|
| | M | F | M | F | M | F | M | F |
| Rich | 50 | 50 | 12 | 88 | 38 | 62 | 33 | 67 |
| Middle Income | 29 | 71 | 59 | 41 | 36 | 64 | 41 | 59 |
| Poor | 33 | 67 | 0 | 100 | 10 | 90 | 11 | 89 |

N = Number of sampled households; M = Male; F = Female

TABLE 5 Percent of households and community forest management group (CFMG) members that received timber permits, by socioeconomic group, membership status and gender.

| CFMG | Timber Size Class | Socioeconomic Group | | | Membership Status | | Gender | |
|-----------|-------------------------|---------------------|---------------|------|-------------------|---------|--------|----|
| | | Rich | Middle Income | Poor | Committee | Regular | M | F |
| All CFMGs | Drashing (sawn timber) | 40 | 30 | 37 | 27 | 36 | 38 | 37 |
| | Cham (beam) | 5 | 1 | 4 | 7 | 1 | 1 | 2 |
| | Tsim (large poles) | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| | Dangchung (small poles) | 2 | 1 | 0 | 1 | 2 | 4 | 2 |
| | Flag poles | 4 | 4 | 1 | 4 | 7 | 12 | 3 |
| Zhasela | Drashing (sawn timber) | 67 | 57 | 56 | 60 | 56 | 60 | 67 |
| | Cham (beam) | 0 | 0 | 11 | 0 | 0 | 0 | 4 |
| | Tsim (large poles) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dangchung (small poles) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Flag poles | 8 | 5 | 0 | 7 | 11 | 20 | 4 |
| Markuling | Drashing (sawn timber) | 17 | 2 | 11 | 8 | 25 | 27 | 18 |
| | Cham (beam) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Tsim (large poles) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Dangchung (small poles) | 4 | 0 | 0 | 0 | 4 | 9 | 6 |
| | Flag poles | 0 | 0 | 0 | 0 | 4 | 9 | 2 |
| Yakpugang | Drashing (sawn timber) | 38 | 32 | 43 | 22 | 27 | 27 | 27 |
| | Cham (beam) | 14 | 4 | 1 | 22 | 4 | 4 | 3 |
| | Tsim (large poles) | 2 | 1 | 2 | 4 | 2 | 4 | 3 |
| | Dangchung (small poles) | 3 | 3 | 0 | 4 | 2 | 4 | 1 |
| | Flag poles | 3 | 8 | 2 | 11 | 5 | 8 | 3 |

in access to forest products amongst the different socioeconomic groups, between the committee and regular members, and also between genders in the studied CFs.

Table 6 shows a similar pattern in distribution of timber (average number of trees per household per year) with the findings in Table 5 for access to timber products. Rich (2.70) and poor (2.94) households on average received more *drashing* per household per year than did middle income households (2.40). By membership status, the average number of *drashing* per recipient for regular members (0.86) was higher than for committee members (0.77). Some products such as *cham* and *tsim* were used more by the committee members than by regular members. By gender, male members received on average more trees from most timber classes (except *dangchung*) than female members received.

b) Fuel wood

One-way Analysis of Variance (ANOVA) was used to compare standing trees harvested by poor vs. other socioeconomic groups, and by committee vs. regular members separately for each of the three CFs (Table 7). Results were not significant in any of these comparisons. The difference in standing trees harvested by males vs. females was significant only for Zhasela CF, where male members collected on average much more standing trees for fuel wood than females collected.

One-way ANOVA for dry firewood collected in head loads by poor vs. other socioeconomic groups (Table 8) was significantly different only for Yakpugang CF, with the other socioeconomic groups collecting more dry firewood than the poor collect. The head loads of dry firewood collected did not differ by membership status for any of the surveyed CFs. In the case of

TABLE 6 Average annual number of trees received per household and community forest management group (CFMG) member, by socioeconomic group, membership status and gender.

| CFMG | Timber Size Class | Socioeconomic Group | | | Membership Status | | | Gender | |
|-----------|-------------------------|---------------------|---------------|------|-------------------|---------|------|--------|--|
| | | Rich | Middle Income | Poor | Committee | Regular | M | F | |
| All CFMGs | Drashing (sawn timber) | 2.70 | 2.40 | 2.94 | 0.77 | 0.86 | 1.10 | 0.87 | |
| | Cham (beam) | 0.35 | 3.45 | 0.67 | 0.99 | 0.82 | 1.50 | 0.52 | |
| | Tsim (large poles) | 1.35 | 0.96 | 0.82 | 0.62 | 0.30 | 0.53 | 0.26 | |
| | Dangchung (small poles) | 1.20 | 3.36 | 0.67 | 1.85 | 2.24 | 0.59 | 0.85 | |
| | Flag poles | 0.80 | 1.58 | 0.87 | 0.46 | 0.43 | 0.84 | 0.22 | |
| Zhasela | Drashing (sawn timber) | 5.00 | 3.43 | 5.67 | 1.33 | 1.52 | 1.20 | 1.59 | |
| | Cham (beam) | 0.00 | 0.00 | 0.33 | 0.00 | 0.78 | 0.00 | 0.78 | |
| | Tsim (large poles) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| | Dangchung (small poles) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| | Flag poles | 1.50 | 0.29 | 0.00 | 0.13 | 0.22 | 0.40 | 0.07 | |
| Markuling | Drashing (sawn timber) | 0.63 | 1.00 | 1.67 | 0.08 | 0.31 | 0.33 | 0.24 | |
| | Cham (beam) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| | Tsim (large poles) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| | Dangchung (small poles) | 0.75 | 6.35 | 2.00 | 0.00 | 4.75 | 0.24 | 2.08 | |
| | Flag poles | 0.00 | 0.94 | 0.00 | 0.00 | 0.22 | 0.45 | 0.02 | |
| Yakpugang | Drashing (sawn timber) | 2.48 | 2.79 | 1.50 | 0.89 | 0.75 | 1.76 | 0.78 | |
| | Cham (beam) | 1.05 | 10.36 | 1.67 | 2.96 | 1.69 | 4.49 | 0.78 | |
| | Tsim (large poles) | 4.05 | 2.88 | 2.47 | 1.85 | 0.91 | 1.59 | 0.78 | |
| | Dangchung (small poles) | 2.86 | 3.71 | 0.00 | 5.56 | 1.98 | 1.54 | 0.48 | |
| | Flag poles | 0.90 | 3.52 | 2.60 | 1.26 | 0.84 | 1.67 | 0.57 | |

TABLE 7 One-way ANOVA results for comparison of standing trees harvested for fuel wood in community forests (CF).

| CF | Socioeconomic Group | | | | Significance | |
|-----------|---------------------|------|----------------------------|------|--------------|---------|
| | Poor | | Other socioeconomic groups | | | |
| | Mean | SE | Mean | SE | F value | p-value |
| All CFs | 0.67 | 0.09 | 0.70 | 0.05 | 0.09 | ns |
| Yakpugang | 0.63 | 0.10 | 0.60 | 0.06 | 0.07 | ns |
| Markuling | 1.00 | 0.00 | 0.76 | 0.11 | 0.61 | ns |
| Zhasela | 0.67 | 0.33 | 1.09 | 0.16 | 1.42 | ns |

| CF | Membership Status | | | | Significance | |
|-----------|-------------------|------|---------|------|--------------|---------|
| | Committee | | Regular | | | |
| | Mean | SE | Mean | SE | F value | p-value |
| All CFs | 1.39 | 0.34 | 0.97 | 0.10 | 2.32 | ns |
| Yakpugang | 0.44 | 0.18 | 0.81 | 0.08 | 2.29 | ns |
| Markuling | 1.25 | 0.48 | 0.88 | 0.27 | 0.30 | ns |
| Zhasela | 3.20 | 0.58 | 2.67 | 0.47 | 0.48 | ns |

| CF | Gender | | | | Significance | |
|-----------|--------|------|--------|------|--------------|---------|
| | Male | | Female | | | |
| | Mean | SE | Mean | SE | F value | p-value |
| All CFs | 1.17 | 0.20 | 0.96 | 0.10 | 1.05 | ns |
| Yakpugang | 0.73 | 0.12 | 0.79 | 0.09 | 0.14 | ns |
| Markuling | 0.82 | 0.23 | 1.00 | 0.36 | 0.14 | ns |
| Zhasela | 4.20 | 0.37 | 2.11 | 0.31 | 17.37 | *** |

*** $p < 0.001$; ns = not significant

gender, the number of head loads of dry firewood collected by female vs. male members showed a significant difference only for Zhasela CF, with males harvesting more than females.

c) Fodder

The amount of fodder (average annual head load) collected by socioeconomic groups was not significantly different (Table 9). The amount of fodder collected by committee vs. regular members was significantly different only for Markuling, where regular members collected more fodder ($p < 0.01$; Table 10). Fodder collected by male vs. female members did not show a significant difference except for Zhasela CF ($p < 0.05$).

d) Leaf litter

Leaf litter collection among socioeconomic groups, between committee and regular members, and by gender did not show a significant difference for any CF.

e) Non-Timber Forest Products

At the household level, NTFPs are used for subsistence purposes. None of the NTFPs were collected on a large scale for generating income. The most common NTFPs were ferns, *dhamboor* (*Elatostema lineolatum*), mushrooms, bamboos, and other wild vegetables. A one-way ANOVA (Table 11) showed a significant difference among CFMGs for the amount of bamboo ($p <$

TABLE 8 One-way ANOVA results for comparison of dry firewood harvested in community forests (CF).

| CF | Socioeconomic Group | | | | Significance | |
|-----------|---------------------|------|----------------------------|------|--------------|---------|
| | Poor | | Other socioeconomic groups | | | |
| | Mean | SE | Mean | SE | F value | p-value |
| All CFs | 0.11 | 0.53 | 0.22 | 0.04 | 2.10 | ns |
| Yakpugang | 0.10 | 0.06 | 0.29 | 0.06 | 4.10 | * |
| Markuling | 0.00 | 0.00 | 1.60 | 0.08 | 0.53 | ns |
| Zhasela | 0.33 | 0.33 | 0.00 | 0.00 | 4.71 | ns |

| CF | Membership Status | | | | Significance | |
|-----------|-------------------|-------|---------|-------|--------------|---------|
| | Committee | | Regular | | | |
| | Mean | SE | Mean | SE | F value | p-value |
| All CFs | 28.44 | 11.36 | 43.22 | 16.18 | 0.13 | ns |
| Yakpugang | 50.56 | 19.90 | 54.92 | 22.41 | 0.01 | ns |
| Markuling | 12.50 | 12.50 | 18.54 | 4.40 | 0.26 | ns |
| Zhasela | 1.40 | 1.40 | 1.11 | 1.11 | 0.03 | ns |

| CF | Gender | | | | Significance | |
|-----------|--------|-------|--------|-------|--------------|---------|
| | Male | | Female | | | |
| | Mean | SE | Mean | SE | F value | p-value |
| All CFs | 48.26 | 21.61 | 30.46 | 11.40 | 0.64 | ns |
| Yakpugang | 71.35 | 34.26 | 37.21 | 15.70 | 1.07 | ns |
| Markuling | 14.09 | 6.35 | 20.00 | 5.42 | 0.49 | ns |
| Zhasela | 3.40 | 2.14 | 0.00 | 0.00 | 4.89 | ** |

** $p < 0.01$; * $p < 0.05$; ns = not significant

TABLE 9 One-way ANOVA results for annual average head loads of fodder collected by different socioeconomic groups.

| CF | Socioeconomic Group | | | | | | Significance | |
|-----------|---------------------|-------|---------------|-------|--------|-------|--------------|------------|
| | Rich | | Middle Income | | Poor | | | |
| | Mean | SE | Mean | SE | Mean | SE | F value | p-value |
| All CFs | 181.06 | 49.65 | 127.12 | 38.23 | 127.11 | 43.75 | 0.46 | 0.632 (ns) |
| Zhasela | 32.50 | 29.26 | 10.57 | 6.02 | 0.00 | 0.00 | 0.94 | 0.417 (ns) |
| Markuling | 19.17 | 6.56 | 13.10 | 8.03 | 2.00 | 1.29 | 1.27 | 0.297 (ns) |
| Yakpugang | 199.86 | 56.38 | 198.86 | 56.25 | 191.14 | 50.51 | 0.01 | 0.995 (ns) |

ns = not significant

TABLE 10 One-way ANOVA results for annual average head loads of fodder collected by membership status and by gender.

| CF | Membership Status | | | | F value | p-value |
|-----------|-------------------|--------|---------|-------|---------|-----------|
| | Committee | | Regular | | | |
| | Mean | SE | Mean | SE | | |
| All CFs | 192.78 | 119.41 | 132.23 | 21.11 | 0.73 | 0.39 (ns) |
| Zhasela | 13.00 | 8.31 | 15.44 | 13.14 | 0.02 | 0.89 (ns) |
| Markuling | 0.00 | 0.00 | 15.71 | 4.64 | 1.85 | 0.01** |
| Yakpugang | 378.33 | 227.97 | 178.04 | 27.82 | 3.25 | 0.47 (ns) |

| CF | Gender | | | | F value | p-value |
|-----------|--------|-------|--------|-------|---------|-----------|
| | Male | | Female | | | |
| | Mean | SE | Mean | SE | | |
| All CFs | 99.86 | 22.48 | 158.57 | 33.32 | 1.28 | 0.26 (ns) |
| Zhasela | 37.00 | 22.11 | 2.11 | 1.40 | 4.73 | < 0.05* |
| Markuling | 12.91 | 6.57 | 13.82 | 5.42 | 0.01 | 0.61 (ns) |
| Yakpugang | 148.73 | 32.59 | 216.31 | 44.33 | 0.83 | 0.73 (ns) |

** $p < 0.01$; * $p < 0.05$; ns = not significant

TABLE 11 One-way ANOVA results for NTFPs harvested by the community forest management groups (CFMG) from community forests (CFs). In this table, 'Groups' refers to the three CFMGs.

| NTFP Type | | df | MS | F | Significance |
|-----------|----------------|-----|----------|-------|--------------|
| Ferns | Between Groups | 2 | 813.89 | 5.72 | ** |
| | Within Groups | 132 | 142.47 | | |
| | Total | 134 | | | |
| Dhamboor | Between Groups | 2 | 60.86 | 5.37 | ** |
| | Within Groups | 132 | 11.32 | | |
| | Total | 134 | | | |
| Mushroom | Between Groups | 2 | 13.73 | 1.71 | ns |
| | Within Groups | 132 | 8.01 | | |
| | Total | 134 | | | |
| Bamboos | Between Groups | 2 | 22071.56 | 17.10 | *** |
| | Within Groups | 132 | 1290.81 | | |
| | Total | 134 | | | |

*** $p < 0.001$; ** $p < 0.01$; ns = not significant

0.001), ferns and *dhamboor* ($p < 0.01$) collected, while CFMGs did not differ significantly in the amount of mushrooms collected. The average annual quantity of NTFPs harvested by different socioeconomic groups from CFs did not show a significant difference for any NTFP type.

Although a higher percent of regular members (59%) had harvested NTFPs from CFs than committee members (41%) harvested, the average annual NTFPs harvested from CFs was higher per committee member ($M = 41.22$, $SE = 24.84$) compared to regular members ($M = 9.03$, $SE = 2.73$). ANOVA showed a significant difference by membership status for collection of *dhamboor*, mushroom and bamboo from CFs (Table 12).

The average annual NTFPs harvested from CFs per household (Table 12) was higher for male members ($M = 26.93$, $SE = 11.45$) than female members ($M = 7.17$, $SE = 2.73$). ANOVA for ferns and bamboos collected from CF by gender showed a significant difference ($p < 0.05$), while the result was not significant for *dhamboor* or mushrooms.

Equity in representation in key positions and livelihood assets

a) Composition of committees, by socioeconomic group and gender

A CF committee comprises a Chairman, Secretary, Treasurer, and Tsogpas⁶. Overall, the middle income household members made up the largest proportion of committees (61%), followed by the rich (22%) and then the poor (17%). By socioeconomic group, representation on committees was 50% female for the poor, 33% female for middle income, and 17% female for the rich.

b) Livelihood assets of CFMGs

The two major types of agricultural land owned by CFMGs are *Chhuzhing* (wetland) and *Kamzhing* (dryland). The average landholding for rich, middle income and poor households

was 1.86, 1.87 and 0.35 acres respectively. ANOVA for *Chhuzhing* landholding showed a significant difference ($M = 0.35$, $SD = 0.37$, $F = 3.36$, $df = 2$, $p < 0.05$) between rich and other households, whereas *Kamzhing* landholdings did not show significant differences between these two categories.

Livestock is the main capital asset that has an important role in maintaining the fertility of agricultural lands. The average number of cattle for rich, middle income and poor households were 5.74 ($SE = 0.94$), 6.47 ($SE = 0.73$) and 2.96 ($SE = 0.97$) respectively. ANOVA showed a significant difference ($F = 3.28$, $df = 134$, $p < 0.01$) in the number of cattle among the socioeconomic groups.

Trees on private land play an important role in the livelihoods of rural households. A significant proportion of an average household's needs for forest products is met from its own private sources for fodder, firewood, timber, fruit and leaf litter. A one-way ANOVA for the number of private trees owned showed a significant difference ($F(2) = 7.83$, $p < 0.001$) among socioeconomic groups. However, a post-hoc (Tukey) test failed to show a significant difference in number of private trees owned by rich ($M = 3.44$, $SE = 0.43$) vs. middle income ($M = 2.59$, $SE = 0.37$) households. Rich and middle income households had more trees on their private lands because they own more land. In comparison, the average number of private trees owned by poor households was less at 1.73 ($SE = 0.43$).

The inclusion of *Tseri* (shifting cultivation) lands into *Kamzhing* land category under new *lag-thram* (land ownership registration certificate) followed by restrictions on use of GRF and CF has increased the number of trees on private lands.

c) Sources of household income

About 30% of the total household income for the rich group was supported by civil servants (Nu. 10,212 \pm 3465 per household). Seventy-six

⁶ "Tsogpas" can be defined as a group of representatives in the CF executives appointed by the group.

TABLE 12 Average annual NTFPs harvested by community forest management groups (CFMGs) from community forests (CFs), by membership status and gender. 'Total collected' is the average annual NTFPs harvested from CFs, while '% of persons' is the proportion of members in that category who harvested NTFPs.

| Membership Status | | NTFP harvested by CFMGs from CFs | | | | Total |
|----------------------------|-----------------|----------------------------------|-----------------|-----------------|----------------|-------|
| | | <i>Ferns</i> | <i>Dhamboor</i> | <i>Mushroom</i> | <i>Bamboos</i> | |
| Committee (N=18) | Mean | 2.44 | 4.11 | 3.00 | 31.67 | 41.22 |
| | SE | 0.47 | 1.57 | 1.50 | 21.30 | 24.84 |
| | Total collected | 44 | 74 | 54 | 570 | 742 |
| | % of persons | 17 | 51 | 39 | 46 | 41 |
| Regular (N=117) | Mean | 1.88 | 0.60 | 0.74 | 5.81 | 9.03 |
| | SE | 0.19 | 0.22 | 0.15 | 2.17 | 2.73 |
| | Total collected | 220 | 70 | 86 | 680 | 1056 |
| | % of persons | 83 | 49 | 61 | 54 | 59 |
| Total (N=135) | Mean | 1.96 | 1.07 | 1.04 | 9.26 | 13.33 |
| | SE | 0.17 | 0.30 | 0.25 | 3.43 | 4.15 |
| | Total collected | 264 | 144 | 140 | 1250 | 1798 |
| | % of persons | 100 | 100 | 100 | 100 | 100 |
| Significance | | ns | *** | *** | ** | |

| Gender | | NTFP harvested by CFMGs from CFs | | | | Total |
|-------------------------|-----------------|----------------------------------|-----------------|-----------------|----------------|-------|
| | | <i>Ferns</i> | <i>Dhamboor</i> | <i>Mushroom</i> | <i>Bamboos</i> | |
| Male (N=42) | Mean | 2.48 | 1.81 | 1.45 | 21.19 | 26.93 |
| | SE | 0.30 | 0.71 | 0.43 | 10.01 | 11.45 |
| | Total collected | 104 | 76 | 61 | 890 | 1131 |
| | % of persons | 39 | 53 | 44 | 71 | 63 |
| Female (N=93) | Mean | 1.72 | 0.73 | 0.85 | 3.87 | 7.17 |
| | SE | 0.21 | 0.29 | 0.30 | 1.94 | 2.73 |
| | Total collected | 160 | 68 | 79 | 360 | 667 |
| | % of persons | 61 | 47 | 56 | 29 | 37 |
| Total (N=135) | Mean | 1.96 | 1.07 | 1.04 | 9.26 | 13.33 |
| | SE | 0.17 | 0.30 | 0.25 | 3.43 | 4.15 |
| | Total collected | 264 | 144 | 140 | 1250 | 1798 |
| | % of persons | 100 | 100 | 100 | 100 | 100 |
| Significance | | * | ns | ns | * | |

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; ns = not significant

Note: Mushrooms in Kg, Bamboos in numbers, and others in bundles

percent of the household income for the middle income group were obtained through business (Nu. 1333 ± 931 per household). For their annual household incomes, the poor group had to depend primarily on private sources (credit and loan from banks), which amounted to 41% of total household income (Nu. 2611 ± 2342 per household per year). Another 24% of the poor households' incomes were met through engagement in daily wage labour with an average income of Nu. 4239 ± 1554 per household per year.

There was no significant difference among the socioeconomic groups for all income sources, except for income from "other sources" (e.g., weaving, power chain works, and sale of vegetables, fruits, poultry and livestock products), which showed differed significantly between the middle income and the poor households ($p < 0.05$).

d) Food sufficiency

Every family in a community is empowered to produce its own food to augment its needs. A one-way ANOVA for food sufficiency showed a significant difference among socioeconomic groups ($F = 20.49$, $p < 0.001$). About 76% (25 out of 33 households) of rich households had sufficient food that lasted more than 12 months in a year. Poor households faced food shortages throughout the year: less than 3 months (1 out of 36 households), less than 3–6 months (5 households) and less than 6–9 months (7 households).

Discussion

Economic equity

The findings from the study suggest that economic equity exists in the distribution of forest products amongst the socioeconomic groups, between the executive committee and regular members, and by gender in the studied CFs.

In the studied CFs, poor households harvested the most timber. Male CF members have harvested more timbers in the form of *drashing*

compared to female members, a result similar to that reported by Buffum (2007). This may be due to males spending more time handling the timber in the forests (an energy-intensive task), while females reported that they attend mostly to household chores.

Inequity regarding access to and distribution of forest products in Nepal's CFs has been reported to be primarily due to restrictive harvesting of trees for timber rather than utilization for small wood and multiple products (Pokharel & Nurse 2004). The CF rules in Nepal were focused on sale and distribution of subsidized timbers such that one can buy subsidized timber only for household consumption, which in fact benefitted the richest—they could afford to construct houses and make furniture. CFM plans reflected the priorities of wealthier households and did not consider the needs of all members.

In contrast to CFs in Nepal, the Forest and Nature Conservation Rules 2006 of Bhutan, as per Chapter IV (34, 2b), empowers CFMGs to harvest forest products from CFs. It states that, "Any member of the CFMG may harvest and extract forest products from the CF in accordance with the Management Plan, these rules and decisions of the CFMG and its management committee". Similarly, regarding the sale of forest products from CFs, the FNCR (2006) under Chapter IV (34, 4b) states that "when the amount of forest products harvested from the CF in accordance with the Management Plan exceeds the requirements of the members of the CFMG, the CFMG may sell (or authorize its members to sell) the excess produce to persons, agencies or in the market".

There was no significant difference in the amount of fodder collected by poor vs. rich households from in the studied CFs. This suggests equitable access and distribution of fodder in the studied CFs.

A higher proportion of regular members harvested NTFP compared to the proportion of committee members who harvested NTFP. However, on average, each committee member harvested a higher total of NTFPs than each

regular member harvested. This result may be because committee members had to spend more time conducting patrolling inside CFs to safeguard from illegal activities, and hence they had more time to collect NTFPs for subsistence use.

Males collected more bamboos than females collected, possibly because most bamboo is found in the far-flung areas inside CFs and a lot of energy is needed to cut and carry the bamboo. According to one female CFMG member, "Males are energetic and hence they are sent for fetching bamboos from forests inside CF" (Sangay, personal communication).

Experiences in Nepal showed that discrimination of certain social groups such as low caste "*dalits*" negatively affected equity in access and traditional livelihoods. The restrictions imposed by Community Forest User Groups (CFUGs) have severely limited some occupational castes such as blacksmiths, and the formation of CFs had also restricted their traditional practice of access to NTFPs (Gautam et al. 2008). Adhikari et al. (2004) pointed out that collection of herbs and other medicinal plants was a common practice under traditional systems of forest management by the poor for subsistence needs. Further, in Nepal, state control over the resources in CFs had seriously constrained local benefits in access to resources (Mahanty et al. 2009). McDermott and Schreckenber (2009) argue bureaucratic requirements in obtaining permits hampered the equitable access of the poor to CFM.

Social equity

The level of social equity in the studied CFs was found slightly higher than what has been reported in Nepal. The major representation of the committees in CFs of Nepal was dominated by wealthier households (Malla et al. 2003) and mostly by high-caste households (Gautam et al. 2008), while such social differentiation did not exist in the studied CFs of Bhutan.

Overall high gender equity among the studied CFMGs in Bhutan could be because

both men and women play equally important roles in agriculture and other development activities (Tshering 1993). Compared to other socioeconomic groups, females from poor households were more equitably represented in CF committee management positions. Khanel and Kandel (2004) found about 24% representation of women on decision-making bodies in Nepal. The low representation of poor and female committee members in Nepal was partly due to the requirement of literate members to maintain CF records (Buffum 2007).

The livelihood assets of the CFMG members such as landholding, livestock, and private land trees besides household income and food sufficiency showed modest differences among the socioeconomic groups. This finding was almost similar to that of CFs in Nepal, as reported by Malla et al. (2003). Rich and middle income households possessed more and better quality agricultural land, with more livestock and private trees than poor households. The higher *Chhuzhing* land holding meant more household income that may possibly exert influence on determining economic equity amongst the CFMGs.

In all studied CFs, the average number of cattle owned by rich households was more than the number owned by poor households. Although most of the fodder needs by rich households were met from their private registered lands, this can still have a significant impact on the household income level amongst the CFMGs. This is because the price of cattle is too high for poor people to afford.

The significant difference between the middle income and the poor socioeconomic groups for income from other sources (e.g., weaving, power chain works, sale of vegetable, fruits, poultry, and livestock products) may possibly be attributed to the engagement of the poor household members mostly as daily wage labors for earning their livelihoods.

The rich households had sufficient food that lasted throughout the year, while the poor households faced constant food shortage. Rich and middle

income households possessed more productive agricultural land and a larger number of livestock to produce farmyard manure, compared to poor households.

Factors supporting equity in the studied CFs

High equity in the studied CFs may be due to four factors: strong socio-cultural homogeneity among Bhutanese households and communities, high gender equality, supportive policies and rules, and appropriate resource endowment. However, this study did not address the question of “why”, so there is a need to emphasize that these are not data-supported explanations.

The first factor potentially supporting equity in CFs of Bhutan is the country’s strong socio-cultural homogeneity. Ethnically, the society is homogenous, sharing a common culture and language, and without social differentiation such as “castes”. In Nepal, however, ethnic heterogeneity was recognized as the central cause of disputes in CFs due to differences in social powers (Nightingale 2003). In Nepal, there is a long history of domination by rural elites holding key positions in executive committees, resulting in a narrow decision-space for the poor and low caste households, thus inhibiting equity in CFs (Malla et al. 2003; Adhikari & Lovett 2006; Mahanty et al. 2009; Maharjan et al. 2009).

The second factor potentially supporting equity in these CFs is high gender equality. The traditional Bhutanese society is matriarchal, with the female head of family held in high esteem. Although females did not hold key positions in the committees in the studied CFs, the findings showed high equity in terms of access to forest resources by gender. Sonam and Namgay (2006) also found that women in Bhutan were actively involved in forestry management with active participation in meetings. However, in Nepal, female membership was less than 10% in the user groups (Agrawal & Ostrom 2001). Further, social norms relating to women differed and women were less privileged than in Bhutan

to community decision making processes (Nightingale 2003).

The third factor potentially supporting equity in Bhutan’s CFs is supportive policies and rules. The CF policy in Bhutan provides strong support to CFMGs. The Forest and Nature Conservation Act (1995) recognizes the traditional and cultural rights of local people to access and use forest resources. The Act also allows establishment of CFs on GRF lands, with the grant of management and use rights to communities as per conditions set out in management plans. Further, the FNCR (2006) called attention in sourcing rural timber supplies from CFs over the long term, when these forests are capable of yielding sufficient timber. Until this time, CFMG members were entitled to obtain their timber from GRFs. The rule also mentioned the role of government officials in supporting CFMGs in all aspects of CF, from identifying suitable forests, to developing, implementing and monitoring management plans. Earlier, the land allocation for CF required an equal ratio of degraded and good forests, whenever possible (Article 28-2[e]), while the new rule required no quantifications on type of natural forests to be handed over, although plantations raised by the Department were not allowed for inclusion (Article 27-1). Further, Bhutan’s regulatory framework provides “enabling” rather than “enforcing” rules to rural communities. This gave CFMGs in management of CFs an increasing sense of ownership that improved their livelihoods and conditions of forests through a supportive and facilitative role of government agencies. McCarthy (2004) argued that the policies and laws do not address local realities in Nepal, and clash with institutional arrangements at various levels. Such disjuncture was found between laws and rules operating at different levels. Further, even where countries had supportive policies and legal frameworks for CFM, rigid rules were applied to commercial use in CFM (Mahanty et al. 2009).

The fourth factor potentially supporting equity in studied CFs can be attributed to forest resource endowment. Mahanty et al. (2009) argues that the qualities of forests

allocated to communities for management determine immediate availability of resources to obtain productive yields. The degraded lands were the first to be targeted across Asia in CFM (Nguyen et al. 2008; Enters et al. 2009). However, Bhutan—unlike Nepal, Mongolia and the Philippines—often allocated high value forest resources to CFMGs. The dominant focus on degraded lands in other countries in the beginning of their CF programs resulted in lack of trust of the community's capacity to effectively manage higher value forests due to government stake in management of valuable forest resources (Gerrard 2007; RECOFTC 2007). This eventually led to conflicts because of geographical disparity in access to high value resources. In Nepal, disparities in access to higher quality forest have been addressed with different benefit distribution regimes for the higher value Terai forests (Bampton & Cammaert 2007). An advantage to appropriate resource endowment in CFs of Bhutan is supported by the country's high percentage of forest cover (70.4%). Virtually all forests are mature, plantations account for only 0.2% of the total geographical area of the country (RGoB 2009), and 14% of the forest area is economically accessible and available for commercial timber production (FAO 2005). Buffum and Tempel (2010) argue, although CFs are currently the smallest component at 2%, they have potential to cover between 8 to 10% of total forest area and reach 70% of the total population of Bhutan under active CFM. Such a progressive trend in CF development is possible only due to appropriate resource endowment supported by enabling policies and rules.

Conclusion

CFs are gaining popularity across the world and in the process equity has become an emerging issue in CFM. Substantial consideration has already been given to address the risks of inequitable CFM throughout the world. Over the years, the CFs in Bhutan have become an increasingly important means to explore opportunities to generate economic and social benefits from active resource management. With the change of emphasis towards more social and economic programs, challenges

are faced on how to ensure good governance through equitable CF management. Further, given Bhutan's changing socio-political context and the development philosophy of GNH, CFs can extend direct socioeconomic benefits to rural farming communities, particularly the poorest section of the Bhutanese society. Overall, this study concludes that the studied CFs are equitable in access to and distribution of forest products. The findings from this study indicated that the equity of CFs may be attributable to socio-cultural homogeneity, gender equality, supportive policies and rules, and appropriate forest resource endowment. Thus, CFM as a strategy in Bhutan can be a viable model to ensure sustainable livelihood and poverty reduction programs. However, policies and CFM plans should be clearly spelt out based on local situations and to the satisfaction of the needs of local communities. The government and other stakeholders should develop effective mechanisms to fully harness the potential of CFM further to contribute to the improvement of livelihoods and poverty alleviation at the community level that can bring undoubted achievement towards GNH in the country.

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