CHAPTER 1: INTRODUCTION

The majority of the Forestlands in developing countries are controlled by the state. Necessarily, these countries generally lack sufficient manpower and budget to supervise and enforce protection rules in these forests. Consequently, forest resources in these countries are deteriorating at increasing rate. To improve this situation, some countries have already adopted policies to involve local bodies and individuals in the management of Forest resources.

Nepal is a classic example where increased deforestation has invited many serious questions about the impact on the rural population. Many studies suggest that excessive cattle grazing and fuelwood gathering are responsible for rapid deforestation in many parts of the country. This has increased soil erosion risks in the upstream watersheds and has increased the flood risk down-stream settlements. Hyde (1993) suggests this problem derives from non-sustainable harvests for domestic consumption.

Before 1957, local villagers living nearby the forests were managing the forest resources. Then, it was believed that about 60 percent of the total lands were forested. The Forest Nationalization Act of 1957 allowed His Majesty's Government (HMG) to claim ownership over all type of private and communal forestlands in the country. Local people believed that HMG was responsible for taking away their traditional use rights on local forests. That created strong incentives for villagers to destroy the forests and convert it to terrace lands so they would claim it as private property (Wallace, 1983; and Chapagain, 1984).

In order to solidify the state control in forestlands the HMG had promulgated two additional acts, the Forest Act of 1961 and the Forest protection Act of 1967. It was expected that the law and order situation in the state-controlled forests would be improved. However, the situation did not improve, and the forests were continually depleted. By the end of 1978, the forest coverage in the country had decreased to 38 percent.

This trend encouraged policy planners to realize that the command and control policy was not the efficient solution to solve deforestation problems in Nepal. Therefore, planners were motivated to work for a new policy framework that provided incentives for local communities to protect state forests. As a consequence, HMG promulgated two Community Forest (CF) regulations in 1978, the Panchayat Forest (PF) regulation and the Panchayat Protected Forest (PPF) regulation. These two regulations are the corner stone of modern CF development in Nepal.

After restoration of democracy in 1990, all the existing forest laws were abolished and the Forest Act of 1993 and its bylaw of 1995 were promulgated. Since this Act was drafted as per recommendation of a Master Plan for the Forestry Sector (MPFS), it fully empowered local communities to protect and manage the CF. The legal provisions of granting full autonomy on forest resources have encouraged local communities to make request for more CF transfer. However, agencies involved (the various District Forest offices, DFOs) have not been able to satisfy the local demands. A recent Forest User Group (FUG) database shows that, thus far, Nepal has been able to transfer only 18.3 percent (about 651,669.6 ha state forestlands to 8949 local communities) out of the total 61 percent potential CF lands available in the country (CPFDD MIS Report, 1999).

Many empirical studies suggest that the quality of state forests have improved after they were transferred to the local communities, Shrestha (1987), Bartlet et al., (1987), Shrestha (1997). This could have been possible due to involvement of many individuals in joint production system. In collective choice situations people may not agree to a new arrangement, unless every body is assured of future benefits. Since access rights and resource boundaries are well defined in the community forests, it is, therefore, logical to expect reduced levels of harvesting in theses forests. This statement allows us to hypothesize that increasing CF transformation rate in the country could reduce the prevailing deforestation problem.

Nevertheless, not all CFs are efficient in managing their forest resources. In some CFs, it is observed that local communities strictly protected their forests and over exploit the nearby state controlled forests. In other places, the communities are unable to implement operational plans to optimize the forest products.

There could be many reasons that are restricting the communities from effective implementation of their plans. My eleven years work experience in this field suggests that following issues are the most common issues in CF management of Nepal, which are chronologically arranged here based on their consequence level. They are- poor resource-user ratios, conflicts on user identification and management objectives, conflict in benefit and cost sharing mechanisms, uncertain and incomplete transferability rights, conflict in resource boundaries, and conflict in securing traditional tenure in public land due to continuous demographic change from migration pattern.

There are many study reports available in CF operational issues, like user identification, boundary disputes and product distribution Joshi (1997) and Shrestha

(1996, 1997). However, to my best knowledge, there are very limited reports on implication of poor resource-user ratios, and demographic change in CF development in Nepal. Since I am incorporating them in my analysis, this study is different from others.

Those two issues can be recognized and treated at different levels: policy levels, institutional levels, and the individual or resource level. However, my approach in this thesis is centered to propose a theoretical explanation for two important policy questions. First, whether increased CF transfers would be effective policy instruments for sustained Forest Development in Nepal? Second, if it does then how the prevailing work situation can be improved?

I believe a critical review of modern CF policy and selected CF case studies could be an important tool to answer these questions. In order to reflect real field situations, I have selected six case studies from three USAID funded project districts, which is located in the Mid-West Development Region (MWDR) of Nepal. I will first examine six case studies as illustrative of the Nepalese experience, and then review modern forest policy of Nepal. I believe this will help me to identify the characteristic features of collective actions that allow CFs to operate successfully or cause them to fail.

The whole thesis is organized into two major sections. The first section includes a general overview of CF experience in Nepal, and a critical review of six case studies, which provides an economic interpretation for successful or unsuccessful CFs. The second section includes a review of modern Forest policy of Nepal, which recommends effective policy instruments for sustained CF development in this country. This section also compares my organization with other common property resource policy literature, and, finally, draws conclusion for better CF work environment in Nepal.

CHAPTER 2: HISTORICAL BACKGROUND

2.1. Institutional History:

Until 1957, there was no separate legislation for forestry in Nepal. The national code of 1854, *Muluki Ain*, was the only legal document that could prohibit forest clearing. This code had authority to penalize people if they collected forest product without state permission. However, it was rarely adopted in the field.

The legal ownership of forestlands in the Terai had been claimed by the state since the mid-nineteenth century, when sale of timber and railway sleepers to India became profitable. Tenure rights to forest in the hill region were more fluid. Legally they belonged to the king, but local communities had been using them under their own rules and supervision for generations (Barraclough and Ghimire, 1995).

The private Forest Nationalization Act of 1957 was promulgated to regulate the use of the forest and their products. This Act could not achieve its goal due to poor administrative capacity and poor communication between regions within the country. However, it did affect communities that were located within administrative outreach. These communities felt uncertainty of future benefits from the state forests, which encouraged them to behave as if the forests were open access property. Thus, uncertainty of tenure in state forests further accelerated the deforestation problem throughout Nepal.

To reinforce protection mechanisms, the Forest Act was promulgated in 1961 (and later amended in 1977 and 1978). This Act classified state forests into four categories and attempted to regulate and systematize forest utilization in these forests. However, malaria was eradicated from the Terai, which encouraged the hill population to

migrate there. Those migrants rampantly cleared forests for settlement. To halt it HMG promulgated the Forest Protection Special Act of 1968, which gave policing and judicial authority to the local forest officials. To make this act more operational and effective, the Forest product sales and distribution rules were formulated in 1971. Despite all efforts, the deforestation problem continued, especially in Terai.

This experience revealed that forest protection was not possible without local participation in forest development activities. It was also realized that the forest product was the basic human need for the majority of the population. Therefore, two additional regulations were formulated in 1978, the Panchayat Forests (PF) and Panchayat Protected Forests (PPF) regulations. Both regulations encouraged local participation in forest development activities, which was in line with the decentralization policy. This regulation defined the categories of state forests that can be handed over as PF and PPF. It also defined a procedure for transferring land, prohibiting activities, and benefit allocation mechanisms for those forests.

According to this regulation, forests had to be managed by the local Panchayats, the lowest level of political and administrative organization. However, the Panchayats usually proved to be unsuitable bodies with which to undertake local forest management, as the areas they administered seldom coincided with user group boundaries (Arnold, 1998). This created confusion and conflict among the local users, particularly where users belonged to different Panchayats from different districts. In these cases either it took a long time to negotiate for new arrangements, or traditional management systems failed to continue.

The passage of the Decentralization Act of 1982 and its bylaws empowered the

District Panchayats and legally recognized local user groups responsible to plan and manage all local development activities. Forestry activities also had to be integrated with other local development activities in the District. Consequently, all existing regulations in Forestry including PF and PPF regulations were also amended to make them compatible to Decentralization Act of 1982.

The Master Plan for the Forestry Sector (MPFS) was introduced in 1988. This is considered a commitment of the government to manage forest resources through public participation. The MPFS emphasizes the important role of the local community in managing the local forest. One of its high priority objectives is- " *to promote peoples participation in forestry resources development, management, and conservation" (MPFS 1988).* Accordingly, HMG incorporated CF as a priority program in its national forest development plan.

The Forest Act of 1993 is the latest forestry legislation. This act and its bylaw of 1995 empower local users to work as a corporate body. This Act has decentralized CF transfer authority to District Forest Officers (DFO), which was previously a cumbersome bureaucratic procedure. The local communities are now empowered to claim ownership rights on forest products. The land as such will remain state property. However, HMG still reserves right to take back the CF as state forests, if local users violate terms and reference of the operational plan. This type of legal arrangement indicates that local users have management responsibility, with the state acting in a regulatory role only.

2.2. Resource consumption and supply trend:

Nepal is an agrarian country where more than 90 percent of the population lives in the rural villages. These communities require fuelwood and construction timber for household consumption, fodder for cattle, and compost for farmlands. This indicates major share of aggregate demand for forest product comes from agricultural population. These products are directly collected and consumed by local inhabitants without entering organized market. Besides forest products, local communities also demand reduced soil erosion, watershed amelioration, and income opportunity from the forest. Therefore, aggregate demand of forest product in Nepal can be categorized into two broad categories i.e., marketed goods and non-marketed goods.

Wyatt-Smith (1982) in a study in west central Nepal, estimated that an area of 2.8 ha of productive but managed forest was required to sustain 1 ha of Agricultural land for fodder. Mahat et al 1987a, estimated 1.33 ha forestlands are required to produce leafy biomass to support 1 ha agricultural land. MOFSC/HMG/FINNIDA 1993 estimated average annual per-capita fuelwood consumption in hills and Terai was between 400-800 kg and 380-650 kgs respectively. MPFS in 1988 conservatively estimated per capita wood consumption in rural areas was around 0.1 $m^{3.}$

It is estimated that about 90-95 percent of woody bio-mass is used as fuelwood (MPFS 1988), which indicates it is the most important forest product in the Nepalese economy in terms of wood biomass consumption. Amacher et al., 1999 suggest- "Agriculture residues are generally considered to be fuelwood substitute, although Nepali households consider them as inferior fuel and prefer not to burn them when fuel wood is available".

The consumption and supply trend of forest products in Nepal will be projected under two different scenarios. First, The current trend scenario that allows us to assume the continuation of current consumption trend without substantial change in current consumption and supply pattern in future. This scenario indicates widening gap between projected consumption and production capacity of the forests, which indicates forests are being used at a rate greater than annual growth (For detail see Appendix 1).

Second, the optimistic scenario, which allows us to assume decreasing pressure on forest resource due to decreasing growth rate in the livestock population, increased seasonal migration from rural to urban areas, and increased forest product supply from community and private managed forests. Fodder consumption would not increase in future as fuel wood and timber. Because the cattle population has decreased in last five year, and population growth rate of other livestock e.g. Buffalo, Goat, Sheep has been lower than human population growth (CBS, 1999).

However, a recent national forestry inventory report shows that Nepal's forest area has decreased from 38 percent to 29 percent in last 16 years period (Spotlight Weekly, Dec. 3, 1999). This indicates that the gap between current consumption level and stock capacity will further widen in future. As Fox (1983) suggests a decline in total forest growth in Nepal may be caused more by the decrease in the stock of resources than by the declining growth rate. Therefore, HMG needs to formulate suitable policy instruments to narrow this gap in the future.

CHAPTER 3: LITERATURE REVIEW

3.1.General Common Property Resource (CPR)

Gordon and Scott (1968), and Hardin (1968) argue that common ownership in renewable resources leads to inefficient exploitation of the resource due to ignorance of external costs imposed by the actors. This model also assumes that common owners would tend to harvest more and consume more, which would eventually reduce the supply capacity of the resource. It also assumes that single ownership or an appropriate cooperative would be the efficient allocation system where all external costs would be internalized.

Ciriacy-Wantrup and Bishop, (1975) suggest common property is not "everybody's property" but it is a well-established formal institutions. They argue " the common property approach suggests a potential remedy: to assign catch quotas to individual fishers in such a way as to make the aggregate of the quotas equal to the desired total catch, which in the long run, would normally equal maximum sustainable yield."

Bromley (1989 a, 1989b) suggests " Rights have no meaning without correlated duties and the management problem; with open access resources there are no duties on aspiring users to refrain from use." Bromley and Cernea, 1989, therefore, argue that the common property term has been largely misunderstood and falsely interpreted for the past two to three decades. Arnold 1998 suggests the situation that Hardin was describing was in practice one that is more accurately termed as unregulated open access.

Recently, common property has been used for land or other resources that are

available to all but neither owned nor managed by anyone, but access to these resources is limited to a specific group that holds the right in common. This clearly suggests that user size in a common property is well defined. Therefore, local communities exclude other potential users from resource. Under this assumption, common property resource is a kind of shared private property.

Some authors offer private property as the best or only solution to the open property problem (Demsetz 1967; Cheung 1970; Ault and Rutman 1979). However, Stevenson 1991 suggests private property is indeed one solution to the inefficiencies of open access, but not necessarily the best solution. He suggests that a common can perform as efficiently as private property only under fairly restricted circumstances (in reference to Swedish common): much lower costs than private property.

Mckean 1995, suggests – "Historically, common property regimes have evolved where the demand on a resource has become too great to tolerate open access use any longer, so that property rights in the resource have to be created, and other factors must exist that make it impossible or undesirable to allocate the resource to individuals". Therefore, he suggests like private property common property also give resource owners incentives to husband their resources, to make investments in resource quality, and to manage them efficiently over the long term.

Berkes et al., (1989); and Bromley and Cernea, (1989); argue that common property, like any other property or governance regime, is likely to be maintained only as long as it is appropriate to the changing situation in which it is found. Therefore, change may be towards individuals or state management, or back to open access, or, as is found in many forest situations, towards some combination of rights and regimes.

This argument indicates that as long as there is an abundant resource, and demand for goods and services is low, local inhabitants will be least interested in devising rules and regulation to manage their resources. In such situation, open access arrangement would be as appropriate as others would.

Berkes (1993) suggests " Open-access… is an efficient regime for the quick conversion of resource into money. Thus it is not surprising that colonialists often dismantled communal property regimes and institutions as a prelude to establishing colonial economies."

3.2. Forest as Common Property Resource

Throughout much of the world, forests have been managed collectively for generations through traditional management regimes. Communities have established rules for cutting firewood and forage and for the harvest of fruit, timber, fibers and other products (Christopher and Bromley, 1989)

Historically, communal management of forests and forestlands developed around Sweden agriculture in order to control use of land or soil, and around rights to use of natural vegetation that was subject to group control (Arnold, 1998). Local people were claiming use right on useful trees in commons. Outsiders had to have permission from locals to collect products from theses trees. Most of these commons were later weakened by introduction of new land legislation that encouraged commercial cropping. Dove (1983) suggests these commons were later owned by individual households.

McKean and Ostrum (1995) suggest common property regimes were legislated out of existence, or ignored by land reform to farm individuals or the government.

However, common forests remain existed in part of the Europe where this was the most suitable arrangement for local communities (Arnold, 1998). Therefore, the concept of community involvement in managing local forest resource is not a new concept.

Three hundred years ago in Germany and other parts of Europe, communities assigned user groups to certain parts of the forest. Those user groups were responsible for managing and regulating the amount of products that would come from certain components of the forests (Hanschel 1978, Limard 1980). Such traditional practices were also common in many Asian countries including Nepal. However, different countries had adopted different types of social arrangements based on the influence of the colonial system in their local power structure.

However modern, many workers claim that in an unequal wealth distribution society (most developing countries), the wealthier families often dominate the poor in collective decisions and enjoy a large share of the benefits. This creates a contested situation and discourages disadvantaged groups from becoming involved in forest development activities.

Therefore, modern literature is more concerned about the issue of inequality in benefit allocation between different segments of the user community members. However, there is no common view in this regard. Some authors (Olson 1982, Sandler and Forbes 1980) claim that inequality may favor to create efficiency in commons whereas others (Netting, 1992; Baland and Plateu, 1999) argue this will result to higher degree of inefficiency

CHAPTER 4: COMMUNITY FORESTRY EXPERIENCE IN NEPAL

4.1. De-facto Community Forest:

Many workers (Eckholm 1978, Periera 1981, Nautiyal and Babor 1985) suggest that the deforestation problem in Nepal is a recent phenomenon, which must have occurred from high population growth. Others (Strebel 1985, Caplan 1970, Poffenberger 1980, HMG 1983, and Mahat et al. (1986, 1987) emphasize a static situation in arable land in hills since at least early 1900's. The later view assumes large-scale deforestation occurred a long time ago.

As Wyatt-Smith (1982) and Mahat et al. (1987) reported a certain ratio between forest and agriculture land use, which is essential to sustain the sustenance level of livelihood in the hill villages of Nepal. Local households realized they need continuous supplies of certain forest products to maintain their livelihood, whether it comes from public forest or commons or private forest. Consequently, local communities evolved new social arrangements to protect remaining forests.

Therefore, by the mid-nineteenth century most of the hill forests were controlled by local users, despite that they legally belonged to the state or by those acting on behalf of the state. The end of the Rana rules and the subsequent nationalization of all forests in 1957 seems to have encouraged more local groups to bring the forest areas they used under their own control in order to secure their access to them (Fischer, 1989).

As Fischer (1989) suggested, those technical and social arrangements must have been simple and adaptable to the local communities. Karmacharya (1990) suggests the most essential feature of such social arrangements is people who recognize each other as having rights to use particular products from particular forests. These arrangements were

later recognized as indigenous Forest management system (IFMS) and will continue as long as social and economic change in the local community is compatible to it.

Unlike open access property, IFMS had a defined user group, resource boundary, and a common agreement regarding protection and utilization of the forest resource. The local elites (often village heads) were generally given authority, by local villagers, to decide about inclusion or exclusion of users, fixing collection period and type of products, and fines against rule breakers. However, this system was not legally recognized, but it was effective to protect the forests.

This allows us to conclude that forest regulations through local arrangements were possible, even if there was no formal organization to supervise those forests. Though this system was very simple to implement, it failed to maintain equity and justice among the users. In those arrangements, the wealthier households were better off than the poor due to their high private capital resources and domination in collective decision-making processes. Nevertheless, IFMS has played crucial role in evolving modern CF development policy in Nepal.

4.2. Formal Community Forest

The amendment to the Forest Act in 1978 categorized state forests into four ownership categories viz. Panchayat Forests (PF), Panchayat Protected Forests (PPF), Leasehold Forests (LF), and Religious Forests (RF). The PF and PPF were established in communal forestlands that were traditionally managed under local arrangements. The LF was established under individual or agency ownership for certain specified time periods. The RF was defined as forests located at places of religious importance and entrusted to religious institutions for protection and management.

The PF were established in degraded forest area where local village Panchayats were expected to participate in reforestation and protection activities. But PPFs were generally established in low quality natural forestlands. The PF and PPF regulation had limited forest size to not more than 125 ha and 250 ha respectively.

The local Panchayats were allowed to collect all PF revenues, but they had to share PPF revenue with HMG. Panchayats had to follow HMG royalty rates and fix product prices to the point where prices were often higher than the real value of the product. Therefore, local users were collecting products from PPF without paying fees to the Panchayat.

Though PF/PPF regulation allowed local communities to claim property rights in state forests, PF/PPF success was very poor due to complex bureaucratic procedures (see Figure 1). It was mandatory for Panchayats to submit forest management plans in order to receive formal transfer certificates. But, these plans also had to be prepared by local forest technicians. Technicians were preparing plans in a standard technical format without consulting the local communities. As a consequence, a majority of these plans

were never implemented in the field.

The PF/PPF amendment of 1987 emphasizes the role of local Panchayats in formulation, implementation, and monitoring of local forestry activities. As Fox and Fischer (1990) suggested, village Panchayats were too large as administrative units to represent small user groups. There also was conflict and dispute regarding use rights and resource boundaries, especially where the user and forest fell under different Panchayats. Therefore, the government effort to involve local political institutions in local forest development was not effective. After abolition of Panchayat system in 1991 all PF/PPF were then renamed as community forest.

The modern forest policy evolved after promulgation of Forest Act of 1993 and its bylaw of 1995, which is based on the decentralization concept and revolves around the forest user group (FUG) concept. This concept assumes those who protect and manage the forest must possess the right of access to those forests. Modern regulation allows local communities to claim as much forestland as they can, provided there is no conflict on access rights with other users.

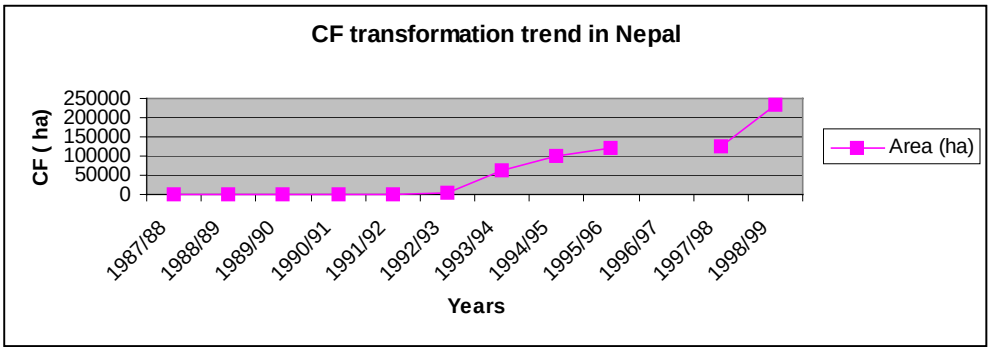
The ninth five-year plan (1998-2003) has given high priority to increase forest production and productivity without permanently damaging the resource base. The local communities are expected to manage local forests for their basic priority products like fuelwood, timber, fodder, and medicinal plants. This indicates CF activities have been implemented in line with Nepal's economic, social, and environmental goals.

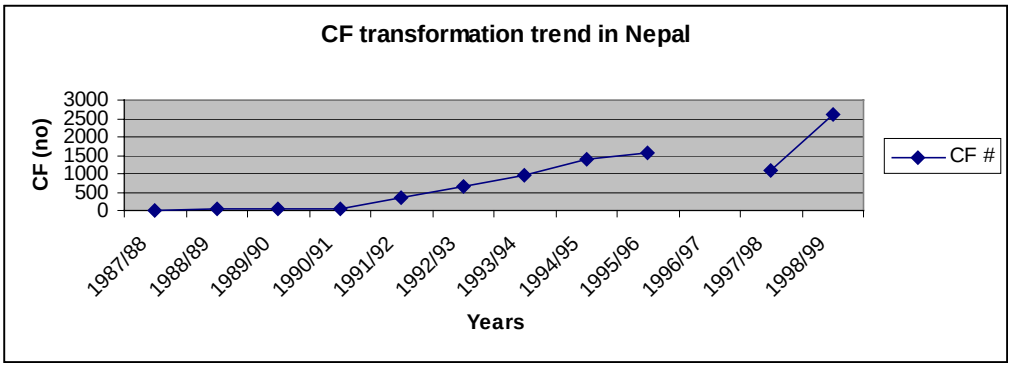
The current legislation has released all previously imposed legal and operational restrictions. The local DFOs have been authorized to hand over state forest located within their district boundary to the local communities. As shown in Figure 1, after this Act CF

transformation rates have significantly increased.

Currently, local users have no restrictions on resource size, resource quality, and product pricing decisions. Once the local users submit their CF constitution in local forest office, they will be officially recognized as Community Forest User Group (CFUG). Since CFUGs have legal identity as a corporate body, CF is now more autonomous than ever before.

Figure 1 (A): Community forests transfer trend in Nepal.

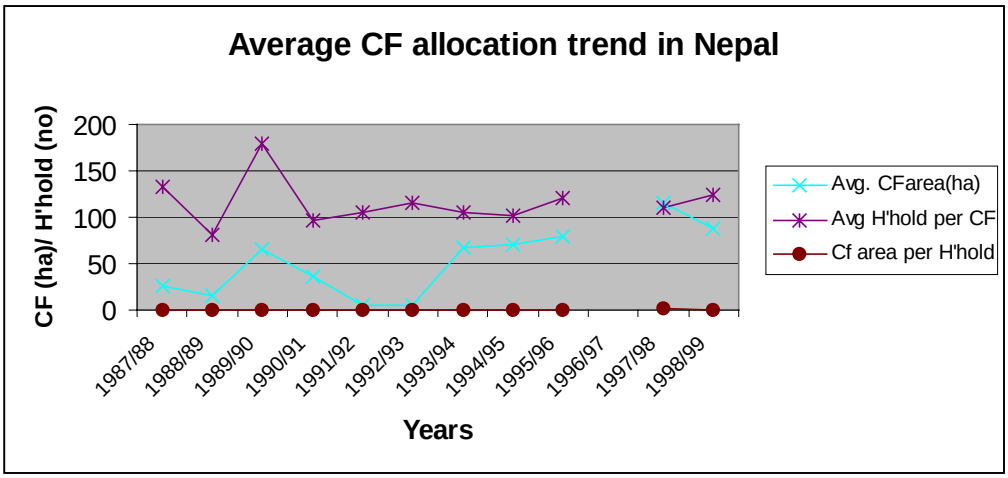




(Source: Joshi, A. L., 1997 and CPFDD MIS report, 1999)

Note: Data for FY 1996/ 1997 was not available

Figure 1(B): Average CF allocation trend in Nepal



(Source: Joshi, A. L., 1997 and CPFDD MIS report, 1999)

Note: Data for FY 1996/ 1997 was not available

Despite all these changes, the CF transformation rate is still below the expected target. If the transformation rate does not improve, then it might take another 20-30 years to transfer the rest of the potential state forests to the local communities. In this period, Nepal could lose additional forestlands forever. Therefore, it is imperative to identify potential operational and policy level issues that are restricting CF transfers in Nepal.

CHAPTER 5: CASE STUDIES OF COMMUNITY FOREST SITUATION IN NEPAL

In this section, I am discussing six case studies as an explicit example of the CF situation in Nepal. I will critically review each CF to identify strength, weaknesses, threat, and opportunities embedded in it. Based on that information, I will recommend policy instruments to improve prevailing condition.

All six cases have been selected from a USAID funded project, Environment and Forest Enterprise Activity (EFEA), working in Mid-Western Development Region of Nepal. Since it incorporates all three ecological zones of Nepal i.e., High Mountain, Mid-hills, and Terai, it well represents social, economical and ecological condition of this country. For detail information see appendix 2

This project is recognized as one of the successful donor-aid program in facilitating local control and management of natural resources in Nepal. A recent progress report shows that about 22.5 percent of the total potential community forestlands available under this project have been transferred to local communities, which is higher than national average (EFEA progress report, 1999). For detail see apendix 3, 4, and 5. This allows to assume, in this study, that the selected six case studies well represent general CF situation of Nepal.

5.1. Example of a classical Community Forest transformation:

Janakalyan CF is located in the Phulbari Village Development committee (VDC) in Dang District. This CF covers about 712 ha Forestlands and includes 270 local households as users. Its forest resource is extended in two mountain folds that surround

the settlement. Historical backgrounds reveal that users of this CF behaved very differently to their communal forest and adjoining state-controlled forest. That, of course, is an example of the classical distinction between CFs and state forests. Such cases are very common in rural villages of Nepal.

In the early 1980's, local residents from Phulbari and other local communities heavily degraded this forest to meet their fuelwood, timber and cattle-grazing requirement. When this forest became degraded, local users switched to another distant state-owned forest to meet their fuelwood and timber requirements. However, cattle grazing continued in the forest, which prohibited natural regeneration and thus increased soil erosion as the ultimate result.

The local inhabitants recognized this problem and decided to protect this forest. They formed a users committee to manage this forest, and later received formal ownership rights on this forest in 1991. When this forest was transferred to local community, the adjoining forest area had already been poor. Since then, local users have managed it as a CF.

After establishment of Janakalyan CF, the forest began to recover very quickly. The local users completely protected the CF and did not allow fuelwood collection, timber harvesting, and cattle grazing. However, villagers rampantly degraded the adjoining state forest.

Forest fires were common in those state-controlled forests, and it was expected that the establishment of CF would decrease fires. Most incidences of fire were due to negligence of trespassers. The local people paid no attention unless fire approached their CF area. When there was fire in the CF, all community members voluntarily worked to

put out the fires.

Recently, the local forest office handed over the remaining contiguous State forest to another community located behind the mountain foothill, the Amiliya village. The watershed boundary was selected as a physical demarcation. Interestingly, forest fire incidence has dramatically declined in these forests.

Indiscriminate tree cutting has also been dramatically decreased. Although the inhabitants of Amiliya claim that they face difficulty in supervising the forest along the mountain ridge due to long walking distances, they note that the intensity of cutting is much lower than in previous years.

From this case study it can be concluded that degraded state forests can be improved by transferring property rights from state to local communities. Transfers of property rights generate incentives for local communities to participate in forest protection and management activities. In this particular case, the community now has incentives for real and costly management efforts such as fire control and care of the forest property through monitoring the careless activity of trespassers. This also reveals that forest protection improves even when the forest is located at some distance from the local village.

5.2. Example of contested situation from dynamic change in the whole system

Basantapur CF (BCF) covers 104 hectares of natural forestlands and the community includes 175 local households. The forestland is located in the foothills above the agriculture lands. It is located in the eastern corner of Dang valley in the Mid-West Development Region of Nepal.

Thirty years ago this forest was a source of fuelwood, construction timbers, green manure and forage for the community. In the course of thirty years the forest has gone through three transformations, from a mature natural stand to a degraded open access forest, to a well managed commons, and more recently to a commons with challenged access. Here challenged access means access restrictions imposed by wealthier families against poor families.

Before 1943, this forest was very dense. Deforestation accelerated after 1953. The forest remained under state control until 1985. Property rights were not well defined, so the local community treated the forest as an open access resource. It was overexploited for local consumption and for wood supplied to the local market. Excessive pressure on the forest eventually converted it to degraded shrub land. Two impacts of the degradation became critical for local households, soil erosion in the foothills and a resulting loss in crop production in the agricultural lands below the foothill forests.

In the early 1980's, the community took collective action to reduce the soil erosion impact of forest depletion. A forest protection committee was formed. The committee was efficient in enforcing the local rules and it successfully protected an area equal to about four-fifths of the current BCF. Enforcement was effective because forest products were easily available from other state-owned forests. In fact, because BCF was

almost barren scrubland by 1968, households had already turned to other more distant state forests for fuelwood, construction wood and fodder. Therefore, no one suffered direct economic injury from protecting the forest. Meanwhile, some gained from the common action because it protected their agricultural lands from upstream erosion.

Forest protection allowed the rapid recovery of this community forest by natural regeneration. After five years, the degraded land turned in to a well-stocked coppice forest. It had two observable positive results. The rate of soil erosion was reduced and crop production below the forest increased. This motivated the forest protection committee to apply for formal rights to the forest. The District Forest Office formally handed over the forest in 1985 to the local community as PPF. Thus, property rights to the resources were formally transferred from de facto to de-jure community property.

In the late 1980's, an additional 15 ha of state-owned plantation land was also handed over to this community. These new lands are contiguous to the original natural coppice-regenerated forest. Both parts of the forest were put under the same protection and use rules. This additional forest also contributed to the erosion control benefits obtained on the lower elevation lands.

In early 1990's, as the forest resource quality improved social conflicts began to emerge. The wealthier families, the landowners, were consistent in continuing protection activities as before. But the accessible forests the poor households had relied on for fuelwood and forage were no longer available. They had been handed over to other communities. The local poor continuously requested fuelwood collection permits on the BCF, but they were only allowed to collect grasses and dead or dying wood products.

The wealthier families did not depend on forest for household energy needs. They had adopted cooking gas and electricity for energy purposes. They had also downgraded their unproductive local livestock units and replaced them with a few improved breeds. These wealthier families became the main decision-makers in protection and management activities of the community forest. They rejected requests of the poor for fuelwood collection permits, in order to maintain the protection of their own agriculture lands from erosion.

The poor must get fuelwood and pole size construction timber from somewhere, and they began to trespass on the BCF for these products. The BCF protection committee had to increase the numbers of forest watchers. This increased the total BCF cost that had to be contributed by the whole community. However, even the paid watchers could not keep out all the forest product gatherers. The poor avoided the guards and collected fuelwood and small size construction timber regardless of their lack of permits from the committee. This forest started to become degraded once more.

This CF remained in a contested situation for few years in the early 1990's. This caused stakeholder to reopen the debate about access to the resource. The continuous pressure from the poor segment of the community compelled the wealthier families to release their control. Recently, a new operational plan was prepared for the 1996-2000 period that allowed collection of forest products obtained from thinning and punning operations. For this, each household has to pay NRs 100 and can use up to six household members to collect products for one hour.

This situation is very common throughout the inner valley and low lands, where many communities are characterized by a bimodal land distribution. The wealthier

families possess notable influence over the poor in making collective decisions. Since the wealthier have access to alternative resources, and so their demands on the forest differ from the poor. The poor have no alternatives. They trespass and degrade the forest. (This situation is less prevalent in the mid-hills and high mountain villages, where the communities are relatively more homogeneous in their demand on the forest)

Without resolution of such class conflicts, the forest would not be better managed. Rather, it would degrade once more. However, willingness expressed by the poor to participate in protection activities reveals that there could be many ways to resolve the conflict. A new arrangement is preferred to bring back contested communities again to a well- managed commons.

In this case (the BCF), the additional piece of plantation alone is not sufficient to meet the fuelwood demands of the poor households. Therefore, careful management of the full BCF could relieve the poor, while still providing erosion control. Therefore, one of the possible options could be rotating the harvest of fuelwood and construction timber in small blocks through the full forest, while leaving more than 4/5 th of the forest cover untouched at any one time. This arrangement would benefit poor without harming wealthier. However, this forest would not be able to meet total fuelwood demand of the users, therefore private planting must go side by side for sustained management of this forest.

In the current situation, a new successful commons will be possible only when both classes agree on a common arrangement. If this happens then it would reduce the need to pay forest watchers, and the community would save the expense of its management activities. Unfortunately, this level of cooperation has not been observed in

many contested situations, and instead further degeneration is very common, once more, to an open access forest. In this situation the CF are neither able to supply products nor able to control the soil erosion hazards to the community.

5.3. Example of incomplete and uncertain transferability rights

Bagmare Bishnupur CF is a situation where local community cannot efficiently manage the forest due to state interference in non-attenuated property rights. The conflict between the Forest office and the local community has seriously affected the implementation of the CF operational plan.

Bagmare CF is a mixed hardwood forest of 306 ha.area, and it includes 699 local households. This CF is located along the Mahabharat foothill of Dang valley. Sal is the dominant tree species, a commercial timber species. Before 1977, this Forest was under state control. It was heavily depleted during the 1973-75 period to supply construction materials for a newly settled town at 20-km distance.

In late eighties, the local community protested against government felling permits in this forest. Local pressure ultimately succeeded in halting harvests by outside contractors. The local community formed a de-facto protection committee in 1977 and hired watchers to protect the forest. Later in 1987, this forest was formally handed over to 699 households as a PPF. The local community has been managing it as a CF since then.

According to the approved operational plan, the users committee can harvest 12,000 Cf. of timber annually. The local users have access to other state forests to meet their fuelwood and timber demand. The committee claims that the local demand for construction timber is less than the annual harvest. Therefore, this community has an opportunity to sell surplus timber to the outside market.

In the early 1990s, the committee announced open bidding for the sale of the surplus wood products. The committee noticed that there were few bidders, and that the

local wood traders acted as a cartel when quoting prices. Therefore, the committee decided to make its auctions more public by providing information on log inventories and terms of reference (TOR) in the local newspaper. As a result, an outside contractor bid the highest bidding price and was awarded the contract. The contractor took all the products outside the district.

This created a misunderstanding between the local forest office and the community. The Forest office claims that CF products must be sold locally. The community argued that it is their property, so they should be free to sell its products wherever they get the better prices. When both failed to reach a common agreement, the local forest office enforced restriction on wood sales outside the district boundary.

Nevertheless, the management committee proposed an alternative plan to satisfy the restriction on outside sales. They had proposed to establish community-owned wood processing plants. The management committee submitted its proposal long ago but did not receive a clear response from the forest officials. Meanwhile, harvested logs accumulated in the community's logging yard. These logs were stored for almost two years in the open. The wood decayed, warped, and lost economic value. This state interference made members of an efficient and sustainable community organization to become pessimistic about the CF.

The bottom line is that the local community will lose interest in managing the forest if the state restricts the community's property rights. The community has now begun to doubt the government's assurance of sustained use rights to the forest resource. It is evident that by taking away incentives of management, the government risks a return to open access behavior and rapid deforestation again.

5.4. Example of demographic change and its impact in maintaining use rights

Tharu CF is located in the Terai of the mid-west development region. It covers about 23.79 ha planted forest land and includes102 households users. It is located at less than twenty minutes walking distance from the district headquarters. The local indigenous Tharu community is managing this forest.

About ten years ago, local communities used this piece of land for cattle grazing and other public uses. In 1979, the referendum year, hill migrants began to flock to the Terai for settlement. As occurred in many other parts of the country, the open access lands of this district attracted new settlers. They were also attracted to this CF land and occupied it for some period.

The records from last two decades reveal that encroachment in open access land increases rapidly during elections or period of political unrest. This trend is common throughout the Terai and inner Terai valleys. The government has been unable to ameliorate this problem due to lack of political commitments. Therefore, it is the local institutions that must be relied on to protect these common lands.

The local Tharu communities of the Balapur village were aware of the squatters. But they failed to protest against the squatters because political parties were often involved in squatter activities. The Tharus are mostly illiterate and poor. (This is a group that still suffers from bonded labor practices). The migrants were better educated and they were able to capture most of the social and economic opportunities available in the local community. Thus, the migrants established themselves as rivals to local inhabitants in sharing common resources. Over time, the Tharu community lost many of their rights and opportunities.

This experience motivated the Tharus to act collectively, keep out squatters, and ensure their own traditional use rights on the common land. The local inhabitants ensured their traditional use right by planting tree seedlings in the open common land

In 1992, the common grazing land was planted with Dalbergia sissoo, a commercial timber species, by volunteer participation. The entire plantation was trenched around the periphery. Babool seeds, a thorny species, were sown all along the inner edge of that trench to make a hedge fence. This thorny fence was an effective protection against wild and domestic animals. The land was fertile, so those seedlings grew rapidly. A well-grown dense forest was established in four years and it functioned to kept out squatters.

This successful plantation encouraged local inhabitants to manage this forest as CF. Accordingly, in 1992, they requested the local forest office to formally transfer this forest as CF. They were denied, due to a lack of clear directives on CF handovers in Terai districts. However, the local community continued to protect the land as a de-facto CF. After four years, in 1997, the community received formal authority for a CF. The success of the Tharu CF was widely recognized. It motivated neighboring communities to convert their open lands to community plantations.

The squatters behaved differently to common land with defined users and open lands with undefined users. This observation was reinforced when there was another incidence of immigration of squatters. Once more, the squatters tended to settle in the open lands rather than on the lands claimed by local community as CF.

The lesson learned from this experience spread to other villages, and demand for CF transfers has dramatically increased. This “hoarding for establishing CF in open

lands" indicates that local communities have greater faith in their own management than in government agencies. They believe that if common lands are left under government control, eventually they will lose their use access rights. Therefore, they choose community plantations as a best alternative for ensuring their rights.

This illustrates that the demand for CF in this region is motivated by three factors: first, each community desires to protect common land from squatters. Second, they believe that tree planting along riverbanks can reduce the annual crop production loss from flood hazards. Third, the CFs can provide green forage for cattle feed mainly during dry seasons.

Now there are more than twelve registered community forests within the single municipality alone. Each forest is located less than a 30 minute walking distance from its users. Some CFs are very small in size. Why are they not unified to a few management committees? Probably, the committee believs that enforcement of local regulation would be difficult if the group is large and heterogeneous.

The heterogeneity of the groups would place multiple demands on the forest products. This will be prevalent once the community plantations (CF) start to produce mature timber. Therefore, small CFs that can be individually managed to meet more homogeneous local demands will have the management advantage.

Meanwhile, the remaining state-owned lands are under constant threat of settlement by squatters for three basic reasons. First, government agencies have limited resources to protect them and they are under political pressure to allow squatter settlement. Second, the punishment for encroachment in open land is less than on wooded land. Therefore, it is easier for migrants to illegally settle in state owned common lands.

Third, the units of state-owned lands are larger, subject to more heterogeneous demands and, therefore, more difficult to protect.

All these factors, therefore, have created the state owned lands as a source for open access exploitation. Currently CFs are well protected. However, the effectiveness of CF protection could change as squatter intensity increases and the available open access common lands decrease with conversion to CFs.

This experience suggests that continued conversion to CF would improve management of the local commons. In the long run, this could decrease migration intensity. If new immigrants continued to enter the area, it could increase conflict between immigrating squatters and old residents.

In sum, this Tharu experience shows that the CF protection is dynamic in nature. It becomes critical, particularly, when a management committee fails to adjust to new entrants and their specific demands. It also shows that group size plays a crucial role in effective management. If common decisions are to be upheld then the small group has advantage over a large group. In large group, there is difficulty in reaching a common agreement and enforcement would be difficult.

5.5. Example of investment in innovative technologies under uncertainty

Pireni Community Forest, though not formally handed over, is one of the examples that represent a sitution where cooperative arrangeemnt is possible in single ownership land. Part of this CF was previously barren, so no one was publicly claiming ownership rights. This land was being used for cattle grazing. Later soil erosion became serious threat for down stream paddy fields, consequently, local villagers decided to improve this land by planting tree species.

In late 1980's, this land was heavily eroded and the land surface was exposed to numerous gullies. To control soil erosion problem, local community planted Ipil-Ipil seedlings in the major exposed areas and adopted vegetative measures across the gullies. The District soil conservation office (DSCO) provided them technical and material support, especially seedling and watcher cost.

The vegetative control method was extremely effective. There was significant increase in the yield of paddy and wheat crop in the down stream irrigated lands. This encouraged local community to adopt innovative technologies. Accordingly, improved grass variety, *Dinanalth*, *Stylo* and *Desmodium*, were extensively planted in this micro watershed, which has now substantially increased forage supply to the local community. As a consequence, local inhabitants are motivated to adopt productive cattle breed that has substantially increased family income.

Later, the Ministry of Forest and Soil Conservation declared it a model integrated watershed management resource center for extension and education purposes. Since then, flow of visitors has increased. This caused them to charge entrance fee to visitors as a

compensation of their time value. Part of this fee goes to the resource person, member who briefs the visitors, and rest goes to community account. Besides fees, the community also provides goods and services to interested private and other institutions.

The community members can buy grass collection permits in all seasons except seed extraction season. In this period, local users cut and dry grasses to extract seeds. After seed extraction, the users are allowed to take the residuals at free of cost. The seeds, which have good market price, are cleaned, dried, stored, and finally send to the market. Thus grass-planting activities adopted in this community forests was effective to generate additional family income among local users.

This type of family income opportunity at minimum investment risks attracted other communities. As a result, many neighboring communities purchased seeds from this community and planted in their respective CFs and private lands. The fast replication of *Stylo* variety, in a short time period, produced surplus seed production in the district. Therefore, seed price started falling (it was Rs.350 per kg in 1997). To maintain price, Community Forests and private farmers formed a grass development cooperative (GDC) to cartel against falling price.

Now all individual firms and communities deposit their product at GDC office. The GDC then deals with seed traders and fixes the price, for this GDC charges a service fee. Now, the Communities and farmers do not worry about their product market. The buyers claim it is now more costly than before, but they save transaction costs to collect seeds by door-to-door visit. However, it is being realized that the quality of seeds is going down due to the absence of quality control mechanism in GDC.

Since this land does not belong to the state, the DFO cannot hand over it as CF.

Therefore, community members are willing to pay a fixed annual land rent to the legal owner, the local school. The school does not object in current arrangement because they are aware of the fact that if local community does not cooperate it will once again degraded and will return to previous condition. However, the local community is also uncertain of long-term use rights, because the land value is continuously increasing so there is possibility that school management committee could change their decision at any time. Therefore, the local community is declining to invest in long-term investment, like commercial tree planting.

This case study allows us to hypothesize - the technology adoption would be higher if the technology is directly related to increasing family incomes and local community is assured of receiving all future benefits. Therefore, local communities will quickly adopt the innovative technologies that produce household income or products in a short waiting period, at minimum investment and risks.

5.6. Example of homogeneous demand of forest products

The Ranikot CF is located in one of the mid-hill District, Salyan, in the mid-western development region. This CF includes 227 ha forestland and 164 user households. The local committee possesses more or less the same number of livestock units and possesses a homogeneous demand on forest products. Since this CF is within the outreach of local administration, it was seriously affected by Forest Nationalization Act of 1957.

Before 1957, part of the current CF area was under private ownership. Those forestlands were better managed than other adjoining state controlled forests. After nationalization, these forests were also changed to open access forestlands, as a result these forests were also rapidly deteriorated like other open access forests.

This forest remained open access until 1966, and then local inhabitants were involved in forest protection activities. Since then, the forest has been managed as a commons. In the referendum year 1979, other adjoining communities again attacked this forest. Though the local community did not have legal ownership in this forest, they managed to protect it by employing paid watchers. Later in 1983, this forest was handed over as a PF and PPF (planted forest as PF and natural forest as PPF). All near by accessible state-forests have already been handed over to other communities; therefore, local inhabitants have no access to freeriding.

This community has experienced collective action in forest management for almost thirty years that has significantly improved their management capacities. Therefore, the local community has been able to adopt innovative technologies in the CF as well as on private lands. The important technologies include the planting of high value

medicinal plants and improved grasses inside the CF, and multipurpose tree planting in the private lands. These efforts have increased their supply of forest products and local household incomes. The committee has also established a Bamboo trial plot in CF to demonstrate soil conservation practices.

This community has efficient distribution system. They have adopted equity-based product and cost sharing mechanisms. The committee charges differential collection fee based on the effort levels of the individual households. They have fixed the maximum number of household labors allowed to collect the forest product. At the bend of each fiscal year, they review opearational plan and fix aggregate output quotas, based on the current stock growth, for next fisca year. To decrease soil erosion risk, committee has declared restriction area to certain erosive foerst blocks.

The committee charges differential enforcement costs to the individuals, which is based on the household demands and income status. The households who are wealthier and need more products have to pay more costs. The committee has restricted product collection from certain critical tree species for certain period and tree sizes.

The committee organizes annual general meeting to discuss revenue and expenditures status of the CF. Participants are allowed to raise other CF related issues in this forum. This is somewhat public auditing, which strengthens participation skill of the community memebers. This exercise has significantly contributed to strengthen local management capacities.

From this discussion, we can conclude that the communal forests works efficiently if CF has homogeneous demands, scarcity of forest product, and efficient cost and product distribution systems.

Table 1: Summary result of Six case studies

Name of CF	Economic Issues	Lesson learned
1. Janakalyan	* incentive for enforcement	* CF transfer generates incentive to protect the forest. If incentive are better then CF can be established even in a distant forest
2. Basantapur	* Heterogeneous demands * Challenged access * Poor resource capacity	* CF cannot work efficiently under contest- - ed situation * If CF cannot satisfy local demands then Private planting must be encouraged.
3. Bagmare	* Incomplete and uncertain transferrability rights	* State interference in proprty rights risks to open access again.
4. Tharu	* Local enforcement to secure access rights * Demographic change and specific demands	* Small group has advantage over large Group to protect publiclands from squatters. * CF becomes critical when it fails to adjust specific demands of new entrants
5. Pireni	* High MC to secure Property rights in land. * Investment under Uncertainity	* CF has low MC than single ownership * Poor H'holds prefer to invest in activities that gives income or products right away.

Table 1 contd…

CF Name	Economic Issues	Lesson learned
6. Ranikot	* Homogeneous demands * Efficient distribution	* CF is efficient if there is homogeneous demands. * When forest products are scarce then People adopt agro- foretsry practice in the private land

CHAPTER 6: REVIEW ON MODERN FOREST POLICY OF NEPAL

Like other renewable resources, the scarcity of forest resource also depends on the relationship between demands and supply. Its scarcity, therefore, depends upon the current and future consumption levels as well as prices. Since, majorities of the Nepalese forests are controlled by the state, these forests are behaved as open access. Consequently, these forests are inefficiently consumed and under-invested.

Nepal Government has been implementing various kinds of policy instruments to increase efficiency in consumption in the state forests. These instruments belong to two broad categoreies. The first category includes pricing policies and subsidies in alternative technologies. The second category includes institutional changes. The main objectives of these policies are to reduce the external cost generated from the inefficient consumption of the forests and increase efficiency in consumption by neutralizing the causes respectively.

Pricing Policies: The pricing policies include permits, taxes and quotas. This policy came in existence after promulgation of Forest Protection Special Act of 1968 and the Forest Products Sales and Distribution Rules of 1971. However, the state largely failed to enforce these two regulations, which were responsible to enforce fees and permits in the state forests. Consequenly, there was no substantial change in the aggregate consumption levels in the country. This impressed policy makers that the Pigouvian solution was not an appropriate instrument for Nepal.

Theoretically, Pigouvian solution is considered one of the efficient policy instruments to increase efficiency in resource consumption. However, it did not work for Nepal due to three possible reasons. First, majorities of the population were poor, and the

price fixed for wood products was higher than the real price, especially for rural households. Second, the demands of forest products are relatively inelastic (Amacher et. al. 1999; Wallace 1981). Third, the administrative capacity of the regulatory agencies was very poor.

Pierson (1994) also suggests that Pigovian solution is not appropriate for Nepal due to two important reasons. First, The benefit and costs are not likely to be uniform across the whole of Nepal, which implies an added administrative complication of receiving different tax rates for each region. Second, the majority of farmers are not part of the cash economy, and the State is unlikely to be able to tax and regulate farmers or afford the cost of subsidies.

Subsidy in alternative technologies: The main objective of this policy is to decrease current fuelwood consumption or demands in the forests. Accordingly, Government is providing subsidies on forest product substitutes (Kerosine, cooking gas) and efficient production technologies (improved stoves, Bio-gas plant, Tree seedlings).

However, majority population live in rural villages where substitutes are not easily available, even if they were available people cannot afford it. The fuelwood demand is inelastic (Wallace, 1981; and Amacher et. al., 1999), and substitutes for fuelwood have high cross price elasticities (Wallace, 1981). This indicates that subsidy policy does not produce expected result in reducing aggregate fuelwood demand in Nepal.

The improved stoves and Bio-gas plants would have been effective to reduce current fuelwood consumption in Nepal. But, its aggregate impact is limited due to traditional houshold cooking practices and high establishment costs respectively.

The subsidized seedling distribution in rural villages, at frees of costs or minimum prices, is one of the most successful programs under this policy. This has encouraged rural farmers to adopt tree planting in their private lands. This is particularly successful in the Terai, inner Terai and low mid-hills, where market opportunities are higher for fuelwood and other forest products.

If government had provided better economic incentives to the Private forests, it would habe been possible to minimize current pressure in the state forests. The current private forestry regulation requires permission from DFOs to process and transport wood products to the market. Intuitively, there is high transaction cost in this process. The owner often prefer to avoid such costs by selling standing trees to the contractors, even below market price. This self explains- why private forestry is not well adopted even in a high potential area.

Institutional changes: There are two potential arrangements viz. single ownership and common ownership. The single ownership could be the simplest policy option to reduce current consumption level, because the owner has economic incentive to reside at optimal consumption levels to receive maximum ownership rent. Theoretically, maximum rent exists when marginal cost (MC) to produce the forest product is equal to the marginal value of that product (MVP). This is also a necessary condition for efficient consumption.

The Terai forests neither are under effective control of the state nor locally managed. These forests are rapidly deteriorating due to increased squattering and timber theft. Access to the organized wood markets qualifies these forests for commercial management. Therefore, the governement can collect land rent from these forests by

leasing these lands to the individual firms or a group. The modern regulation has also such provisions, but this article has been largely inactive.

Therefore, singleownership could be successful in Terai, inner Terai and low mid-hills forests. Nevertheless, it may not be effective for hill forests due to two possible reasons. First, It is not possible to compensate the traditional use rights of the local households. Second, hill forests have poor access to the organized wood market. Therefore, establishing cooperative arrangement would be the most efficient policy instrument for these forests.

The formal establishment of communal property rights in the state forests started after promulgation of PF and PPF regulations in 1978. It is obvious from our case studies, Basantapur CF, Ranikot CF, and Janakalyan CF, that forests are better protected when management responsibilty goes from state to the local communities. This is possible due to local restrictions in the number of entrants and their effort levels in the forests.

Anderson's (1977) static fishery model provides excellent theoretical interpretation for renewable natural resource problem under different property rights arrangement. I am adopting two models, household and industry level, to develop theoretical explanation for forestry problem in Nepal. This model is based in static assumption and it assumes the forestland in question is a fixed entity.

Household level analysis: As illustrated in Fig. 2, it is assumed that each household faces U-shaped cost curves due to diminishing marginal return, and all other products have identical cost curves. It is also assumed that there is no fixed cost for collecting the forest products i.e. average cost (AC) and average variable costs (AVC) are same.

If single owner owns this forest, the owner uses E* effort levels where she receives maximum profit equivalent to ABCD. If this forest is an open access, she continues until she receives positive profit. She stops at E, because beyond that point she goes in economic loss. This clearly indicates that effort level in open access equilibrium is higher than the single ownership equilibrium.

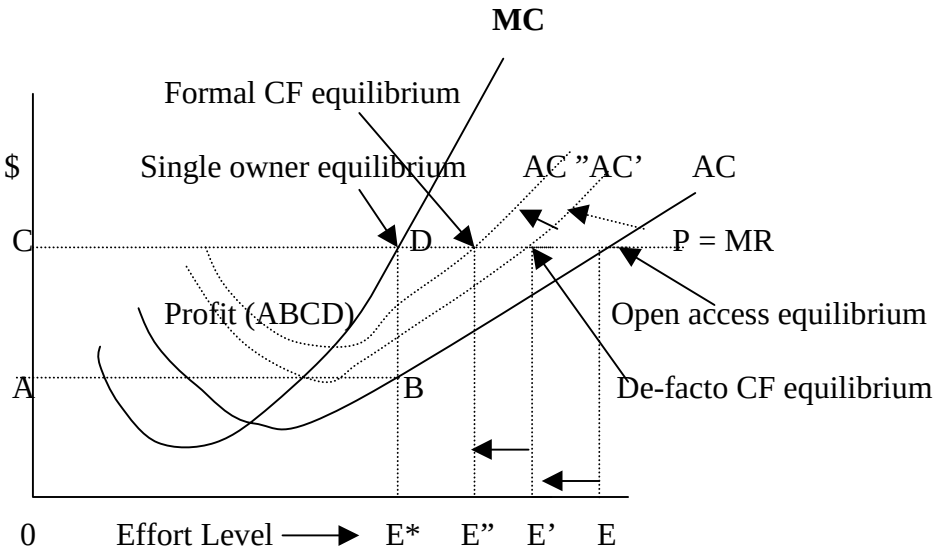


Fig. 2: Individual household response to different property rights arrangement.

If local community owns this forest, the average costs to collect product increases due to the local regulations. Therefore, households employ fewer efforts in the de-facto CF than the open access forests. However, there is rivalry in consumption so everybody tries to maximize their personal utility by increasing effort levels until their new AC intersects to the MR curve.

It is now clear that de-facto equilibrium exists somewhere between open access and single ownership equilibrium, say at E'. Following same logic, it can be proposed that a formal CF equilibrium exists left to the de-facto equillibrium, say E". Because, now management committee imposes additional restrictions that further increases the AC.

Therefore, collector further decreases her effort levels in this arrangement. The bottom line is- more defined the property rights less efforts will be used, E* <E" <E' < E.

Industrial level analysis: In this analysis, average revenue of product (ARP) is considered as a demand curve and marginal cost (MC) is considered as a supply curve. Theoretical basis is almost similar to the previous one.

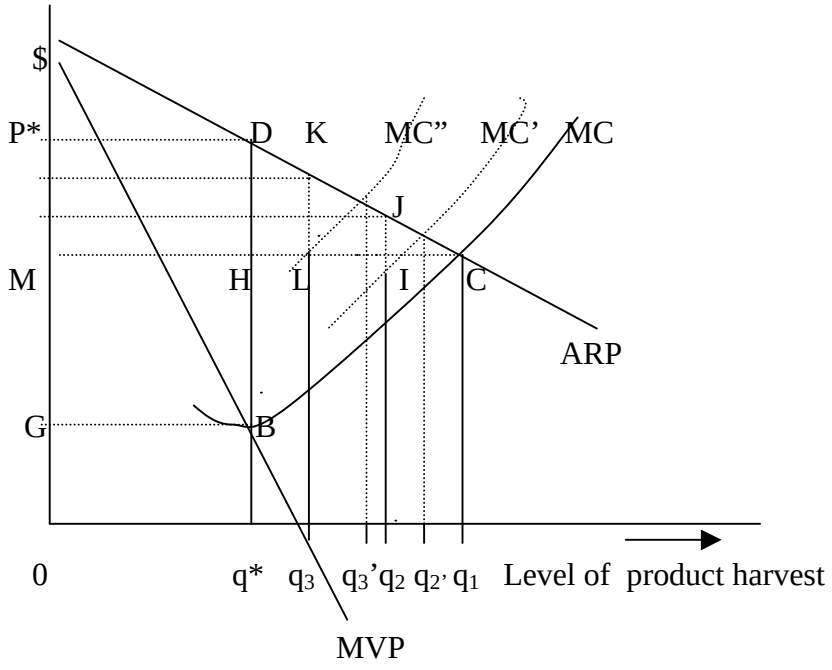


Figure 3: A graphical illustration for industry level forest harvesting under different Property rights arrangeemnts

If a single owner owns the forest, the forest is optimally harvested at q* level to collect maximum ownership rent (DB). If the forest in question is an open access, then q_1 amount is harvested to collect additional factor rent (HBC), which is available due to dissipation of ownership rent from single ownership. Therefore, there is zero ownership rent in open access forests.

This model suggests that more defined the property rights more efficient would be the consumption. This precisely justifies our observation in Ranikot CF, where the forests were over exploited when private forests were transformed to the state forests. Later, same forestland was better protected when it was transformed to the CF.

If users are allowed to make independent decision, without additional restrictions, the de-facto and formal CF equilibrium exists at q_2' and q_3' levels respectively. However, local arrangeemnt does not allow them to stay at this level. The management committee imposes aditional restrictions like aggregate quotas, location restriction, tree species and tree size restrictions. Therefore, households end up at q_2 and q_3 levels respectively and generate resource rent equivallent to IJ and KL respectively.

Modern CPR literature is silent about these rents. However, it is clear from our case studies that such rents exist due to the local enforcements. Basantapur CF is generating positive rent by fixing very high input rights and minimum aggregate quotas. Ranikot is generating positive rent by adopting input rights, input quotas, and output quotas all together. This suggests that there is no theoretical reason to deny the existence of resource rent in communal forests.

This analysis clearly shows that the property rights issue is one of the major factors for over exploitation of forest resource in Nepal. Therefore, if sole ownership is not possible then common ownership could be the second best policy option for sustained forest development. Local arrangements in CF also satisfies six neo-classical solutions for open access problem viz. single ownership, input quotas, input rights, output quotas, output rights, and taxation. Therefore, higher the CF transformation lower would be the deforestation problem in the state forests of Nepal.

However, there are few operational, institutional, and policy level issues that are restricting CF transformation. The following section attempts to answer if CF transformation is an efficient policy instrument then how the prevailing CF work situation can be improved in Nepal.

As Hyde et al., (1996) suggests it is not economically efficient to manage all forests sustainably. Therefore, it would not be feasible to transform all state forests to the local communities. Janakalyan CF reveals that enforcement is effective within a certain access range only, where committee can supervise and enforce at low costs.

It is evident from figure 1 (A) that CF transformation directly responds to the CF transformation process. It is obvious that CF transforamtion increases when the transformation process becomes easier. Before 90's, CF transfer was slow due to required technical operation plans, which was very technical and inappropriate for local level management.

In early 90's forest offices started accepting locally prepared short and simple plans, consequently, the CF transformation accelerated. It further accelerated when DFOs were empowered to approve the plans. This indicates that lower the establishment cost to establish communal property rights more state forests would be transformed to CF.

Basantapur CF suggests that CF cannot work efficiently if it fails to meet local demands. It is evident from many study reports, Wyatt- Smith (1982) and Mahat et al. (1987), that each household requires a certain minimum resource size to maintain their livelihood. However, average CF allocation trend in fig 1(B) indicates that majority Community forests do not meet this requirement.

A recent study by Chhetri and Sigdel (1999) suggests that about 13 % users in Terai and 35 % users in hills have claimed that they have been able to meet their demands from CF. This means that majority households still meet their major demands from the state forests. This raises a potential question against the sustainability of CF in Nepal. If this is true then CF are well protected at the cost of nearby state forests.

To improve this situation, Government needs to accelearate CF transformation along with suitable resource-user ratios. I am adopting Von Thunian model to address this problem. This model have been nicely adopted by Hyde et al., (1996), and Hyde (1999) for analyzing similar policy issues in other Asian countries. This model assumes that forestland is not fixed. An individual makes decision about its use at the margin of its marginal value to its marginal cost.

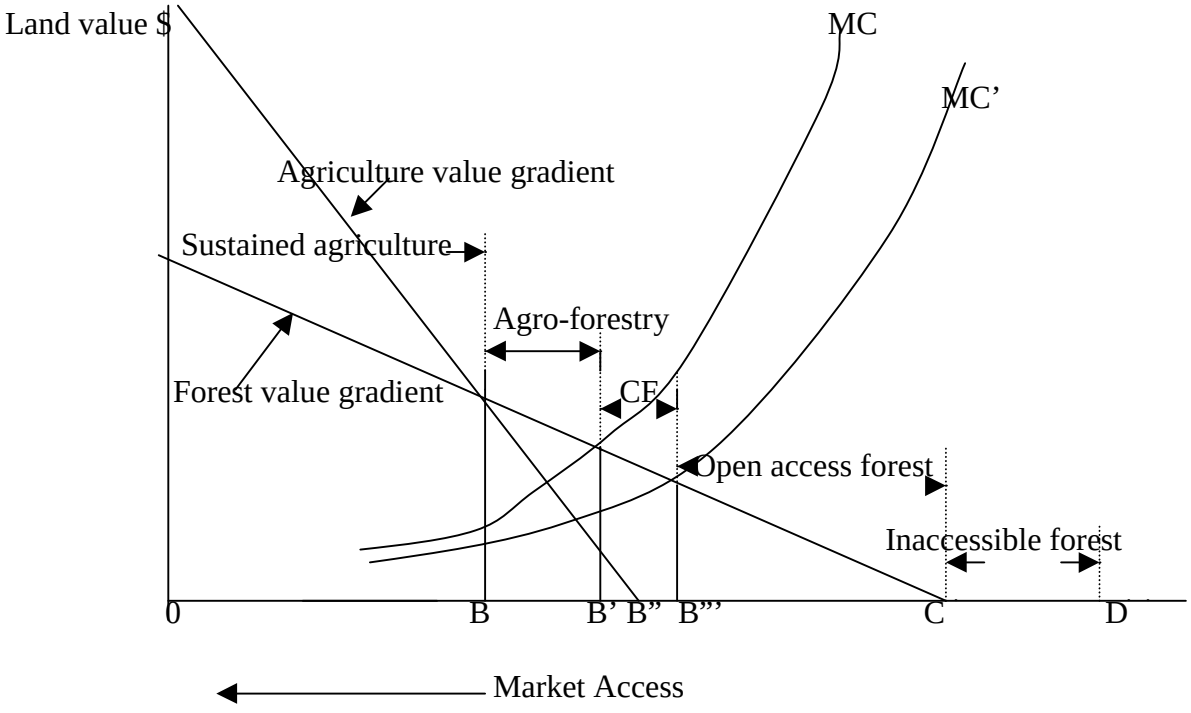


Fig. 4: A graphical illustration for community forest extension potentiality in Nepal.

As shown in Fig 4, people keep private lands until the MVP from a land is equal to the MC securing private property rights in that land. The land units between 0- B' will be claimed as private property. The land unit 0-B will be used for sustained agriculture practices and land unit B-B' will be used for growing fruit, forage, and wood products. However, if MC to maintain property rights in that land is greater than MVP; then such land could be left as open access, which is shown by land unit B'-B".

This exactly fits to our CF case studies. The landowner in Pireni abandons the land for common use due to high MC to mainatain property rights. In Ranikot CF, local people have adopted agro-forestry practice in land unit B-B'due to scarcity of forest products.

The CF regime is represented by the land unit B'-B"'. Since MC for community is low than the individuals, the accessible open access private lands could be managed as commons. The land unit B'"- C is left as an open access forest due to high marginal costs (MC') to mainatain property rights. The land unit C-D is inaccessible so it is suitable for National Parks and Reserves.

Now the question arises, how additional state forests could be transformed as cf so that rural household can sustain their livelihood? Based on the above analysis, I am suggesting three possible options to accelerate CF transformation in Nepal. First, any change that reduces the costs of establishing communal property rights. Second, any changes that increase the present value of future return. Third, any change that reduces the present value of MC to maintain property rights.

In conclusion, I am suggesting for an amendment of CF policy guidelines to authorize DFOs to transfer cf without a formal operational plan. The application submitted by the

local communities should be considered their commitments to protect the forest. The committee should be empowered to take legal action against outsiders. This will shift MC’ curve right; consequently, cf area would extend to the right to the point B’’’.

I also sugest that users should be given full autonomy to participate in all kinds of CF based micro-enterprises. This will shift forest value gradient to the right, consequently, it would be possible to extend cf beyond point B’’’.

CHAPTER 7: CONCLUSION

Community based forest management practices have been recognized as a suitable policy instrument for sustained forest management in Nepal. This practice will be effective as long as the state provides incentives to the local communities to manage these forests. However, the sustainability of the Community Forest management system also largely depends upon the capacity of the forests to satisfy the local requirements.

The CF development trend (for detail see Appendix 5) reveals that per household resource allocation is far below the estimated minimum forest area required to support the rural household economy. This indicates that a large portion of household demand is still satisfied from the state-controlled forests. If this is true then CF are well protected at the cost of nearby state-controlled forests, then it raises a potential question against the sustainability of CF.

To improve this situation, I propose in this thesis that HMG should revise its CF operational guidelines so that more state-controlled forests could be transferred with a proper resource-user ratio. Unfortunately, this issue has been largely ignored in modern CF policy guidelines.

It is suggested that donor communities could play critical role in this matter. Donors, especially World Bank, DANIDA, and USAID, should change their current CF monitoring indicators; the number of CF transferred to users, to a resource-user ratio related indicators. Otherwise, DFOs will focus on CF and household numbers. This will restrict CF to operate efficiently due to poor marginal flexibility. Such communities will eventually lose interest in CF and return to open access.

It is believed that the CF model recommended in this thesis will efficiently work for hill forests of Nepal, where sole ownership may not be best choice due to technical, social, and political factors. Nevertheless, this model would not work efficiently in Terai as it would in hills.

CF transfer in hills is easier because local communities are stable and they have homogeneous demand for forest products, both favor collective action. Nevertheless, Terai has different situation, where local communities, especially along forest fringes, are unstable due to constant demographic changes from immigration, and they have heterogeneous demand due to bimodal community structure. Therefore, a contested situation could be the serious threat to CF transfer in this region.

However, the public lands in Terai and inner Terai region of Nepal are under constant threat of settlement by squatters. Since, Government agencies are not efficient to enforce regulation; the transfer of interior public lands to the local communities would be the least cost policy option to discourage squatter problem in long run. Regarding other forests, if state does not improve enforcement, the leasehold and CF should be adopted. However, I would suggest that the traditional use rights of old residents must be recognized while identifying the users for CF.

As discussed earlier, all CFs are not efficient to manage their forests. Certain situations may favor CF transfer and other may restrict. Based on the above discussed six case studies and other similar personal observations, I draw following conclusions that would favor or restrict the CF transfer. Though, these conclusions are drawn from Nepalese experience, but this could apply broadly in any community forests of other developing countries under similar situation.

Favorable situation: The following situations favor the CF transfer.

1. If forest resources are physically scarce and substitutes are not readily available, the local communities will prefer to participate in collective effort to manage these resources. This will occur only when local inhabitants are assured that the collective effort will generate more goods and services than any other alternate practices would do. Therefore, greater the values of the forest higher would be the demand for CF transfer.
2. The economic incentives and costs structure of securing property rights decides whether a particular resource should be allocated under private property or open access. A simple and complete property rights transfer process, which allows the community members to enjoy all available incentives, will encourage local inhabitants to act collectively to manage the state forests. Therefore, situation where local communities can establish property rights in state forests at low marginal cost will favor CF transfer.
3. CF transfer is more successful in the communities where local users have minimum conflicts regarding forest use. Since, the communities with a homogeneous forest product demand often have minimum conflicts; they must have been able to maintain equitable benefit distribution system in the CF. Therefore, small homogeneous communities with homogeneous forest product demand will favor CF transfer.
4. Poor households have little discretionary investment capital, so they are sensitive to time preference. Consequently, they prefer low investment activities that would generate income right away. Since, CF succeeds in the villages where external investment opportunities in resource development are low and local inhabitants need

immediate return, the poor community will favor CF transfer.

Restricting situations: Following situations restrict CF transfer

1. If capacity of the forest is very poor compared to the local demands, then local households will give minimal or little value to the forests. In this situation, local communities will not be interested in collective actions. In such situation, a low resource-user ratio restricts CF transfer.
2. If state regulation is inconsistent, local communities might doubt that property rights transfer is incomplete and uncertain. Consequently, local inhabitants loose incentive to participate in collective action, which would result to under investment. Therefore, incomplete and uncertain property rights transfer restricts CF transfer
3. In a bimodal community, the household demand for forest products is heterogeneous, which results to unequal product distribution. Consequently, a contested situation arises due to equity issues in product distribution. In such cases, the CF may futher degenerates, once more, to an open access. Therefore, a heterogeneous demand also restricts CF transfer.
4. In a community where wealthier families continuously neglect the poor; the neglected households will continuously attempt to avoid local protection measures, and will tress pass the forests to meet their requirements. This will eventually create a challenged access situation where CF once more starts degrading. Thus, restriction in resource use may cause efficiency loss in CF operation.

Scope on future research

This study has identified situations that favors or restricts CF transformation in Nepal. Since this work is based on a static theoretical model, it cannot estimate the exact consequences of the problem. The potential question for future research is to find the rate of increase in CF transformation if situation changes over time.

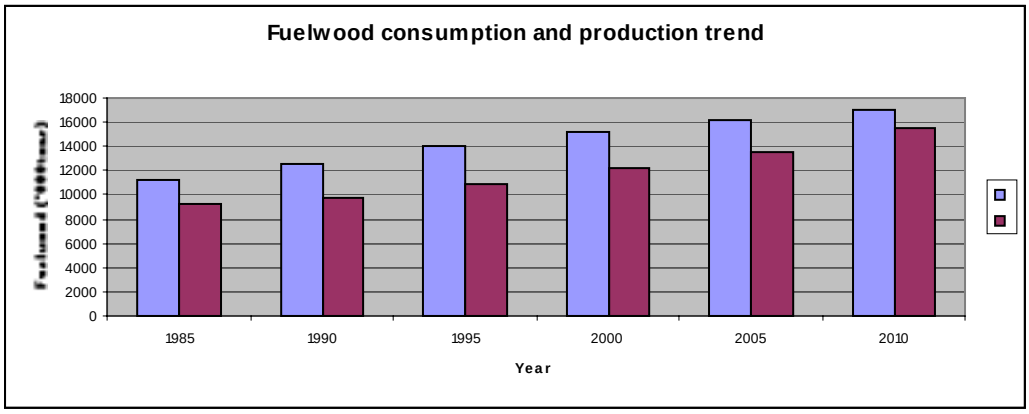
I am interested to develop a CF allocation model that provides different policy scenarios for CF transformation for different values on resource capacity, demand size, market access, product prices, demography, and income levels. I believe, this study will be extremely useful to formulate a CF policy guideline for developing countries like Nepal.

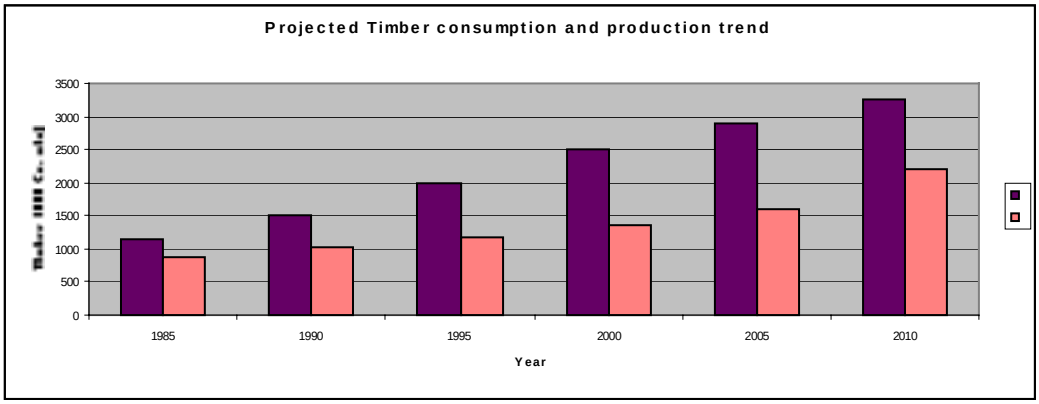
Household survey will be the main reserch tool. The questionnaire will incorporate questions on demands, supplies, production costs, product prices, market opportunities, institutional capacities, local technologies, employment opportunities, demography changes, and gender issues. Econometric tools will be widely adopted to develop the model. Micro- and Macro- economic theory will be adopted to intereprete the results. Finally, I will propose an optimal CF allocation model for Nepal.

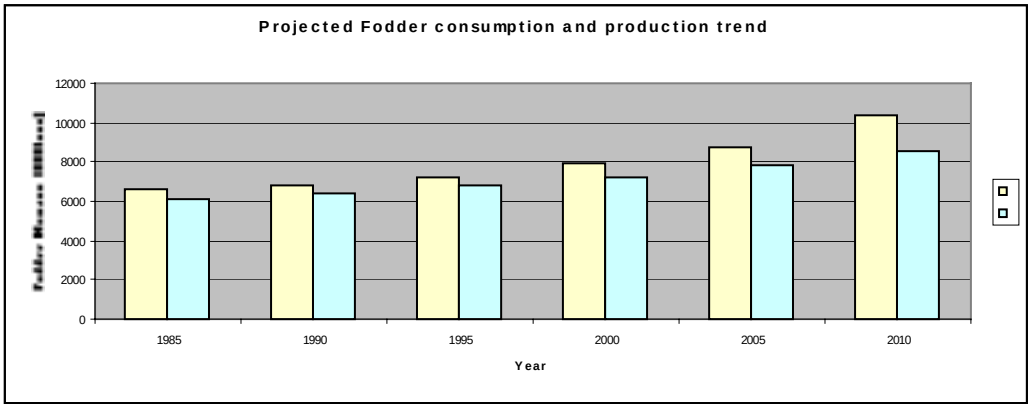
APPENDICES

Appendix 1: Projected trends for product consumption and supply capacity of forest

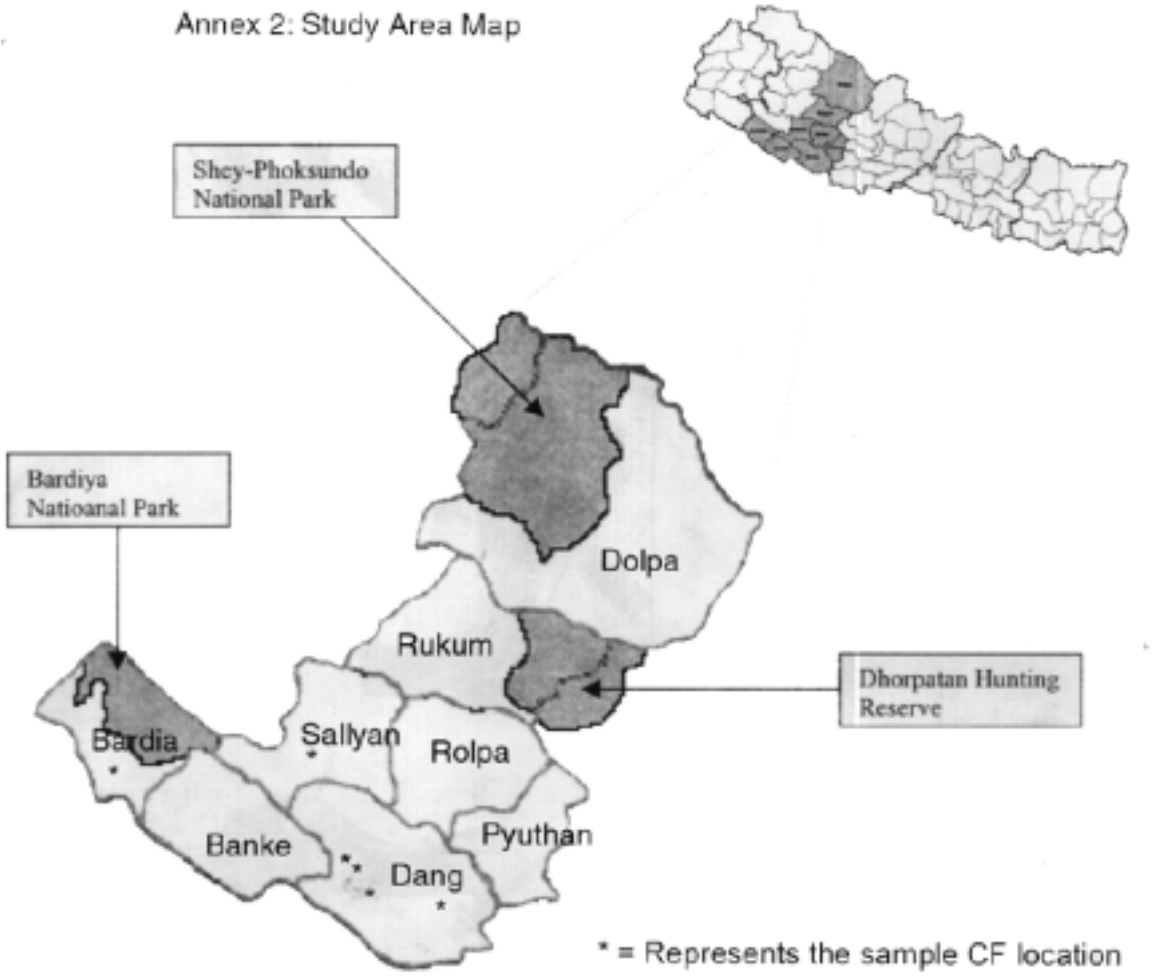
(Adapted from MPFS, 1989)





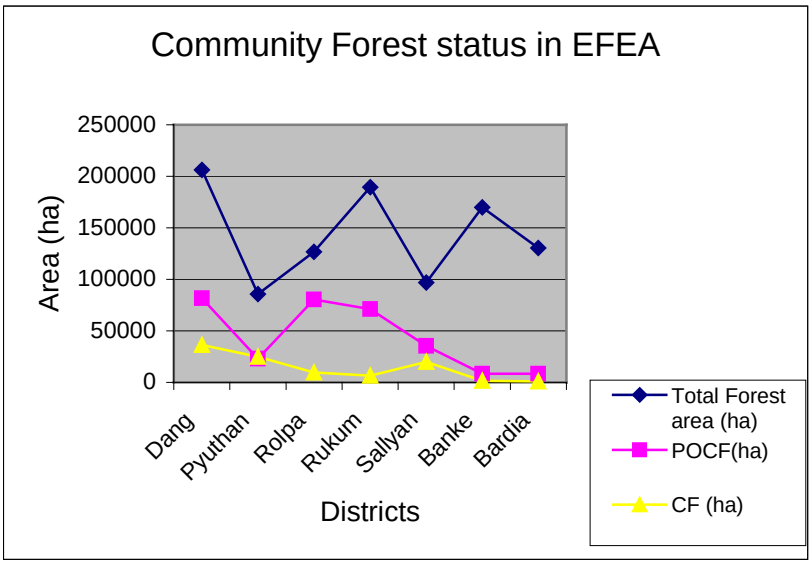


Annex 2: Study Area Map



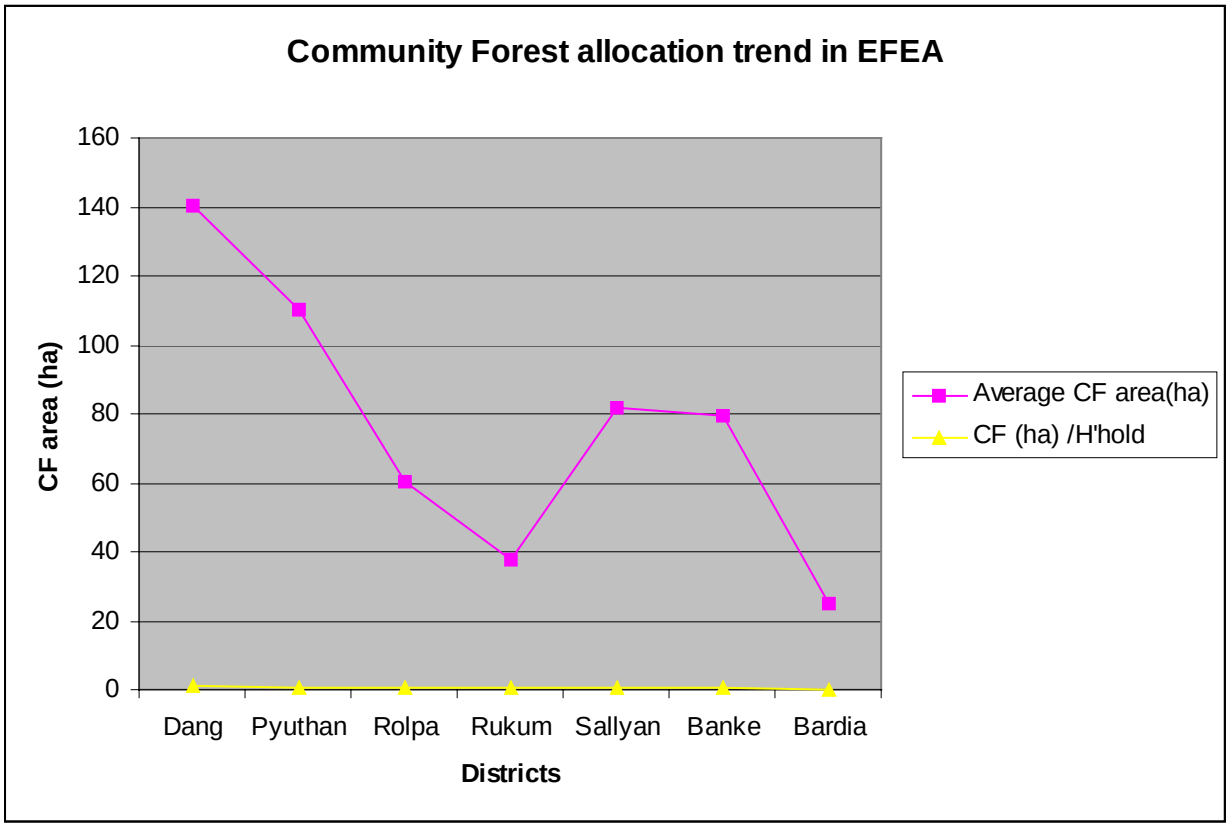
Appendix 3: Community Forest transfer status in EFEA Project (Source: EFEA annual progress report, 1999)

District	Total Forest area (ha)	POCF (ha)	CF (ha)	Topography
Dang	206178	81713	36478.9	Inner Terai
Pyuthan	85593	22963	24889.0	Mid-hill
Rolpa	126796	80470	9475.27"	"
Rukum	189538	70982	6601.5"	"
Sallyan	96932	35513	19786.4"	"
Banke	169820	8429	1589.47"	"
Bardia	130576	8535	1029.57"	"



Appendix 4: CF allocation trend in EFEA (Per household basis)

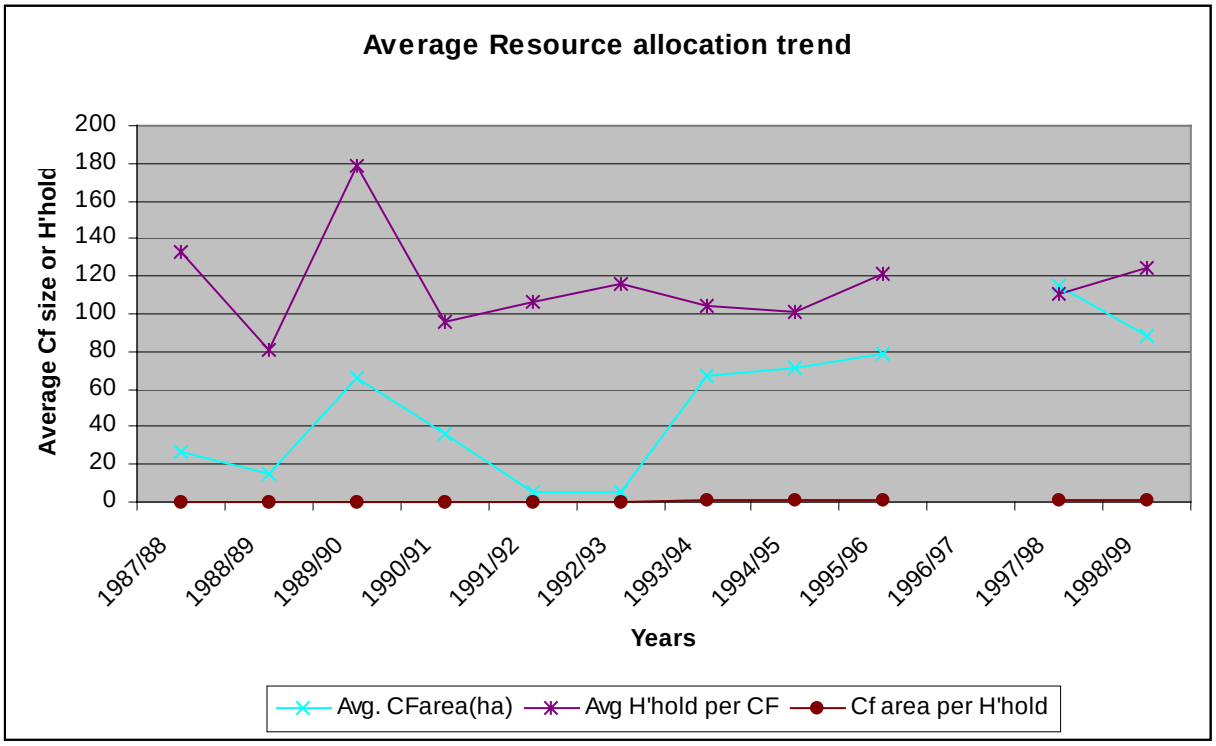
District	# CF	Average CF area(ha)	CF (ha)/ H'hold
Dang	260	140.3	0.92
Pyuthan	226	110.1	0.86
Rolpa	157	60.35	0.69
Rukum	174	37.9	0.52
Sallyan	241	82	0.78
Banke	20	79.5	0.77
Bardia	41	25.1	0.24



Appendix 5: Community Forest transformation status in Nepal

year	CF #	Area (ha)	H'hold #	Avg. CFarea(ha)	Avg H'hold per CF	Cf area per H'hold
1987/88	3	79.8	398	26.6	132.6666667	0.200502513
1988/89	34	518.8	2732	15.25882353	80.35294118	0.189897511
1989/90	29	1916.5	5189	66.0862069	178.9310345	0.369338986
1990/91	54	1950	5189	36.11111111	96.09259259	0.375794951
1991/92	354	1991.9	37506	5.626836158	105.9491525	0.053108836
1992/93	634	3592.2	73303	5.665930599	115.6198738	0.049004816
1993/94	950	63308.4	99249	66.64042105	104.4726316	0.637874437
1994/95	1390	98530.9	141159	70.88553957	101.5532374	0.698013588
1995/96	1548	121458.5	187309	78.46156331	121.000646	0.64843921
1996/97						
1997/98	1098	126395	121125	115.1138434	110.3142077	1.043508772
1998/99	2624	231927.6	326215	88.38704268	124.3197409	0.710965468

(Source Joshi, 1997, and DOF MIS, 1999)



(Data for FY 1996/97 not available)

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