ABSTRACT    Community-based forest management has been popular and effective in Nepal. Community forest comprises 96 percent of the total forest under different community based management regimes. This case study of Debnagar community forest shows that forest protection (grazing bans, forest fire control and cessation of illegal timber harvesting) is the first important objective. Members of the Community Forest Users Group (CFUG) reported feeling proud and satisfied with working in a group for the management of forest resources. The theoretical underpinning of the social capital approach was used to analyze the process and progress of the CFUG. They have been successful in linking forest management practices with economic activities such as marketing forest-based products, saving-credit, and the domestication of high value medicinal and aromatic plant species. The CFUG has noticed an improvement in regeneration and increased floral and faunal diversity in forest areas.

[Social capital, Community forest, Non timber forest products, Resource]
INTRODUCTION

Nepal is a landlocked and agrarian country with a total land area of 147,181 sq. km. It lies between 26° 22’ N - 30° 27’ N latitudes and 80° 4’ E - 88° 12’ E longitudes. Roughly rectangular in shape, the land extends approximately 885 km. east-west and ranges from 145 km. at its narrowest to 241 km. at its broadest, north-south. The country is bordered by China in the north and by India in the south, west, and east. The landmass is divided into three geographical zones, the high Himalayas, the mid- Himalayas or mountainous region with long terraced slopes leading to fertile valleys, and the flat, sub-tropical Terai region (MOAC 2011).

Nepal has a great variety of topography, which is reflected in the diversity of weather and climate. The country experiences tropical, mesothermal, micro-thermal, taiga, and tundra types of climate. Annual precipitation ranges from less than 250 mm in the central part to 1500 and 2500 mm over different parts of the country. Monsoon season (June-September) receives about 60 to 80 % of annual rainfall. Wide variations in agro climatic regions from tropical to temperate and alpine climates provide opportunities to produce a wide variety of agro commodities. Based on physiographic delineation of presently cultivated area, four distinct ecological zones are distinguishable in Nepal (MoFSC 2012):

- **Tropical zone**: The tropical zone runs east-west along the southern part of Nepal, with elevation ranging from 60 to 1000 m.
- **Subtropical zone**: The subtropical zone also runs east-west along the middle part of the country with elevation between 1000 and 1500 m.
- **Warm temperate zone**: The warm temperate zone is restricted to hill slopes in the mid and high mountain physiographic regions and has elevation ranging from 1500 to 2000 m.
- **Cool temperate zone**: In the cool temperate zone, elevation ranges from 2000 to 3000 m.

NATURAL RESOURCES

*Forest and Non Timber Forest Products (NTFPs)*

Broadly, Nepal can be divided into three regions, namely Terai, Hills, and Mountains. These regions comprise 23%, 42% and 35% respectively. The major land use categories in Nepal are forest, agriculture land (including non-cultivated), grassland, shrub lands, water, and others. The major agricultural systems are tropical, subtropical, warm temperate, cool temperate, subalpine, and alpine. The land use statistics of Nepal are presented in Table 1.
Table 1. Land Use Pattern of Nepal.

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Land Area ha. (‘000)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest (including shrub)</td>
<td>5828</td>
<td>39.59</td>
</tr>
<tr>
<td>Agricultural land (cultivated)</td>
<td>3091</td>
<td>21.00</td>
</tr>
<tr>
<td>Grass land and pasture</td>
<td>1766</td>
<td>11.99</td>
</tr>
<tr>
<td>Agricultural land (uncultivated)</td>
<td>1030</td>
<td>6.99</td>
</tr>
<tr>
<td>Others</td>
<td>3003</td>
<td>20.40</td>
</tr>
</tbody>
</table>

Source: Ministry of Agriculture and Cooperative (MOAC), 2011

Various types of forests are found in Nepal. Nepalese forests are rich in medicinal and aromatic plants. Timber and herbs are valuable natural resources. Forests sustain a wide range of animals. Birds and wildlife have been good sources of foreign currency as they attract a large number of tourists. Still, the majority of livestock rearing relies on the forest for fodder and grazing. Numerous National Parks and Wildlife Reserves have been established in the forested regions. The forestry sector has received significant attention in Nepal’s periodic development plans as a means to achieve Nepal’s poverty reduction goal (APP 1995).

Non-Timber Forest Products (NTFPs) support the poor in many parts of Nepal. In the past, the rationale for forest conservation was simply to sustain the timber industry. With the rise of community forestry in Nepal, local people are gaining better access to significant benefits from NTFPs. NTFPs are often common property resources and in some places serve as open access resources too (Arnold 1995). The use of medicinal and aromatic plant species has been an overwhelmingly remunerative business for the mountain endogenous people (Edwards 1996). NTFP-based enterprises contribute to foreign exchange earnings; they also support biodiversity and other conservation objectives (Shrestha 1998). Edwards (1996) estimated that every year 10,000-15,000 tons of NTFPs, representing around 100 species, are harvested from forest land in the mid-hills and high mountains regions of Nepal. Studies show that more than 700 species of medicinal and aromatic plants are available in Nepal (Shrestha 1998). The distribution has been found to be approximately 31% in tropical and sub-tropical zones, 55% in the temperate zone and 14% in the alpine zone (Hara et al. 1978). It can be argued that NTFP management should be understood as complementary to timber management, though NTFPs have comparative advantage in the high mountain region (Shrestha and Joshi 1993; Banjade and Paudel 2008).
**Water Resources**

Despite being small and landlocked, Nepal is endowed with abundant water resources. There are about 6000 rivers in Nepal. Of the total, 33 rivers have a watershed coverage that exceeds 1000 square kilometers. Water resources sustain abundant floral and faunal species. Water resources play a critical role in irrigation. The majority of the rivers originate in the Himalayas. These rivers are perennial and have tremendous potential as a source of irrigation and hydropower development. About 23% of Nepal’s total area lies above the permanent snowline of 5000m (MoPE 2010). Presently, about 3.6% of Nepal’s total area is covered by glaciers and about 10% of the total precipitation in Nepal falls as snow (UNEP 2001).

**Keystone Wildlife**

Nepal is one of the most biodiverse countries in the world. Compared to its small area of 141,181 km², Nepal is home to 4.2% of all mammals, 8.5% of all birds, and 2.2% of all flowering plants on the earth (Shrestha et al. 2001). Nepal possesses the following threatened flagship species.

- Royal Bengal Tiger (*Panthera tigris tigris*)
- Asian Elephant (*Elephas maximus*)
- Greater One-horned Rhino (*Rhinoceros unicornis*)
- South Asian River Dolphin (*Platanista gangetica*)

The government of Nepal estimates the vast faunal diversity in 35 forest types and 118 ecosystems in Nepal (Shrestha 1998; MoFSC 2005). Almost 25% of the country’s landmass is designated as protected area, with 10 national parks, three wildlife reserves, five conservation areas and one hunting reserve. The wildlife diversity status (in numbers) is presented in Table 2.

**Table 2. Diversity of Wildlife in Nepal.**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Total species</th>
<th>Endemic species</th>
<th>Threatened species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphibians</td>
<td>50</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Birds</td>
<td>864</td>
<td>8</td>
<td>31</td>
</tr>
<tr>
<td>Mammals</td>
<td>203</td>
<td>4</td>
<td>29</td>
</tr>
<tr>
<td>Reptiles</td>
<td>123</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Total wildlife</td>
<td>1240</td>
<td>36</td>
<td>69</td>
</tr>
</tbody>
</table>

Source: Ministry of Forest and Soil Conservation (MoFSC 2012); NPC 2004
AIM AND OBJECTIVES
The aim of this study was to better understand the issues involved in forest resource management from the collective action perspective. Specific objectives include:

- Assess how social capital accelerates collective resource management, and
- Determine the effectiveness of community forestry in the tropical region of Nepal.

METHODS
This research was primarily a desk study. The case study of one community forest user group was prepared from personal communication with a representative of Debnagar Community Forest Users Group (CFUG), Chitwan, Nepal.

THEORETICAL FRAMEWORK
Social capital (SC) refers to an attribute of individuals in the form of networks such as groups, cooperatives, clubs, close-knit functional associations etc. Social capital thus comprises both networks and the assets that could be mobilized to achieve a specific goal of a project or program. Trust is the central element in developing sustainable social capital via personalized, generalized, and institutionalized trust. Social capital explains that social bonds and norms are important for people and communities (Coleman 1988). Most experts agree that social capital consists of three important dimensions: trust, social norms, and membership of social networks (Putnam 1995; Portes 1998). Because of connectedness and effective cooperation, social capital helps to reduce the cost of actions. Social capital lowers the transaction costs of working together (Pretty 2003). According to Pretty, four features of social capital are: i) relations of trust, ii) reciprocity and exchanges, iii) common rules, norms, and sanctions, and iv) connectedness in networks and groups. Trust building is an important component of success in collective resource management. Trust may be derived from various sources. Reciprocity plays a vital role in enabling trust between individuals, groups or communities; however it takes time to build.

In their study of the Mexican farming system, Grunewald and Bulte (2012) revealed that trust explains why some people more readily “catch up” with opportunities created by an expanding market, while others lag behind in poverty. Their proposition has important implications for economic incentives while conducting resource conservation practices. Basically they argued for personalized, generalized, and institutionalized trust. Trust influences adaptive behavior of actors in the collective management of resources and also affects economic outcomes. In Nepal, people who have worked in groups or cooperatives have realized stronger economic incentives than those working individually. People in the high mountain regions of Nepal collect NTFPs
and medicinal plants individually (because of resource constraints) but practice collective marketing to enhance bargaining power and negotiate better prices. Like other assets, trust may be considered an asset for economic activities because it promotes cooperation and stimulates more efficient social and economic exchange (Dasgupta 1998). The involvement and participation in groups can have positive consequences for the individual and the community.

Social capital comprises two elements: first, the social relationships themselves that allow individuals to claim access to resources possessed by their associates and second, the amount and quality of those resources (Bourdieu 1985). A diverse source of social capital reduces the distance between the sociological and economic perspectives and simultaneously engages the attention of policy-makers seeking less costly, non-economic solutions to social problems (Portes 1998). The acquisition of social capital requires deliberate investment of both economic and cultural resources.

Social Capital and Collective Management

Social capital offers a route to sustainable management and governance of common resources (Pretty 2003). The likelihood of resource depletion is higher where natural resources are commonly owned. According to Pretty (2003), people tend to free-ride, both by overusing and underinvesting in the maintenance of resources. Increasing population has to use more and more resources that harm land, water, forest and other resources. Hardin (1968) argues that mutual coercion, mutually agreed upon, is necessary to have effective collective action. In contrast, privatization increases the likelihood that resources will be more carefully managed (Demsetz 1988). Development workers and policy makers generally believe that if communities are given control over their resources and access to technical and managerial assistance, they will act to conserve their natural resources. It has been resulting in better outcomes for forestry, irrigation water management (Pretty 2003) and very recently in watershed too (Pradhan et al. 2012).

Through social capital, stakeholders can improve their capability to access various environmental and economic resources such as forest user groups, irrigation water user groups, group loans, protected markets, etc. It is widely accepted that social capital focuses on social relations that have productive benefits. However, social capital does not have a clear, undisputed meaning (Dolfsma and Dannreuther 2003). It is context specific and differs in conceptualization and operationalization accordingly. It will depend on the discipline and level of investigation (Robison et al. 2002).

COLLECTIVE MANAGEMENT OF FOREST RESOURCES

Community-based management has been a hallmark in sustaining Nepal’s forests and biodiversity. Nepal has taken a number of approaches to community management, including
community forestry, buffer zones around national parks, conservation areas, leasehold forestry, protected forests, and collaborative forest management. Community forestry is the second largest forest management regime after government-controlled management. Local communities in Nepal are managing about one-third of the country’s forests. Between the 1960s and 1990s, the forest cover decreased from 60% to 29% (FAO 2009). However, after the advent of community forestry, forest cover increased to 40% by 1994. In addition, community forestry has contributed to decreased poverty and also contributes to social development activities (MoFSC, 2005). Nepal has also been successful in directly conserving biodiversity and forests with one of the highest percentages of land under protection (>23%) in the world, putting it in the top 20 countries (and second in Asia) for most area protected (Allendorf 2007). About 31% of Nepal’s forests (1.71 of 5.5 million hectares) are managed by the local communities (Tables 3 and 4). This area does not include buffer zone area forest. The conditions of the community-managed forests are better than the government forests (Allendorf 2007; MoFSC 2012).

**Table 3. Forest Under Different Community-Based Managed Regimes in Nepal.**

<table>
<thead>
<tr>
<th>Types of Forest</th>
<th>Forest area (ha)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Forests</td>
<td>1,664,918</td>
<td>96.03</td>
</tr>
<tr>
<td>Leasehold Forests</td>
<td>38,997</td>
<td>2.25</td>
</tr>
<tr>
<td>Collaborative Forests</td>
<td>29,798</td>
<td>1.72</td>
</tr>
<tr>
<td>Total</td>
<td>1,733,713</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Ministry of Forest and Soil Conservation (MoFSC 2012)

**Table 4. Status of Community Forests (CF) in Nepal.**

<table>
<thead>
<tr>
<th>Ecological Belts</th>
<th>No. of HHs</th>
<th>% of HHs covered by CFUG</th>
<th>Community Forests</th>
<th>CF area</th>
<th>Households Members</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Number (%)</td>
<td>Area (ha) (%)</td>
<td>Number (%)</td>
</tr>
<tr>
<td>Mountains</td>
<td>319,887</td>
<td>91.85</td>
<td>2,861 (16.07)</td>
<td>269,526 (16.19)</td>
<td>293,801 (13.39)</td>
</tr>
<tr>
<td>Hills</td>
<td>1,982,753</td>
<td>71.36</td>
<td>12,882 (72.34)</td>
<td>1,095,054 (65.77)</td>
<td>1,414,835 (64.48)</td>
</tr>
<tr>
<td>Terai</td>
<td>1,950,580</td>
<td>24.90</td>
<td>2,065 (11.60)</td>
<td>300,338 (18.04)</td>
<td>485,714 (22.13)</td>
</tr>
<tr>
<td>Total</td>
<td>4,253,220</td>
<td></td>
<td>17,808</td>
<td>1,664,918</td>
<td>2,194,350</td>
</tr>
</tbody>
</table>

Source: MoFSC 2012
Forest Management Policy

The government of Nepal has initiated a legislative approach to handover the public forest to the communities as a community forest. This legislation defines and ascertains secure tenure rights and the authority to manage and utilize common property resources. The Forest Act (1993) and the associated Community Forestry Directives of 1995 declare that communities have the right to constitute Community Forest Users Groups (CFUGs), which function democratically. CFUGs can harvest and trade forest products as well as collect the royalties levied on forest products. Community forest management identifies rural users as the true stewards of the forests who are then responsible for conserving, developing, managing, and utilizing the forest resources (Acharya 2002).

CASE STUDY: DEBNAGAR COMMUNITY FOREST USERS GROUP (CFUG), CHITWAN, NEPAL

This case study was prepared based on personal communication with members of CFUG. Debnagar forest in Chitwan district has been managed by the local Debnagar Community Forest Users Group, which was established in 2003. There are a total of 245 members in the CFUG. The CF is 25 kilometers southeast of the district headquarters. It consists of 351 ha of tropical forest with abundant floral and faunal habitat. In addition, there is one small watershed (37 ha), which plays an important role in water storage. The water accumulated in this watershed is diverted to a permanent irrigation channel, which passes through the middle of the community forest area. In addition, the watershed is a popular site for migratory bird watching in the summer.

The government of Nepal has given priority for women’s involvement in resource management. The government office in each region gives incentives (waiver on registration fee, tax and transportation subsidies) for CFUGs headed by women.

Forest protection (grazing bans, control of forest fire, and cessation of illegal timber harvesting) is the first important objective of this CFUG. Community Forest (CF) saw a three folds increase in tree species during the period of 2003-2012. Not all trees are mature yet. The CFUGs have noticed an improvement in regeneration and increased floral and faunal diversity in forest areas. The majority of the people in the CFUG region are farmers and are rearing milking cows on a commercial scale. In the early years of the project, farmers experienced difficulties addressing certain household needs such as fodder, firewood, and some other forest products. After three years, the CFUG developed the “Conservation and Utilization Protocol”. They then submitted it to line agencies to get it approved. After some modification in terms of wildlife protection, the protocol was approved. This CF borders Nepal’s superior protected
region (Royal Chitwan National Park), where most of the tigers and one-horned Asian rhinoceros have been protected.

For the last couple of years, CFUG members have been successful in harvesting fodder in spring and summer seasons on a rotational basis. They collect felled trees and their limbs once a year (before monsoon) and make arrangements for sale. If a member of the CFUG needs firewood or timber, s/he gets first priority at a 40% discount. Otherwise, they put the material up for bid with a fixed minimum price. The earning goes to a saving-credit cooperative of the CFUG, which is provided as credit at low interest rate (3-5% as compared to 12-14% market rates) to needy members.

The forest supports a number of plant species, most of which have useful values. Recently, CFUG has started domesticating and cultivating some high value NTFPs. These include *Rauvolfia serpentina*, *Asparagus racemosus*, Lemon Grass, Chamomile and Citronella. However, they have not been harvested at a commercial scale yet. It is deemed that these crops would be good sources of income generation via small-scale bio-enterprises.

The NTFP sub-sector contributes about 5% of the GDP of Nepal (CECI 2006). The NTFPs of Nepal possess a comparative advantage in terms of sustainable production and trade. Among the advantages of Nepal’s NTFP sector are their use of an organic farming approach, as well as the high medicinal and aromatic properties of these products. About 150 species are considered to be feasible to cultivate in the tropical region of Nepal with economic importance (Bhattari and Ghimire 2006) and potential to raise the living standard of the marginal and resource-poor communities in all regions of Nepal (Larsen and Olsen 2007).

CFUG has experienced occasional conflict over management issues. These issues included free riding and rivalry. The majority of conflicts are related to fodder and firewood collection. One-third of the CFUG members are relatively poor and do not have alternative sources for firewood and livestock feed. It was found that collective action becomes problematic only when there is inadequate information, conflicting interest or there is something intrinsically problematic about the nature of the resource itself (Poteete and Ostrom 2004). However, these problems have been resolving smoothly by linking government’s biogas program (for firewood) and practicing agroforestry (for fodder/forage to goat and cattle).

RESULTS

In the past decade of practicing community forestry, CFUG has seen the following outcomes:

- Sustainable forest products and enhanced biodiversity and environmental amenities.
- Improved access to small to medium sized credit facilities to establish local resource-based micro-enterprises.
- Additional opportunity to operate NTFPs farming, silkworm rearing and other feasible high-value cash crop production (NAP 2004).
- Promising conservation practices by communities through conservation education in the local communities.
- Institutional support at the community level such as conservation grants, non-formal environmental education and scholarships to indigenous communities for their high school children, excursion visits to see similar management practices.

LESSONS LEARNED

The case study indicates that any conservation program, to be sustainable, should have clear economic impacts for the community. In order to improve their sustainability, conservation programs should have sufficient seed money to foster collective action effectively. Extension education on biological monitoring and conservation management planning must also be initiated from the start. Economic benefits proved to be a critical factor in the formation of cohesive groups, in developing trust and respect among community members, and in gaining their interest in resource management issues.

Finally, access to resources and control over these resources must be defined properly. The state must be guardian rather than umpire for effective environmental resource management. This proves that property right issues are very relevant institutions for the efficient functioning of the economy (Demsetz 1967; North 1991). Enforcement of property rights are essential part of economic incentives. Tenure alone is not sufficient; CFUG must also have access to technical, management, and marketing expertise to effectively manage their natural resources.

CONCLUSIONS

Collective resource management programs have been very popular in sectors such as forestry, irrigation water, community hydro, recreational parks, and watershed conservation in Nepal. The majority of the community based forest resource management efforts are working efficiently in the foothill and hilly region of Nepal. The Terai region is also gaining momentum in community forestry, especially near protected areas (national parks and wildlife reserves). Forest protection (grazing bans, forest fire control, and cessation of illegal timber harvest) is the first important objective of CFUGs. Community Forest claims a threefold increase in tree species during the period of 2003-2012. The CFUGs have noticed an improvement in regeneration and increased floral and faunal diversity in forest areas. The CFUG employs democratic procedures, which might have been instrumental in improved management of forest resources. Linking forest products to markets and operating saving-credit programs in rural areas has had positive impacts for the low-income members in the community. Recently
adopted NTFPs domestication would further expand economic opportunities. At the community level, these activities foster the physical environment and the livelihood of the people.

Collective action efforts that seek to build trust, develop new norms, and help form groups have become increasingly common. Development workers and civic society prefer to refer to collective management practices alternatively as community participatory, bottom-up, and co-management. Research on the application of the social capital concept in natural resource management yields nearly unanimous results (eg. Pretty 2003; Ostrom 1990; Ostrom 2007; Deitz et al. 2003). Social capital (group/cooperatives or any functional groups) can help to ensure compliance with rules and keep down monitoring costs, provided networks are dense, with frequent communication and reciprocal arrangements, small group size (Olson 1971) and lack of easy exit options for members.
REFERENCES


