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THESIS

ANALYSIS OF PEOPLE'S PARTICIPATION IN SUBSIDIZED RURAL TIMBER ALLOTMENT POLICY TOWARDS SUSTAINABLE FOREST MANAGEMENT AT SARPANG *DZONGKHAG*, BHUTAN

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This research was aimed at investigating level of people's participation in current forest management under subsidized rural timber allotment (SRTA) policy. It was also assessed on their willingness to participate in community forests for sustainable forest management in Bhutan.

Sample for the study consisted of 248 households at Dekiling *geog* (block) under Sarpang *Dzongkhag* (district). Qualitative data was collected from focus group and key stakeholder's meetings. It was analyzed using PRA tools, SWOT analysis, problem-tree and force-field analysis. Quantitative data was collected through structured questionnaires and analyzed with Statistical Program for Social Science.

Around 87 percent of the respondents revealed no participation in forest management under SRTA policy. Statistical test as well as the perceptions of different categories of people also confirmed lack of people's participation in local forest management. On the other hand, 89 percent of the households felt the current local forests cannot be sustainable at all. Thus, present level of people's participation could be a threat for sustainable forest management. The attitude of people on sustainability of forests ($\chi^2 = 14.514$, $p < 0.024$) indicated uncertainty in future rural timber supply. However, about 88% of the total households responded positively for future participation in local forest management. There is a possibility of transforming current "*resource users*" into "*resource managers*".

Student's signature Thesis Advisor's signature

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Karma Tempa

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LIST OF ABBREVIATIONS

ACC	=	Anti-corruption Commission
AHL	=	Annual Harvesting Limit
CBFM	=	Community –based Forest Management
CF	=	Community Forestry
CFMG	=	Community Forest Management Group
CFO	=	Chief Forest Officer
cft	=	Cubic feet
DoF	=	Department of Forest (Previous name for DoFPS)
DFO	=	Divisional Forest Office
DoFPS	=	Department of Forest and Park Services
DzFO	=	Dzongkhag Forest Officer
DzFS	=	Dzongkhag Forest Sector
DYT	=	Dzongkhag Yargay Tshogchung
FDCL	=	Forest Development Corporation (old name of NRDCL)
FAO	=	Food and Agriculture Organization
FMU	=	Forest Management Unit
FNCA	=	Forest and Nature Conservation Act
FRDD	=	Forest Resource Development Division
FNCR	=	Forest and Nature Conservation Rules
GFO	=	Geog Forest Officer
GNH	=	Gross National Happiness
GNHC	=	Gross National Happiness Commission
GRF	=	Government Reserve Forests
IIED	=	International Institute for Environment and Development
JFM	=	Joint Forest Management
JSWNP	=	Jigme Singye Wangchuck National Park
LUPP	=	Land Use Planning Project
m^3	=	meter cube

LIST OF ABBREVIATIONS (Continued)

MoA	=	Ministry of Agriculture
NEC	=	National Environment Commission
NCD	=	Nature Conservation Division
NRDCL	=	Natural Resource Development Corporation
NSB	=	National Statistics Bureau
NSCF	=	National Strategy for Community Forestry
Nu.	=	Ngultrum
NWFP	=	Non Wood Forest Product
PCS	=	Planning Commission Secretariat
PFMP	=	Participatory Forest Management Project
PHCB	=	Population Housing Census of Bhutan
PM	=	Park Management
PRA	=	Participatory Rural Appraisal
RMNP	=	Royal Manas National Park
RGoB	=	Royal Government of Bhutan
SFD	=	Social Forestry Division
SFM	=	Sustainable Forest Management
SRTA	=	Subsidized Rural Timber Allotment
UNFF	=	United Nations Forum of Forests
UNCED	=	United Nations Conference on Environment and Development
UNDP	=	United Nation Development Program

LIST OF GLOSSARY

Cham	=	Trees (girth 3’ to 3’11” for conversion into beam)
Chimi	=	People’s representatives
Chiwog	=	A unit under a Geog
Chiwog tshogpa	=	Leader of the *Chiwog*
Chuzhing	=	Wet land
Dangchu	=	Trees (girth below 1’ for using as purling)
Drashing	=	Trees (girth 4’1” and above for sawing)
Dzongdag	=	District Administrator
Dzongkhag	=	District
Geog	=	Block (Administrative level below District)
Geog Yargey Tshogdu	=	Block Development Committee
Gup	=	Head of a Geog
Kidu	=	Grant
Lhakhang	=	Temple
Meesup	=	Fire care-taker
Ngultrum (Nu.)	=	Bhutanese currency
Reesup	=	Village forest-guard
Sokshing	=	Woodlot
Thram	=	Registered land holding
Thrimzhung Chenmo	=	Supreme Law of Bhutan
Tsamdrog	=	grazing land
Tsim	=	Trees (girth 1’ to 2’ for using as rafter)

ANALYSIS OF PEOPLE'S PARTICIPATION IN SUBSIDIZED RURAL TIMBER ALLOTMENT POLICY TOWARDS SUSTAINABLE FOREST MANAGEMENT AT SARPANG *DZONGKHAG*, BHUTAN

INTRODUCTION

Forests worldwide is reported destroyed very fast due to population growth and unsustainable management. Global Environment Facility (2009) estimated that 1.6 billion people including more than 2,000 indigenous cultures depend on forests for their livelihoods. Forests face numbers of significant threats globally, including illegal logging and overharvesting. Sayer *et al*. (1997) agrees that much of the world's forests are over-utilized and under-managed, so that average productivity (of industrial round-wood) is 1 m^3/ha/yr. Yet there is an increasing demand for wood despite low productivity. Wolf, (2001); Schindele (2004); Dhital (2009) realized similar exploitation of forest resources in accessible areas of Bhutan.

Bhutan is a small country with total area of 38,394 sq. km and located in between the Indian plains and the Tibetan plateau (National Statistics Bureau, 2009). About 69 percent (438,871) of the total population (634,982) live in rural areas (Royal Government of Bhutan, 2005) dependent on mixed subsistence farming. Forests play very important roles in sustaining rural people's livelihood. Forest resources are granted almost for free to rural communities in supplementing their farming activities. Royalty charged are nominal and negligible including timber for house construction. Timber supply in rural areas is highly subsidized to ensure proper housing and farm infrastructure development.

The subsidized rural timber allotment (SRTA) is one of the essential grants or *kidu* carried on since 1969(Dhital, 2009). Timber subsidy was provided when most of the people were economically down and there were less population. Review of legal policies revealed that SRTA continued with series of amendment of Forest and Nature

Conservation Rules, 2000, 2003 and 2006. Every change in the rules favored SRTA by offering more quantum, options, time limit for timber operation and royalty rates. Hence, timber supply through SRTA policy has become challenging since several problems emerge due to the growing pressure on forest resources.

One of the main problems is pertaining to roles and responsibilities of the recipients in forest management. The local people are not involved in any way except as end users. Their participation in forest resource management under SRTA is almost nonexistent. However, His Majesty, King Jigme Singye Wangchuck said that "people's participation is the key to conservation and utilization of forest resources" (Namgyel, 1996 and Chhetri *et al.,* 2009). Following the above Royal decree in 1979, community forestry (CF) program has been initiated almost two decades ago. Dorji (2003) claimed that the concept of people's participation is not new in Bhutan. It is mostly related to sharing and helping each other in any social activities which indicated strong sense of community feelings or cohesions. Regardless of successful experiences of CF programs in local resource management, SRTA existed parallel in rural timber supply. SRTA entitlements are guaranteed with legal policy and detrimental to establishment of community forestry in Bhutan. Thus, the high demand supported by legal policy is seen as a threat to sustainability.

The second problem is supplying SRTA without proper management plans and undermining sustainable forest management (SFM). Current system of timber allotment from SRTA is completely based on demand from the beneficiaries. Anti-Corruption Commission (2009) reported that people claim subsidy timber as a matter of right. Rural people consider eligibility rather than judging the needs and increasing timber misuse cases. The rural timber is mostly supplied from unmanaged forests (outside forest management units). Silviculture options are often ignored and harvesting is usually carried out haphazardly and timber allotment often done according to the demand from clients (Schindele, 2004). Westoby (1987) quoted "Forestry is not, in its essence, about trees …it is about trees only so far as they can serve the needs of people" Thus, if current system of SRTA continues, there is a potential threat to sustainable forest management.

Third problem is difficulty in immediate lifting of subsidy timber since poorer sections of people in rural areas will be affected most. The use of forest resources is inevitable in rural areas. More than 38% of rural Bhutanese continues to live with poverty (Planning Commission Secretariat, 2007). Natural resources and poverty nexus are directly linked to each other. Accordingly, Royal Government of Bhutan (RGoB) has articulated poverty reduction as the main objective and theme of the tenth Five Year Plan (2008-2013) to stimulate socio-economic development (Gross National Happiness Commission, 2009). All the Ministries, Departments and Divisions have oriented their plans and priorities towards reducing poverty. Therein, with the changing economic scenario and people's need, it is challenging to limit such allocation. As suggested by several studies (Gilmour *et al.,* 2004; Temphel and Bukeabum, 2006; Wangdi and Tshering, 2006; Chhetri *et al.,* 2009; Carter, 2010; Department of Forest Park Services, 2010a), community forestry can be the better form of local forest management. CFs not only builds strong social capital but also instills a great sense of ownership for local forests towards economic development and environmental conservation.

Thus, this study is focused on studying level of participation in general by beneficiaries and their willingness to participate in local forest management. The study would enable us to know about the awareness of people on resource management. It would also help in planning of activities, policy formulation, and implementation of strategies that best suit to Bhutanese context. Further, it would guide in ensuring people's participation in local resource management and future sustainability. In this line, this research firstly tried to learn on the extent of forest resources and conditions in relation to SFM. Secondly, it assessed the impacts of SRTA on rural housing and attitudes of people. Lastly, it studied on people's opinion on the current level of people's participation and their willingness to participate in community forests for sustainable local forest management.

OBJECTIVES

The overall objective of this research is to find out impacts of subsidy timber allotted to rural population and to study if current SRTA policy can be transformed into participatory forest management practices. The specific objectives of the above study are as given below:

1. To learn on the current forest resource conditions in relation to sustainable forest management.

2. To assess the impacts of subsidized rural timber allotment and attitudes of people.

3. To study on the level of people's participation towards sustainable forest management.

Research Implications

Subsidized rural timber allotment is a national policy, which is benefiting 69 percent of the total population in Bhutan. This research is expected to bring impact to the nation by proposing some policy interventions; paradigm shift from spoon-feeding to self-help. The current SRTA beneficiaries may find hard to accept easily since timber subsidy remained more than 50 years ago. The subsidy policy provided forest resources including timber almost for free and there is no obligation to manage the resources. It will be a great challenge to make this study a reality. The expected outcomes of this study are as follows:-

1. This study would help all levels of people to realize on SRTA as a development policy at the cost of compromising sustainable forest management.

2. Policy makers would recognize the gaps of people's perception on the sustainability of local forests and increasing demand for timber through SRTA.

3. Policy makers and local beneficiaries would understand the need of mainstreaming people's participation in sustainable local forest management

Scope of the Study

About 69% of the total Bhutanese population (about 635,000) is defined as rural people (RGoB, 2005). They are the beneficiaries of SRTA. Although, rural people are granted subsidy for wide range of forest resources, this study has focused on subsidy timber for rural housing only. While general SRTA trends were considered, the study period concentrated after the decentralization of rural timber to *Dzongkhags* (2000 to 2009). Primary sources of data collection were from 248 households of Dekiling geog, GYT members, CFMG executive members of Bumpaling CF and relevant forestry staff under Sarpang *Dzongkhag.* Three components; forest resources, SRTA (timber supply) and CF were identified to study levels of people's participation and SRTA towards sustainable forest management (SFM).

Definition of terms

The following terms which have been used frequently are defined as follows:

Subsidized Rural Timber Allotment: Individual citizens (household) entitled to subsidized timbers in standing form or log form or sawn form for use in rural areas (DoFPS, 2010b).

Timber: Timber in actual meaning is usually the wood that is currently erect and is attached firmly to the earth's ground. On the contrary, lumber is generally accepted as the wood that is no longer attached to the ground and is often seen as the laid down or processed wood. However, this study used 'timber' in general whether wood is processed or not processed.

Community forestry: "…any situation which intimately involves local people in a forest management" (FAO, 1978).

People's participation: "Participation" in its simplest of meanings mean people taking part, sharing, or acting together towards common goal.

Sustainable Forest Management: as a dynamic and evolving concept aims to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations (United Nation, 2008).

Organization of the Thesis

The main study is presented in five parts. The first part is an introduction to the study. The second reviews the literature and related studies to subsidized rural timber, people's participation and community forestry. The third shows research methodology including materials and methods. The fourth presents research results followed by discussions. Finally, the fifth part is a conclusion and recommendations.

LITERATURE REVIEW

This research bears three components; forest resources, SRTA and community forestry as a means of participatory forest management. In order to understand the current situation better, literature review is focused on the following aspects;

1. Subsidized rural timber allotment
2. Sustainable Forest Management
3. People's participation
4. Community Forestry

1. Subsidized Rural Timber Allotment

Forest concessions at the global context are seen very different from the subsidized rural timber allotment in Bhutan. Literature review from different sources revealed forestry concessions granted to timber companies, social groups and private to curve pressures from commercial logging industries. For example, forest concessions have been the dominant means of allocating harvesting rights for tropical forests in developing countries and temperate forests in several developed countries (Gray, 2000). The intension of the forest concession in Indonesia was initiated to promote sustainable forest management (Barr, 2001). Canada had a variety of types of forest concessions, area based and volume based tree farm licenses and other licenses, short and long term timber sales (Haley and Luckert, 1990).

Subsidized Rural Timber Allotment (SRTA) policy in Bhutan is perhaps one of the unique timber subsidies prevailing in the world. The subsidy policy to provide goods and services existed before the establishment of the Department of Forest (DoFPS, 2010b). Likewise, some sorts of subsidy (concessions) still prevail in other developmental sectors; agriculture, livestock, education, health etc. In general, Department of Forest and Park Services continue wide range of subsidy to rural people including timber, firewood, poles, posts, sand, stones, boulders and other non-

wood forest products (RGoB, 2006). SRTA is one of the main *kidu* provided to rural population to ensure proper housing and farm infrastructure development.

1.1 Legal Policy

Shelter is a basic necessity for human need regardless of social status. Unique architecture of Bhutanese houses gives the communities a sense of identity. Rural houses are spacious, beautiful, and structurally sound using the building materials that are locally available. Timber remained as the primary construction materials and it was used customarily even before the era of nationalization of the forests (Budur, 2009). *Thrimzhung Chenmo,* 1959 was the country's first forestry-related legislation. This law shifted the power from the community to the centre and changed traditional unwritten customary laws to formal written law (Penjor and Rabten, 2004).

However, the first Forest Act, 1969 considered the rights of people (RGoB, 1969) and continued timber subsidy. Accordingly, subsequent national forest policy formulated in 1974 also supported the clause enshrined in the Act. While, Forest and Nature Conservation Act (FNCA), 1995 do not adequately reflect on rural timber supply, series of amended rules (FNCR, 2000, 2003 and 2006) favor SRTA. New rules increased quantum, provided timber options(standing trees or sawn timber or logs), extended time limit and lowered royalties(Appendix Table A4)(RGoB,1974; RGoB,2000 and RGoB,2006).

In general, rural timber supply is guaranteed by Government law and policy (Statz *et al.,* 2007). Subsidy of timber was provided when there was less population and household income was very low (Dhital, 2009) and limited alternatives of wood. The social livelihoods of general people have improved far beyond expectation and population growth increased manifolds, yet SRTA continued with increasing demand. Furthermore, the forest policy has been instrumental in developing forestry sector since its promulgation in 1974. There is an attempt in

reviewing forest policy from 1991 and it is still remained at the draft stage. The policy has provided a new direction with the inclusion of people-oriented programs.

Community forestry (CF) is a paradigm shift initiated aiming local resources management and meeting their basic requirement of the forest products. Wangdi (2009) indicated that if there is a conducive environment, some of the community forests have potential to supplement rural timber. RGoB, (2009) and DoFPS (2010a) claimed that SRTA may be gradually replaced by CF for sustainable rural timber supply.

1.2 Current Situation on Rural Timber Allotment

Currently, Forest and Nature Conservation Rule (FNCR), 2006 is the standing legal basis for rural timber supply. Chapter X is fully attributed to the supply of subsidized timber for rural house construction, repair/renovation/extension and other purposes including construction of shed for livestock, storehouse, farm guard shed/watch tower, toilet and machinery shed (RGoB,2006). In addition to that the rule also considers subsidized timber for furniture, wooden water channel, handicrafts, agriculture implements, religious instruments like drums, drum holder, etc. The maximum entitlement ceiling for subsidized rural timber for new/re constructions and repair/renovation are given in Appendix Table A1 and A2.

Demand for SRTA has been observed increasing over the years. The draft Subsidized Rural Timber and other Forest Produce Allotment Policy, 2010 reported at least 51% on an average supplying timber to rural people on subsidy basis (Table 1) (DoFPS, 2010b). Annually, it was calculated to 2,277,052.92 cft of timber supplied to rural housing (new/re-construction and repair/extension) from total timber production. On the other hand, a supply trend for commercial timber has been noticed decreasing.

Table 1 Quantity of timber supplied for SRTA and urban consumers

Year	Timber supplied to rural people	%	Timber supplied through NRDCL to urban consumers	%	Total (cft)
2003	1,327,662.05	39	2,057,801.00	61	3,385,463.05
2004	1,220,742.55	35	2,241,636.71	65	3,462,379.26
2005	2,306,876.45	55	1,919,812.25	45	4,226,698.29
2006	2,191,234.57	49	2,248,292.25	51	4,439,526.82
2007	2,395,292.11	55	1,976,557.51	45	4,371,849.62
2008	2,944,106.47	59	2,057,915.89	41	5,002,022.36
2009	3,553,456.21	65	1,876,201.00	35	5,429,657.21

Source: Draft Subsidized Rural Timber and Other Forest Produce Allotment Policy (Department of Forest and Park Services, 2010b)

Likewise, timber allotment (SRTA) record from Sarpang *Dzongkhag* Forestry Sector noted 2,108,721 cft distributed to twelve *geogs* over the period of nine years (2001-2009). An average of 234,302.3 cft of timber was supplied to rural housing through SRTA policy annually (DzFS, 2010). It included all categories of timber (standing trees, logs and sawn timber) for both new/re-construction and repair/extension of rural houses (Appendix Figure A1). The above quantity does not include other categories of forest products (fuel-wood, fencing posts, prayer flags, timber for local institutions such as *Lhakhangs*), which are also granted on subsidy. In general, forest resources are highly subsidized for rural people to ensure better social livelihood.

The assessment of timber subsidy illustrates huge differences of prices as compared to the commercial timber. The subsidized timber is intended for bonafied use and Government charge nominal royalty (RGoB, 2006), which is affordable by the rural population (Appendix Table A3). For example, for one standing tree (girth 4'1" and above) charge Nu. 40/- only for the subsidized allotment for "B-class trees' ("A class" trees are also allotted in some cases). But if it is sold at the commercial market, a single tree has the chances of fetching at least more than Nu, 50,000/- depending on size of the tree. The current local market value of the timber is Nu,

250/- to 350/- per cubic feet (cft). The market value for an entire entitlement of subsidy opting option for standing trees per household work out to be over 1.3 million, where beneficiary pays royalty of only Nu. 4,080/-. The cost of extraction, sawing and transportation is incurred by the beneficiary themselves (DoFPS, 2010b).

While there are several impact studies done on the poverty and rural development, there is no much study done on any aspects of the effects of subsidy on rural housing. Assessment of subsidy in relation to monetary impact showed very high on rural housing. The draft policy revealed an average loss of Nu, 2,296 million per year by the Government through subsidy timber for the period of three years (2007 – 2009) (DoFPS, 2010b).

Table 2 Monetary impact on the (rural) subsidized timber

Year	Rural Timber and Subsidy	Rural Supply
2007	Timber Supplied(cft)	2,395,292.11
	Subsidy royalty paid (Nu.)	1,916,233.69
	Expected income at market price	620,380,656.49
	Total Loss (Nu.)	**618,464,422.80**
2008	Timber Supplied(cft)	2,944,106.47
	Subsidy royalty paid (Nu.)	2,355,285.18
	Expected income at market price	762,523,575.73
	Total Loss (Nu.)	**760,168,290.55**
2009	Timber Supplied(cft)	3,553,456.21
	Subsidy royalty paid (Nu.)	2,842,764.97
	Expected income at market price	920,345,158.39
	Total Loss (Nu.)	**917,502,393.42**

Source: Draft Subsidized Rural Timber and other Forest Produce Allotment Policy (Department of Forest and Park Services, 2010b)

On the other hand, ACC (2009) figured out that there is no proper monitoring of the utilization for the rural timber. Utilization certificate which is supposed to be issued after the completion of the house by the *Gup* is not materialized in accordance to the sub-section 11, section 97 of the FNCR, 2006. There are increasing numbers of deflection/misuse of subsidy timber to other ineligible areas. Frequent request for timber, illegal felling and additional felling of trees are also

reported as some of the problems under the SRTA policy. DoFPS (2010b) noted sharp increase of 86% misuse during 2009 as compared to the previous year. For example, *Dzongkhags* like Haa, Paro and Thimphu were cautioned by the Anticorruption commission in relation to the heavy transaction of illegal logging and deflection of rural timber (ACC, 2009). As a result, allotment of subsidized timber has become complex and time consuming when scrutinized for genuine allotment.

On the contrary, Penjore (2007) argues that the rural people face great difficulty in obtaining the timber due to the long standing bureaucratic and lengthy procedures. It is said that such formalities are burden and harassment to the local communities. The excerpt from the particular paper is as given below;

> "The present system of obtaining permits (for fuel wood and rural timber for house construction, repair, renovation, and extension) is bureaucratic and lengthy, wasting many precious man days of farm labour. For example, the process for obtaining rural timber permit for constructing a new house is as follows: a farmer first travels (for hours or a day) to his *gup's* office (lucky if the *gup* is in) to get a form. Whether he will get the form quickly will depend on his relations with the *gup*. After getting the form, he looks for a Dzongkha literate person to fill up the form with all necessary information. After the form has been filled, it is submitted for the *gup*'s verification (*gup* takes his time). The form is then sent to the district headquarters for the *dzongda's* signature. The signed form then goes to the territorial division for the divisional forest officer's approval. The approved form is next sent to the forest range office for issuing the permit. The permit is then sent to the forest beat office where dates for tree-marking are discussed. After the end of this long process, the farmers are allowed to fell trees. The process for obtaining the forest products for rural consumption like firewood, poles/posts for fencing and prayer flags, and other produces are equally long, except it goes directly from the *gup* to the range, territory or parks offices whichever is applicable, by skipping *dzongkhag* administration. The above formality has been designed as a check and balance system for reducing the misuse of subsidised rural timber in some districts, but its application in all districts, irrespective of the local contexts, is a big harassment to the people"P.-78.

Although, the intention of SRTA is goodwill, there exist lot of practical problems for both the responsible Government offices and beneficiaries. Resource control rests with Government and SRTA recipients do not take any responsibility to local resource management. Current subsidy policy has not encouraged people's

participation. Generally local people remained complacent even though forest conditions nearby settlements are deteriorated and depleted. Nonetheless, the demand of timber for construction has been increased more than the volume that can be produced sustainably (Dhital, 2009). Thus, Department of Forest and Park Services is in the process of finding better ways on how to optimize subsidy timber for genuine rural people.

1.3 Shortage of Timber Supply

National forest resources potential assessment conducted in 2004 indicated rural timber as demand driven rather than considering resource capacity. Timber allocation was said to be done on an ad hoc manner without any harvesting or management plans (Schindele, 2004; RGoB, 2005; Wangchuk, 2008). The local forest resources are observed declining in terms of quality and quantity because of the heavy pressure from rural timber allotment. The sources of SRTA are usually made from all possible forest areas including forest management units (FMU) and protected areas (except core areas). While outside FMU is not governed by any management plans, it is the main source of rural timber allotment (FRDD, 2005). Such forest types, which are easily accessible and close to settlements are often found over-exploited.

In general, timber deficiency is the major concern of the Department of Forest and Park Services. Schindele (2004) revealed that timber for rural construction can be provided sustainably if all unmanaged forests are brought under proper management. However, due to the rapid development and increasing population, timber deficient is already experienced in many parts of the country. A recent study such as Bhutan forestry outlook revealed that in-country production of construction timber will not be able to meet the growing demand (Dhital, 2009). The demand for constructional timber has increased more than the volume that can be produced sustainably. DoFPS (2010b) noted very small percentage of forest area (about 14%) is suitable for producing construction timber. The wood balance is forecasted negative from the estimated demand of logs for rural supplies (152,000 m3 (5.36 million cft).

The estimate potential to produce rural timber from all possible sources (FMU and outside FMU) is about 139,365 m3 (4,922,371.80 cft) of logs (DoFPS, 2010b).

Likewise, Phuntsho and Sangye (2006) indicated that community forests in Bhutan are at the infancy stage and majority of them are not in the position to meet the timber demand. Moreover, some approved community forests are totally degraded and some are oriented towards the management of NWFP. For example, Tshangkha and Willing community forests in Trongsa *Dzongkhag* have no possibilities of timber production for some decades (Tshangkha Community Forest, 2004 and Willing Community Forest, 2004). Forest type is broadleaved forest dominated by *Quercus glauca* associated with *Rhododendron* and *Symplocus* species. The undergrowth is mostly *Lyonia* spp that do not have any economic value. Similarly, some community forests have oriented their management objectives to land or watershed management like Samcholing CF (Samcholing Community Forest, 2007). Thus, timber production may not be possible at least for some decades from such approved CFs.

However, several case studies have demonstrated that NWFPs can contribute to income generation while managing the resources in a sustainable manner (SFD, 2008). For example, Meijboom *et al.* (2008) noted the total annual average income of Bjoka community forestry group earned from cane and bamboo was Nu 3,475,000/-. Likewise, income from lemon grass oil in the eastern Bhutan has been reported about Nu. 51,247,045/- for over a period of 10 years (1994-2004)(Wangdi and Tshering, 2006). NWFPs user groups may be formed wherever possible and transformed into community forests for sustainable management (SFD, 2008). Thus, incomes from NWFPs have the potential to purchase timber for rural housing.

The rural timber allotment within the protected areas is often perceived better since outsiders are not permitted to collect any forest resources. However, some communities within the Royal Manas National Park (RMNP) particularly Zurphey and Tshanglajong exert tremendous pressures on forest resources (firewood, timber and bamboo). People from Umling geog under Sarpang *Dzongkhag* also expressed very costly to construct a descent house as the forest area around their land has been

restricted for extracting timber except collection of the dead, dying and wind fallen trees (RMNP, 2006). Jigmecholing *geog* is the main source of timber. It is located quite far, where transportation and other costs far exceed the costs of timber. Conservation management plan (2003-2007) of Jigme Singye Wangchuck Nationl Park (JSWNP) also shared similar opinions on the timber scarcity at Korphu and Tangsibji *geogs* in Trongsa *Dzongkhag* (JSWNP, 2002).

In brief, timber scarcity has become one of the major challenges for both rural and urban populations. FMUs, outside FMUs, protected areas and community forests felt inadequacy of timber and other wood products (fuel-wood, poles etc.,) for growing desires. Bhutan is recognized as one of the highest consumer of wood. The per capita consumption has been estimated at 1.92 per annum (Tshering, 2005). The demands are expected many times higher than what can be produced and pressurize local forests. Human-induced activities are more aggressive and can influence on forest depletion in a variety of ways leading to unsustainable forest management.

2. Sustainable Forest Management

Sustainable forest management (SFM) is the management of forests based on methods that jeopardize neither future harvests of forest products nor future benefits of environmental services (Putz, 1994). Sustainable forestry integrates consideration of social, economic, and environmental factors in decision making. Forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. Sustainable development and sustainable forest management have become the most widely accepted paradigms for resource management throughout the world. The 1987 Brutland Report was the modern catalyst for world sustainability. It defines sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987).

Some researchers such as Nilsson (1991); Seip (1996); Duinker *et al.* (1998); Nilsson and Gluck (2001) discuss different concepts of sustainability. The concept that is most in line with the United Nations principle: "increased human welfare and aggregated benefits from the forests". This also corresponds with FAO's Strategic Plan for Forestry (FAO, 1997): "to enhance human well being through the sustainable management of the world's trees and forests".

United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro in 1992. At this Earth summit, 144 countries developed and adopted a non-binding statement of Forest Principles that recognized the importance of sustainable forest management for all types of forests (Raison *et al.*, 2000). FAO (2003); Nilsson and Gluck (2001) also substantiated sustainability of forests as forest resources and forest lands sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. In 2004, the United Nations Forum on Forests (UNFF) identified the following seven thematic elements of sustainable forest management (Montréal Process, 2009). It was adopted from the criteria identified by the Montréal Process and other criteria and indicators processes, as a reference framework for sustainable forest management:

1. Extent of forest resources
2. Forest biological diversity
3. Forest ecosystem health and vitality
4. Productive functions of forests
5. Protective functions of forests
6. Socio-economic functions of forests
7. Legal, policy and institutional framework

The General Assembly of the United Nations adopted the most widely, inter-governmentally agreed definition of Sustainable Forest Management. Sustainable forest management as a dynamic and evolving concept aims to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations (United Nation, 2008). It is characterized by above

seven elements. While the concept of sustainable forest management is accepted as the framework for managing forests in most countries, its implementation differs considerably among them (Food and Agriculture Organization, 2009).

The sustainability concept is on-going, and will continue to go, through an evolving process over time (Nilsson and Gluck, 2001). The reasons are mainly due to changing societal values, changing socioeconomic conditions, changing political realities. The Dictionary of Forestry defines sustainable forests as the capacity of forests, ranging from stands to eco-regions, to maintain their health, productivity, diversity, and overall integrity, in the long run, in the context of human activity and use (Floyd *et al*., 2001). Thus, sustainable forests are a description of a forest condition that people value or desire. The idea of forestry for sustainable development is, therefore closely related to the notion of sustainable forestry.

In general, sustainable development is also understood differently in different countries depending on geography, society, history, cultural heritage, political systems and levels of development. In Bhutan, sustainable development is defined as "the capacity and political will to effectively address today's development and environment problems and tomorrow's challenges without compromising Bhutan's unique cultural integrity and historical heritage or the quality of life of future generations of Bhutanese citizens" (Rabten, 2009). Sustainability in Bhutan, therefore, transcends beyond economic dimension to social, culture and environment.

The future vision (Bhutan 2020) also considers sustainability from many dimensions: social, financial, economic, cultural and environmental. All these aspects are of critical importance in Bhutan since they all impact, directly and indirectly, on country's sovereignty and security (Planning Commission Secretariat, 1999). Bhutan's sustainable development is unique since socio-economic development is guided by the overarching philosophy of Gross National Happiness (GNH) formally introduced by HM the King of Bhutan in the early seventies (Rabten, 2009). GNH is the development philosophy rested into four pillars and conservation of the environment is one of them (GNHC, 2009).

Royal Government of Bhutan is strongly committed to environmental conservation as reflected in various national policies and legislations. One of the most important commitments of the 1974 Forest Policy has been to maintain 60 percent of the country under forest cover, in perpetuity. This clause is now enshrined in the Constitution of the Kingdom of Bhutan (RGoB, 2008). Further, the "Middle Path" policy was initiated in 1990 for promoting sustainable development in Bhutan (NEC, 1998). It aimed for the superior performance by taking a balanced view. It provides an overarching conceptual framework for articulating appropriate forest policies and strategies in support of SFM in Bhutan. Environmental conservation will continue to be the cornerstone of Bhutan's development policy for all times.

However, Penjore (2007) argued that conservation success is a rural failure. Farmers face great challenge to human-wildlife conflicts despite heavy crop losses and encroachment of farmland by forests. The conservation policy has seriously deteriorated the household's food security. In the past, local communities were largely more responsible and accountable to their environment. The people enjoyed a balanced, harmonious and respectful relation with nature. At the moment, without rights to ownership and use, communities are not encouraged to manage natural resources in a sustainable manner, while the government manages it to the point of denying the people their traditional rights. Most communities blame modern forestry laws for taking their rights over local forest management. Giri (2004) claimed that conservation policy is considered above all other considerations.

On the contrary, Schindele (2005) and Forest Resource Development Division, (2005) pointed out that outside FMUs are the main source of rural timber supply. This forest category is often unmanaged forest areas and under tremendous pressure. There is a very small percentage (14%) of forest area that is suitable for producing construction timber without compromising on the principle of sustainable forest management (DoFPS, 2010b). The restricting factors are (i) economical, (ii) technological (iii) social and (iv) ecological. About 41 percent of the forest area is under strict protection being National Parks, Wildlife Sanctuaries and Reserves etc. About 34 percent of the area is very steep and big chunk of it falls above the timber

line and various kinds of river and road buffers. Biological corridors occupy about 9 percent of the forest and about 2 percent is community forests. Sustainable use of the forests cannot be guaranteed at the current level of forest utilization and management. Yet, Forest and Nature Conservation Rule, 2006 considered rather heavy concession and provided more options for rural timber supply (RGoB, 2006).

These challenges to SFM reaffirm the call for greater people's participation and legitimizing expression of their interests, values and perceptions of forest and forestry. Participatory public is indispensable to promoting sustainable forest management. (Montréal Process, 2009). Local communities must be empowered to conserve and manage the natural resources upon which they depend (McNeely and Mainka, 2009). Therefore, involvement of people and incorporating their values in to the decision-making process is a vital step towards SFM.

3. People's Participation

Managing resources is about managing people; this is widely accepted and supported by many resource managers in different fields. Westoby (1987) argues that forestry is not about trees, it is about people. And it is about trees only as trees can serve the needs of people. Thus, people are the real wealth of a nation. The basic objective of development is to create an enabling environment for people to enjoy long, healthy, and creative lives (UNDP 1990).

3.1 Concept of Participation

Today, people's participation concept is the best approach in development processes of any aspects of socio-economic development and environmental conservation. It can be applied to all levels, from community, national to international levels. "Participation" in its simplest of meanings means people taking part, sharing, or acting together. For most of the time people have been participating in the development of their own cultures through the sharing of tasks and responsibilities in their own small communities. The participation of local communities can range from

local people providing labour for a project, to the involvement of local people in major decisions about a project. The World Bank (1996) defines the concept of participation as "a process through which stakeholders influence and share control over development initiatives, decisions, and resources that affect them".

Erwin (1976) defines participation in development aspects as a process in which people are involved in development operations, namely thinking, making decision and solving their problems. Local participation must be actively emphasized by employing local thoughts, creativity and skills, putting emphasis on mutual problem solving, using appropriate technology to support and evaluate related organization and performance. Likewise, United Nations (1975) elaborates participation as procedure relating to mass activities ranging from;

1. Decision making process concerning community's objectives and resource allocation
2. Eliciting community's contribution to development programs
3. Voluntary actions towards activities and projects
4. Participation in sharing the benefits from the development process

Participation can be better understood in terms of its practical use. A study undertaken for the UN Panel on People's Participation in 1982(Oakley, 1988) reviewed the practice of participation in rural development and suggested four different forms of participation:

1. Participation as Collaboration: Whereby rural people are involved in rural development programs and projects and their collaboration is sought, but they have no direct control over the project activities.
2. Participation through Organization: Whereby organizations are set up which ostensibly have the objective of felicitating participation.
3. Participation in Community Development Activities: Whereby the direct and active involvement of local people is sought to undertake and complete a whole range of physical improvements at the community level.

4. Participation as a process of Empowering: Whereby a group of people who previously had no basis from which to intervene in or influence rural development activities, achieve this basis and use it for their continued involvement in these activities.

Participation of the stakeholders varies in intensity and approach (Arnstein, 1969). The degree of participation may be of three types: non participation, partial participation and genuine participation. Arnstein describes the type of "non-participation" represented by the lower two rungs on the ladder as attempts to 'educate' participants (Figure 1). Levels 3 and 4 allow participants to hear and have a voice, but they have no power to ensure that their voice has influence. At level 5 participants can advise, but the right to decide is retained by the agency. True participation begins from sixth rung where 'Partnerships' enable negotiation and shared decision-making responsibility. Arnstein considers that partnership working is most effective when participants have an organized and resourced base from which to work, and to which they are accountable. At levels 7 and 8 participants form the majority in decision-making arena, or hold managerial power.

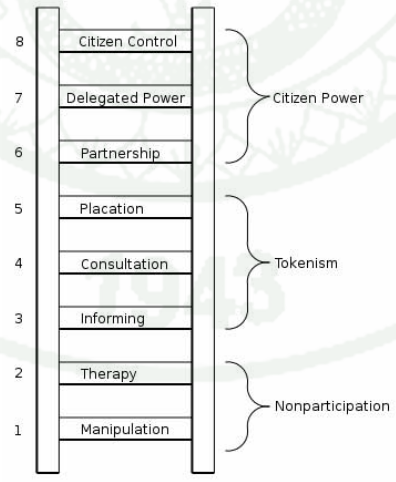

Figure 1 Arnstein's ladder of participation

Source: Adapted from Arnstein (1969)

There are various levels of participation of stakeholders in a development programme. Levels of participation vary with the degree and nature of involvement. People's participation could mean different things to different people. The many different meanings are often due to reference to the different levels in the participation continuum. A "typology" of participation as developed by the International Institute for Environment and Development (IIED, 1994) is presented in the Appendix Table B1.

Proponents of decentralization argue that people's participation is good for natural resources management, since it can incorporate local knowledge about resource base (Carney, 1995). The concept of participation originally grew out of radical criticism of mainstream development projects in the 1960s and 1970s. Critics who asked why development projects often failed to meet their objectives came to the conclusion that a lack of participation was the reason (Wily, 1997). Forest resources under local authorities can be well maintained because they are closely monitored (Arnold, 2001). In the recent years, participation of people in forestry is one of the most important issues for a better conservation. Participation is an effort to increase control over resources and regulative institutions in given social situations. Globally, there has been a deliberate shift in responsibilities for forest management away from central forest administration to local governments, the private sector, non-governmental organizations and local community organizations (FAO, 2000). Thus, conservation without local participation is doomed to failure.

Participation is intended to empower local people and to provide a "voice for the voiceless" (Kelly, 2001). Empowerment is defined as the expansion of assets and capabilities of poor people to participate in negotiate with, influence, control, and hold accountable institutions that affect their lives. It calls for shifting the balance of power and enabling an interactive learning process (Kelly, 2001). Participatory approaches are seen as "a dynamic and emergent process in which people, their ideas, and their actions can and do change" (Poncelet, 2001). Participation by local people is essential to any conservation effort.

Recently people's participation approach has been further strengthened by the concept of forest governance for sustainable livelihood. Forest governance is increasingly being recognized as an essential ingredient for achieving long term forest conservation and sustainable forest management (Tacconi, 2007 and Broekhoven, 2005). Key principles guiding good governance of forests include: equity and justice; empowerment; accountability; transparency and sustainability (Koirala *et al*., 2008). Forest governance in community forests addresses the relationships, rights, responsibilities and incentives among user groups and government. Accordingly, CF exhibited better in local forest governance. Several studies (Malla,2000; Dev *et al*., 2003; Ramadhani, 2009; Dahal *et al.,*2010) revealed that members of community forests are increasingly being more responsible, accountable, transparent, compliant of rules, defined roles and responsibilities, pursuant of participatory decision-making, gender sensitivity, equitable representation and user balance.

3.2 People's Participation in Bhutan

The concept of people's participation is not new in Bhutan. It existed since time immemorial and some form of strong participation is still seen in rural Bhutan. It is mostly related to sharing and helping each other within the context of forest resource allocation (Dorji, 2003). Many communities have arrangements for water sharing during the cropping season; coordinated mechanisms exist to accomplish tasks such as house construction, cultivation, and harvest; collective solutions exist in dealing with misfortunes such as a death in a family; participatory mechanisms are followed for hosting religious ceremonies and festivals that are strongly believed to be related to community welfare; and conflict resolutions processes are familiar to village members.

Likewise, local institutions like *reesup* and *chusup,* were said to be existed even before 1950 (Wangchuk, 2001 and Dorji, 2003). Traditional forest land management practices like the *Sokshing* and *Tsamdro* exhibit a high level of local understanding and concern for sustainable management of local forest resources (Wangchuk, 2001). These local forest land use practices were not only determined by the

subsistence needs of communities but were based on a sound understanding of local social, ecological and physical capability of the land (NEC, 1998). They engendered a high degree of communal responsibility towards sustainable management and use of local resources, enforced and maintained through a complex integration of social values and religious belief systems.

Today, people's participation is one of the key elements considered in every development activity in Bhutan. His Majesty King Jigmi Singye Wangchuck , during his coronation in 1974 commanded that "the participation of the local community is the key to the conservation and utilization of the forest resources" (Namgyel, 1996; Turkleboom *et al.,* 2001; Chhetri *et al*., 2009). Accordingly toward this vision, several institutions have been established and legislation passed to empower people, through which the representative system of governance has evolved. In this line, Forest and Nature Conservation Act, 1995 was promulgated to involve people in the local forest resource management through social forestry programs (RGoB, 1995). It is mainly intended to manage their local forests for meeting basic requirement of the forests and remedies to reduce future adverse effects on environment. The particular Act has provided a new direction with the inclusion of people-oriented programs.

Ura and Kinga (2004) argue that people's participation has been identified with effective encouragement even in political life, through good governance. This indicates making local institutions more responsible in decision making about local priorities. For example, the local institution, *Geog Yargay Tshogchung* (GYT) has been delegated to assess any environment-related activities in their *geog.* These include protection of local forest resources, water resource management and maintaining a clean and sound environment in general (RGOB, 2002).

Turkelboom *et al.* (2001) argue that the natural resources have been able to be preserved by the Bhutanese people for hundreds of years. The relationships between the Bhutanese people and the environment are inherited within cultural and

ecological boundaries. However, until recently, participation has been viewed primarily as a feature of community, private and school social forestry and protected area networks. Now it is recognized that participatory forest management should be a broad development strategy that can take diverse forms.

4. Community Forestry

Literature review on community forestry covers concepts of community forestry and community forestry in Bhutan.

4.1 Concept of Community Forestry

Community forestry is defined as "…any situation which intimately involves local people in a forestry activity" (Food and Agriculture Organization, 1978). Sarre (1990) also recognized local people as key to success rather than the cause of failure. Local people living in and around the forests were often blamed for the destruction of forests. Carter (2010) spelt out that local people are often those who lose the most from many players involved in forest exploitation. If they gain anything, it tends to be the least.

The concept of community forestry was emerged as a result of the failure of industrial forestry to benefit the rural poor or address the increasing rate of deforestation (Gilmour and Fisher, 1991). The industrialization model was associated with the 'top-down approach' or 'development from above'. Conventional forest management often failed to consider local people in forest management. However, the need for conservation of forest resources and securing livelihoods of the rural communities has prompted change from government controlled management to involvement of communities (Agrawal and Gibson, 1999; Adhikari *et al.,* 2004).

The new regime of forestry was called Social/Community forestry, which embraced the notion of communal action (Gilmour and Fisher, 1992). Forest management in this approach shifted its focus from 'tree centered' to people-oriented

approach (Pulhin, 1996). Egan *et al.*, (2002) noted CF is a strategy to manage the local forests by mobilizing the local communities. People's participation is the basic strategy to which the community forestry program is committed. It aims at involving people at every stage of community forest management activities. Many developing countries in the world are pursuing some forms of participatory forest management, which involve local people. Different terms are used to indicate involvement of communities in forest management. The terms include: community forestry, collaborative forest management (CFM), participatory forest management (PFM), decentralized forest management, community based forest management (CBFM) and joint forest management (JFM) (Leach *et al.,* 1999; Ribot, *et al*., 2006; Taconni, 2007, Rath 2010).

Regardless of the variations of various terms of people's participation in local resource management, community forestry is the result of earlier experiences of global development thinking (Agrawal and Ostrom, 2001). The initiation of the community forestry as per British Columbia can be traced back to 1945 (Gunter, 2004). Community forestry involves the three aspects of sustainable development: social, economic and environment. Sustainability of forest resources is the very essence of community forestry management. Thus, successfulness and importance of community forestry are outlined in several studies (Chhetri *et al.,* 1993; Jackson and Ingles, 1995; Varughese and Ostrom, 2001; Gautam and Shivakoti, 2005; Chhetri *et al.,* 2009, Carter, 2010). Thus, community forestry is the paradigmatic shift of local forest management from State forestry.

The definitions of community forestry are as numerous and varied as the communities trying to implement them (Gunter, 2004). In 1985, Shepherd defined community forestry as;

> "Any form of forestry activity undertaken specifically and principally to provide communal benefits to the people living in villages or small communities in the vicinity of the forest area which involves them directly in its management".

Later, Martel and Whyte (1992) cited in Rath (2010) defined community forestry as;

> "Community forestry is a village-level forestry activity, decided on collectively and implemented on communal land, where local populations participate in the planning, establishing, managing and harvesting of forest crops, and so receive a major proportion of the socio-economic and ecological benefits from the forest."
>
> Martel and Whyte (1992)

Likewise, Community forestry is also referred to as;

> "regime of common property management that strives to achieve sustainability by linking local people's social and economic interest with forest conservation".
>
> Taylor (2000)

In a recent study on how communities manage forests from selected examples from around the world, Jane Carter broadly defined community forestry;

> "as an approach to forest management that actively promotes the rights of people living in and around the forest to both participate in forest management decisions and to benefit (financially and in kind) from the results of this management".
>
> Carter (2010)

This paper regards all the definitions stated above. True essence of Community forestry is considering the rights of people for maintaining sustainable local forest management. It is intended to realize sense of ownership of people for meeting requirement of forest resources in socio-economic development without compromising environmental conservation.

The local people use forests for multiple purposes. Accordingly, there are multiple benefits provided by the community forestry. Arnold (2001) stated that local populations are the immediate custodians of the forest and proximity should result in more effective protection of the resource. They are the stakeholders in closest touch with the forest, and are dependent on it in a wide range of ways. Hence they are best placed to ensure its effective management. Community forest management leads to livelihood security and poverty alleviation that in turn, leads to sustainable development (Community Forestry International, 2009). The Community forestry guide book of British Columbia (Gunter, 2004) identified some of the numerous benefits of community forestry are as follows:

1. Better flow of forest products (timber /NWFP) for social livelihood
2. Long-term community economic development resulting in the increased self reliance of rural communities.
3. Local employment in rural communities.
4. Local-level decision making that leads to locally appropriate decisions and improves the incentives to consider the long-term benefits of sustainable management.
5. Increased potential to resolve conflicts over timber harvesting in watersheds and other sensitive areas.
6. Protection of drinking watersheds, landscapes, and other values that are important to communities and to local and regional economic activity.
7. Enhanced opportunities for education and research. Community forests can be laboratories for testing innovative forest practices.
8. Improved awareness of forest management among members of the public.

Community forestry has become a popular movement and adapted by many countries in the world (Malla, 2007). While States still hold ownership of

almost 75 percent of the world forests, there are increasing trends of local communities gaining use rights or full legal rights of local forests Carter (2010). Bull and White (2002) noted some 420 million hectares, which is around 11% of world forest is now managed in some form of community forestry. The developing countries constitute at least 22% and with the current trend the figure is expected to reach 45% by 2015. Some extent of community forestry in Asian region is as given below;

Nepal: Community forestry (CF) (Kanel and Nirula 2004)

Since 1980, about 1.1million ha of forest have been handed over to nearly 14000 Forest User Groups (FUG). Amount 1.2 million households are involved. Forest is handed over to FUGs after application to the Forestry Department and jopint completion of a management plan. Supportive policies and legislation for CF have been adopted. About 25% of the national forest is now managed by more than 35% of the total population.

India: Joint Forest Management (Poffenberger 2000; Bahuguna, 2001**)**

Over 62,000 village forest communities(approx, 75 million people and 14 million ha of forest) are participating with Indian Forest Service across 26 states since 1988. The share of benefits to community varies from 25-50, in return for people's inputs of labour and time.

Philippines: Community- based Forest Management (CBFM) (Rene de Rueda *pers.comm*.)

Social forest started in the mid 1970s . CBFM is a national strategy for management and conservation of forest resources. There are now 4,956 social forestry project sites, covering 5.7 million ha. Tenure changes have been issued for 4.4 million ha of this land. The beneficiaries are 2,182 people's organizations(PO) involving 496,165 households.

Figure 2 Community forestry in Asia region

Source: Extracts from Gilmour *et al.* (2004)

4.2 Community Forestry in Bhutan

Community forestry in Bhutan was evolved with the command of His Majesty, the fourth King to initiate social forestry in 1979 (Penjore and Rapten, 2004; Temphel and Beukeboom, 2006). Although social forestry program started in Schools

with tree plantation in 1985, the actual implementation of CF was incepted in 1992 along with an advent of decentralization policy. Some of the forestry activities including CF program were decentralized to the *Dzongkhags* from central level (Penjore and Rapten, 2004). There has been a clear shift of primary focus from tree-centered to people-centre approach. The importance of community involvement in the protection and management of forest resources was increasingly recognized.

The Forest and Nature Conservation Act, 1995, is the most important legal basis for community forestry program in Bhutan (RGoB, 1995). Subsequent Forest and Nature Conservation Rules (FNCR), 2000, 2003 and 2006 favor establishment of community forestry for sustainable forest management (RGoB, 2006). Community forestry is Bhutan is Government owned forest lands for which communities, organized as Community Forest Management Groups (CFMGs), have been granted management and use rights under conditions set out in a management plan approved by the Department of Forests and Park Services (RGoB, 1996). In Bhutan, FNCR chapter four, article 27(1) defines community as;

> "Any area of Government Reserved Forest, in and around villages and human settlement including government land situated in the interspaces between registered private land, suitable for management by a Community Forest Management Group (CFMG), may be designated as Community Forest, pursuant to the procedures described in this chapter. However, plantations raised by the Department shall not be included in the Community Forest" (RGoB, 2006).

The experiences of community forestry in Bhutan illustrate greater scope in meeting forest product requirement and generate income from wood and non-wood forest product (NWFP) without destroying the natural environment. The CF programs indeed attribute to several national and international goals such as GNH, poverty reduction and millennium development (Temphel and Beukeboom, 2006; Chhetri *et al.,* 2009; DoFPS, 2010a). There was a gradual adoption of CF program in the country. Community Forestry in Bhutan has come a long way and much progress has been made over the short span of time. Although initiation of community forests

was started in early 1990s, the actual implementation progressed well in mid 2000. The reasons for cautions were due to no concrete legal framework and skepticism of communities in relation to the handing over of GRF for their management (Chhetri *et al.*, 2009).

Until September 2010, 259 community forests were handed over to local communities covering an area of 31,334 hectares (77,082 acres) and involving 12,546 households (Social Forestry Division, 2010). This area combines both timber and NWFP management, and it is projected that the number of CFMGs could rise to about 400 by 2013. Accordingly, Sarpang *Dzongkhag* has fourteen approved CFs involving 574 households managing 1174 hectors of natural forest land nearby settlements (Appendix B1 and B2). There are around 23 CFs provisioned in the tenth FYP, but many more can be established as per the current trend and strong legal support (*Dzongkhag* Administration, 2008).

The rate of establishing CFs increased greatly in 2007, with 2008 accounting for more than half the total number established. Community Forestry has proved to be a viable policy option to complement the other key forest management regimes, particularly the commercial management of forests in FMUs, and the conservation of forest lands through protected area management. This strategy puts Community Forestry as a major contributor to the overall forest policy development goals of the country (RGoB, 2009). Therefore, community forestry programs have great potentials to replace subsidized rural timber allotment gradually and reduce dependency on the GRF. Accordingly, the recent draft national forest policy 2009, support the community forestry objective to gear towards achieving progress in three major areas (RGoB, 2009):

1) Returning rights and responsibilities for managing forests surrounding villages to community groups.

2) Interfacing contemporary management and institutional arrangements with indigenous and traditional approaches to forest management.

3) Providing, as far as possible, the rural timber supply from community forests.

Many of the approved community forests began to benefit the local communities in terms of socio-economic development and environmental conservation (Wangdi and Tshering, 2006; Chhetri *et al.,* 2009; RGoB, 2010a). Some of the social, economic and environment benefits are as shown below;

1) Social benefits

The most important social benefit derived from community forests is the development of social capital. When the CFMG members closely participated in local forest management, social ties improved within the community. RGoB (2010a) pictures an instance from Bumpaling CF for better social cohesion. The different ethnic background, language, customs and beliefs formed CFMG after they received *kidu* land. Beginning of CF establishment marked some difficulties in accepting each other due to above factors. However, working together for CF helped them bringing together through mutual trust and respects.

A case study from three community forests (Dozam, Yakpogang and Masangdaza) indicated that establishment of community forests influenced people's participation and made community to realize ownership of local forests. Community felt empowered and decreased conflicts among members (Wangdi and Tshering, 2006). Community obtained control over forest resources and CFMG need not have to follow lengthy process for getting permits for resource utilizations (Chhetri *et al.,* 2009).

CF contributes to the process of democratization, improved local governance and devolved decision making on natural resource management and beyond (Chhetri *et al.,* 2009). As an organized group, the members can better express their concerns and priorities and defend their rights in the *geog* and *Dzongkhag* committees, the local parliaments.

2) Economic benefits

CFMGs are inspired with the economic benefits from wood, NWFP, contribution/donations, fees and fines from their community forests. Wangdi and Tshering (2006) assessed CF funds generated by three CFs in Mongar *Dzongkhag* (Dozam, Yakpogang and Masangdaza) amounted to total of Nu. 226,727/-. Dorji and Phuntsho (2007) reported that Masangdaza CFMG has utilized 6,757cft of timber in the past 5 years against 7,300 cft as permitted by management plan. Thus, there is a provision to sell the excess timber for income generation. Likewise, Shambayung CFMG has marked ten Drashings (estimated volume of 784 cft) for sale in line with their CF management plan in 2007. In 2009, Yargey CF in Tshirang *Dzongkhag* sold around 600 cft after meeting their domestic demand (Tshering, 2011).

Peldon (2009) showed at least 13 community forests attributing to NWFP in until 2007 involving 1,342 households for sustainable utilization and management. NWFPs were lemon grass, pipla, matsutake, bamboo, cane, *Illicium griffithii* and *Chirata*. The community of Wamanang (97 households) in Trashiyangtse *Dzongkhag* could potentially generate more than Nu. 500,000/- from *Borinda grossa* products (Dorji and Tenzin, 2007). In general, CF program has the potential to contribute to the improvement of rural livelihoods through the use and sale of surplus timber and NWFPs.

3) Environmental benefits

Environmental conservation is one of the most important concerns of the CFMGs. The most of the members are well aware on the negative impacts of the degradation of the local forest resources. Wangdi and Tshering (2006) reported that there is an improvement on the forest conditions. Yakpugang CF has improved its vegetation cover by 70% to 80% over the past five years. Plantations were carried out annually in partially degraded areas. Cattle grazing were controlled to ensure successful natural regeneration. Temphel *et al.,* (2005) added decreasing

trends of forest fire outbreaks after the establishment of community forests. Soil stability was also found improved in the community forests.

Although, there are multiple benefits of community forests, CFs in Bhutan are still at infant stage and results are yet to be seen. Given an opportunity community forestry has been recognized as best approach for local resource management in Bhutan. The draft national forest policy envisions CF to empower rural communities to manage forest sustainably for socio-economic benefits and contribute towards sustainable forest management (RGoB, 2009). Thus, there is a possibility of mainstreaming community forests as the local forest resource allotment through proper management.

Background of the Study Site

The sampling area is Dekiling geog under Sarpang *Dzongkhag* in southern part of Bhutan (Figure 3). The Dzongkhag comprise of a *Dungkhag* (Gelephu) and twelve *geogs* namely –Shompangkha, Dekiling, Hilley, Senghi, Bhur, Gelephu, Sershong, Chuzagang, Dovan, Umling,Taraythang and Jigmecholing Geogs. The total household under Sarpang *Dzongkhag* is 7,346 with the population of 37,101 including two town centers (RGoB, 2005). Around 83 percent of the total area is covered by forest which spread to an area of 190651 hectares.

In general, Sarpang Dzongkahg has 83.3% forest cover and it provides forest products and services to residence of the *Dzongkhag* (Land Use Planning Project, 1997). The vegetation types are mostly subtropical broad-leave and some with cool temperate broad-leave forests. There are three protected areas; Manas National Park, Jigme Singye Wangchuk National Park and a Phibsoo wildlife reserve, which are partly located inside the *Dzongkhag*. However, the local people can access to resource collection although there is no clear boundary delineated.

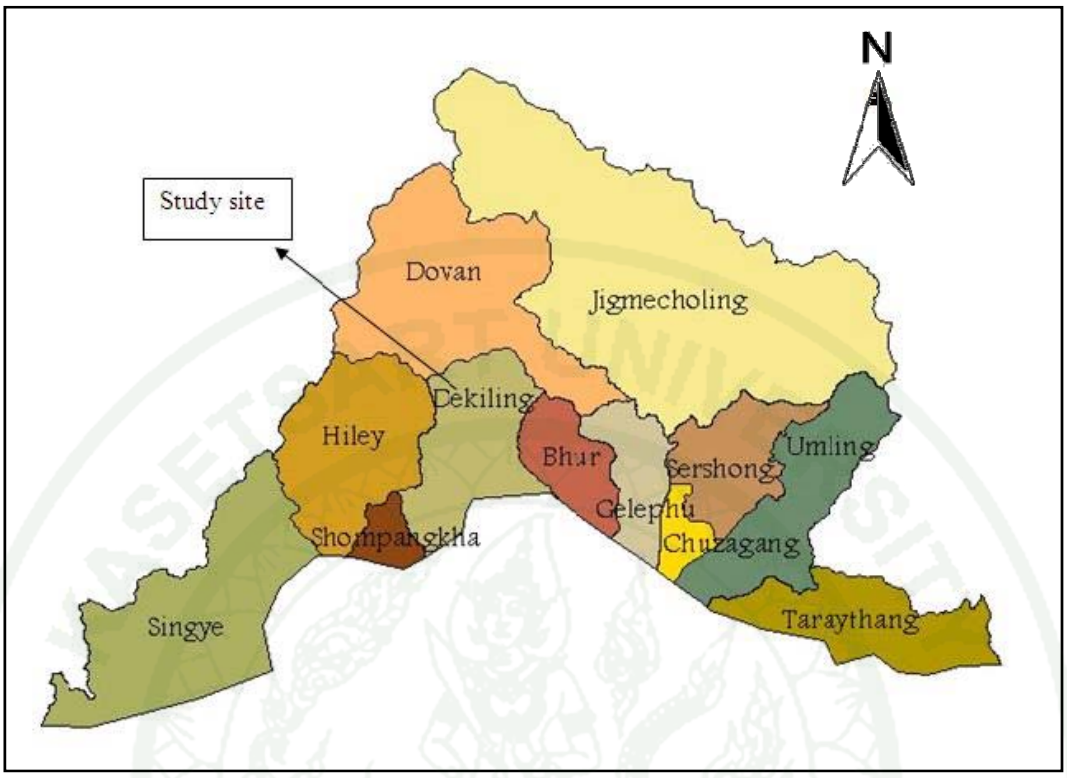

Figure 3 Map of Sarpang *Dzongkhag* showing study site (Dekiling *geog*)

The major chunk of the forests is unmanaged and they are normally termed as Government Reserve Forests (GRF) and administered by the Division Forest Office. They are outside any management regime and do not fall under protected areas, FMU and community forests. They are the main source of STRA and other required forest products. However, there are some plantation forests of *Tectona grandis, Shorea robusta* and other commercial species carried out by the Government in 1960s (Tshering, 2005) and they are restricted for SRTA.

Likewise, the forests areas stretching from Sershong geog to Umling/Taraythang *geogs* have been temporarily ban of timber felling due to the Royal decree passed in 1990's due to the heavy degradation and deterioration (RMNP, 2006). Today only few trees from the private land, wind-fallen and drift wood are being extracted. It has affected four *geogs* in timber allotment and they need to collect from other *geogs*. But very recently, some portion of these forest lands has

been handed over as community forests and other communities also expect to manage such land under the community forestry. Sarpang Dzongkhag has fourteen approved CF (Appendix Table C1 and Appendix Figure C1) and some CFs already use timber for rural house construction.

Sarpang Dzongkhag has only broad-leave forests and certain categories of the timber allotment options in the Forest and Nature Conservation Rule, 2006 like *cham, tshim, dangchug* are not available and allotments are limited to *drashing*/sawn timber. Subsidy on timber for the construction of rural houses enables people to build large houses. But unlike other parts of country, the rural housing in Sarpang *Dzongkhag* is little bit different as compared to those in eastern and western Bhutan. Majority of the houses are constructed with concrete single storied since it is located in hot and humid area. Moreover, the *Dzongkhag* is in the proximity to the Indian boarder and there is some influence over the cost of materials. Thus people prefer to construct concrete bungalow with traditional Bhutanese designs.

Selection of Study Site

Population of the study was local villages of Dekiling *geog* under Sarpang *Dzongkhag*. The unit of an analysis was the households (HH) in nine *chiwogs* of this *geog*. Dekiling *geog* was selected for this research based on its central location and mixed ethnic people from old and new settlement. Out of 651 HHs, 248 samples HHs were selected randomly. The study area fairly represented other *geogs* in the *Dzongkhag*. Dekiling *geog* is located in between Bhur and Shompangkha *geogs* on the either sides. The total *geog* area is 113.21 sq. km and population of 4,561. The geog has one approved community forest (Bumpaling CF) and another one (Dolpani CF) under process for establishment. In general, three aspects were focused; forests condition, timber supply (SRTA) and people's participation in forest management.

The demographic characteristics of the study site are as given in Table 3. The interview schedule considered randomly selected household and any individual/member to represent as interviewee (respondent to a questionnaire) for a

selected sample. Both male and female respondents were regarded and there was no limitation to the age-group.

Table 3 Description of sample population

Sl.#	Description	Number	Percent
1.	Population(no)		
	Male	1,053	49.30
	Female	1,083	50.70
	Total population	2,136	100
2.	Age (year)		
	<13year	518	24.25
	14-60year	1,475	69.05
	> 60year	143	6.69
3.	Average family size (no/hh)	3.30	
4.	Primary livelihood (hh)		
	• Agriculture	209	84.3
	• Livestock	4	1.6
	• Employment	23	9.3
	• Business	5	2.0
	• Others	7	2.8
5.	Farm labour (no)		
	Male	410	52.90
	Female	365	47.10

Note: no = number, hh = household

MATERIALS AND METHODS

Both qualitative and quantitative data were used in this study. Quantitative data were recorded through structured questionnaires while qualitative data were generated through focus group and key stakeholders' meetings. The analyses were performed separately for quantitative and qualitative data. Quantitative data were subjected to statistical analyses using statistical program (SPSS ver. 16) for descriptive, chi-square and correlation. Qualitative data were studied using Participatory Rural Appraisal (PRA) tools, SWOT and force-field analysis. The results of both approaches were compared and substantiated. The study was carried out at Dekiling geog under Sarpang *Dzongkhag* during April to June 2010. The schematic approach for the entire study is shown in Figure 4.

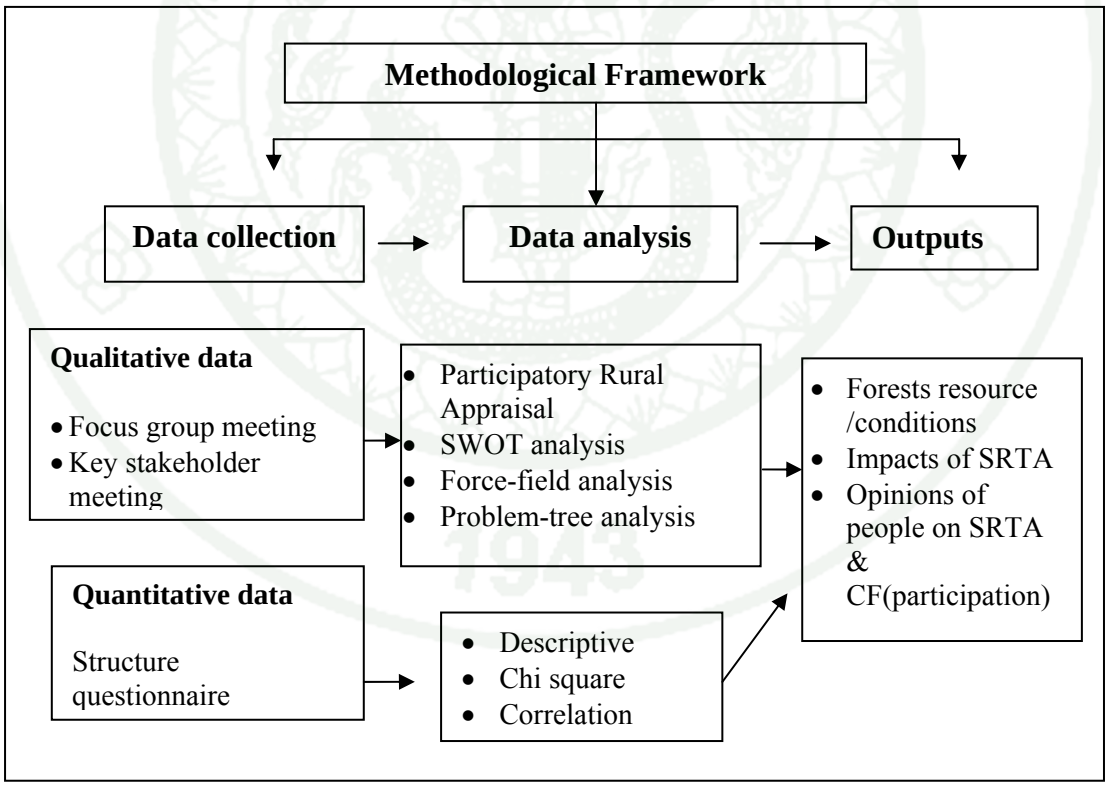

Figure 4 Methodological framework of the research

The research instruments used in this research are as outlined below;

1) Materials
2) Methods

The major portion of the study involved local people and there is not much sophisticated equipment applied in this study. Both quantitative and qualitative data were used in this research. The detail explanations are as given below;

Materials

The essential materials used are the complete list of the households in the *geog* and past records of timber allotment in all *geog*s under Sarpang *Dzongkhag*. During the data processing and analysis, SPSS is used to provide statistical analyses on the collected data. Other necessary materials used are as given below;

- Secondary data and information of the rural timber utilization (National reports and reports from Sarpang *Dzongkhag*)
- Policy documents on forest resources and sustainable forest management (Forest Acts, Policies, Rules and guidelines)
- Community forest management plans – Sarpang *Dzongkhag* and other relevant CFs

Methods

The data were collected separately for qualitative and quantitative approaches. Qualitative data were explored through two group meetings (focus group and key stakeholder's). The quantitative data was generated through structured questionnaires for three broad categories: forest resource, timber (SRTA) and people's participation (CF). The information gathered was supplemented and triangulated. Both qualitative and quantitative approaches were based on the people's opinions.

1. Qualitative Data Collection and Analysis

The main purpose of qualitative data collection is to help in understanding the existing situation better. It is also intended to serve as the basis to construct the questionnaires for quantitative data collection. Qualitative data were collected through focus group meeting and key stakeholder's meeting. Focus group used PRA tools (resource mapping, historical timeline), SWOT analysis and brain storming on problem identification. Key stakeholders meeting used force field analysis and problem tree analysis. The tools for qualitative approach served both for data collection and analysis. Qualitative and quantitative information generated were compared and triangulated.

1.1 Focus Group Meeting

The focus group meeting was conducted with *Geog Yargey Tshogdu* (GYT) members and executive CFMG committee members. The meeting was discussed using participatory rural appraisal (PRA) tools (historical timeline, resource mapping), SWOT (Strengths, weaknesses, opportunities, threats), identification of main problem and analyze its cause and effects (problem tree). The details are as given below;

1.1.1 Historical Timeline

Historical timeline was drawn to find out trends in policy; process and people's participation in local resource management and SRTA. The events since 1969 till date was gathered and presented in the chronological order (Appendix Figure D1).

1.1.2 Resource Mapping

Resource mapping exercise was carried out to understand the extent and condition of forests under Dekiling *geog*. The particular exercise was done

in four small groups and discussed intensively during the plenary session. Resource mapping was focused on following aspects;

- ✓ Availability and scarcity of forest resources
- ✓ Extend of protection (accessibility and restriction areas)
- ✓ Production area (plantations) for forest resources.
- ✓ Current sources of timber harvesting areas and
- ✓ Extent of pressure on forest resources from growing demand (within and outside *geog*).

The compiled version of the resource map drawn during the focus group meeting is shown in Appendix Figure D2.

1.1.3 SWOT Analysis

SWOT analysis was done on current system of SRTA policy. It was conducted by focus group and confirmed during the key stakeholder's meeting. The strengths, weaknesses, opportunities and threats regarding current SRTA policy and implementation were discussed. While strengths and weaknesses considered present internal matters, opportunities regarded external factors as influences to future change. The detail finding based on the discussion is shown below in Appendix Figure D3.

1.1.4 Problem Identification and Prioritization

The problems/constraints on current SRTA policy were identified through brainstorming sessions during the focus group meeting. All problems/constraints were listed randomly and three main problems/constraints were prioritized based on the severity. Appendix Figure D4 illustrates list of problems/constraints along with the prioritization of three most severe problems.

1.2 Key Stakeholder Meeting

The key stakeholders consisted of different expertise group (extension, park, territorial) services. The discussion on SRTA was basically to complement and crosscheck with the finding of focus group meetings. The following approaches were used:

a) Force-field analysis
b) Problem-tree analysis

1.2.1 Force-field Analysis

Force-field analysis is a general tool for systematically analyzing the factors found in complex problem. It studies factors support the status quo (hindering forces) and those pressures that support change in the desired direction (helping forces). In this study, the force –field analysis was carried out by key stakeholders to find out what makes SRTA remain status quo. The group discussed on helping and hindrance forces of SRTA towards the goal of ensuring proper rural housing and farm infrastructure development (Appendix Figure D5).

1.2.2 Problem Tree Analysis

This exercise was used to analyze the root causes of a problem and to identify the primary consequences. The main problem shortage of subsidized rural timber" identified and prioritized by focus groups were further studied to the causes and effects (Appendix Figure D6).

2. Quantitative Data Collection and Analysis

The personal interview was conducted for all sample households using questionnaires in Appendix F for quantitative data collection. Questionnaires were conceived from the findings of focus group meeting based on the practical

experiences. Therefore, questionnaire used in this study is valid and reliable. GFOs from nearby *geogs* (Hilly, Shompangkha, Bhur and Singhe) were deployed with brief induction training on the above questionnaires. The contents of the questionnaires were pre-tested before actual interviews. The details of quantitative data collection and analysis are as given below;

2.1 Quantitative Data Collection

Quantitative data collection was firmly anchored to three main components; forest resource conditions, SRTA and its implications and people's participation (CFs).

2.1.1 Forest Resources and Conditions

The first component (forest resources) was assessed with the help of third section of the structured questionnaires (forests). This component focused on the following contents; forest resource assessment, availability and dependency, causes of forest depletion and constraints and opinions on the existing forest conditions. The detail explanations are as given below;

Forest Resource Assessment

Forest resources was assessed for different forest products (timber and NWFP), source of collection (FMU, outside FMU, other *Dzongkhag*, CF and PF). The forest products were assessed at the individual household level.

Availability and Dependency

The forest product availability and dependency response were assessed to reflect the households' perception towards current status of forest resources at Dekiling *geog*. Availability (no, scarce, less than required, as required and more than required) and dependency (no, little, moderate, lot, alot) were noted on

the basis of response of sample households on availability status of forest product over 10 to 20 year over time. Score number is assigned to measure the availability status over time (abundant = 4, as required = 3, less than require = 2, scarce = 1 and no = 0). Similarly households rated their degree of dependency on the forest resources (0 = no dependency, 1= little, 2= moderate, 3= lot and 4=alot).

Cause of depletion and constraints

The causes here refer to what influence or created the problems or constraints of forests. Causes of depletion (increasing population, resource competition, lack of management plans, grazing pressures, weak law enforcements, open accessibility, illegal harvesting, natural disasters and forest-fire)were pre-identified and household survey marked seriousness of the causes of constraints/problems based on their opinions (no, little, moderate, high and very high).

Constraints of forests (shortage of timber, scarcity of NWFP, drying up of water sources, loss of species, Soil/land erosion, others) were included. The households rated perceptions on the degree of constraints/problems with (no, little, moderate, severe and very severe).

Existing Forest Conditions

Forest conditions were assessed based on the views of the households. The data were collected on following areas; forest area, vegetation (composition, species, structure and regeneration), soil/land resources, water resources and wild animals for decrease, constant and increase.

2.1.2 SRTA and its Implications

The second component was examined on the following aspects of SRTA; quantity and distribution of timber, impact of SRTA on rural housing,

sufficiency and demand of timber, assessment of attitude towards SRTA(Satisfaction and Perception; people's participation and sustainability).

Quantity and Distribution of Timber (Benefits of SRTA)

The data on quantity of timber (amount in cft) was collected for new/reconstruction and repair/extension. The distribution class of SRTA is grouped into four categories as per the amount of timber obtained from SRTA; none (no allotment), low (< 500 cft), moderate (501 – 1000cft) and high (> 1001 cft). Further, distribution of timber for different social groups (social status, CF membership) for the period of nine years (2001-2009) was collected from different HHs. Social statuses constitute of poor (34%), moderate (48%) and rich (18%) according to the income of households per month. Poor (< Nu, 3000/-), medium (Nu, 3001-10,000/-) and rich (>Nu, 10,001/-). Likewise, study site has one CF and sample household represented at least 8 percent of the CF members and almost 92 percent of non- CF members.

Impact of SRTA on Rural Housing

The impact of SRTA on rural housing was assessed for the types of house constructed (permanent, semi-permanent and temporary).

Sufficiency and Demand of Timber

The opinions of the people were studied for the sufficiency and demand. The sufficiency of timber was assessed for different group of beneficiaries for the sufficiency response (enough, not enough, unused timber). To further substantiate, assessment was made on the rationale for insufficiency of allotted rural timber. There were five possible reasons (requested only this much, rules didn't allow, obtained small-size trees, sold and loaned) identified and rated accordingly.

In addition, the demand of rural timber was considered in study for different purposes (new/reconstruction, repair/extension, other farm infrastructure). The cross-tabulation of demand of timber and different demographic characteristics (social status, houses owners, and membership of CF) was also included. The timber demands were made in standing trees as per the options reflected in legal entitlement. According, number of trees were converted to cubic feet (cft) using the conversion factors of Forest Resource Development Division (FRDD).

Assessment of Attitude towards SRTA

Attitude here refer to an opinion or general feeling of a members representing sample households about SRTA and CF. The attitudes of people such as satisfaction on SRTA and perception, sustainability of forest under SRTA, current people's participation in forest management and future rural timber supply were identified based on the results of the structured questionnaires. The attitudes of people were assessed according to the level of timber distribution through SRTA; not acquiring SRTA (none 16%), at least 11 percent received timber < 500 cubic cft (low), nearly 61 percent had been allotted moderate quantity of timber (501 – 1000cft) and almost 12 percent availed high quantity of SRTA (> 1001 cft).

a) Satisfaction and Perception

The level of satisfaction (strongly satisfied, dissatisfied, mixed feelings, satisfied, greatly satisfied) was explored. Perception on future rural timber supply from different alternatives (continue with present system of SRTA, replace by CF, to phase out completely, supply through NRDCL or purchase from commercial saw mails) were assessed to understand their preferences.

b) People's Participation and Sustainability

Participation here refers to the involvement of people in management of forests (protection and production) for sustainable management. The

level of peoples participation (no, passive, active) and sustainability of forest under current SRTA (Yes, No idea, No) was assessed. The attitude of peoples' participation towards existing SRTA policy was also collected from different social groups (occupation, social status, education and age groups).

2.1.3 People's Participation (CF)

The third component (people's participation) mainly investigated on the future level of people's participation in relation to local forest management. The opinions of the people were also assessed to find out their willingness and expectations for participating in CF.

People's Participation and Willingness in CF

Like an assessment of the attitudes of people on SRTA, opinions of people on community forestry were also assessed based on the categories of SRTA benefits (none, low, moderate and high). The attitude of peoples' participation towards future forest management was also collected from different social groups (occupation, social status, education and age groups). Further willingness (yes, no) of the people's participation on CF activities were assessed.

Expectation of Participation in CF

The people's opinion on their expectation towards participation was evaluated for various reasons (sustainability, benefit, production, income and protection).

2.2 Quantitative Data Analysis

Quantitative data were processed and analyzed using descriptive statistics and non parametric test (Chi square). The correlation (Pearson's product moment and Spearman's rank) were also used to determine the relation (Table 4).

Table 4 Statistical data analyses for quantitative data

Statistical Methods	Variables
Chi-square (χ^2)	Dependent variables: X = Benefits of SRTA Independent variables : Y1= Present level of people's participation Y2 = Opinions on sustainability of forests Y3 = Future level of people's participation
Spearman Correlation coefficient(r_s)	Opinions of people on the Dependency of timber (X) Vs Availability of timber (Y) *(High dependency Vs Less timber resources*) Type of house (X) Vs SRTA (Y) *(Quality and quantity of rural houses Vs SRTA)* SRTA (X) Vs Social livelihood (Y) *(Presence of subsidy Vs better housing)* People's participation Vs opinions on future timber supply *(Increasing community forests Vs increase timber supply from CFs)*
Pearson product moment correlation (r)	Population (X) Vs SRTA (Y) *(Increasing population Vs Declining timber availability)*

The equations of following statistical methods is therefore expressed as,

1.) Chi-square (χ^2)

$$\chi^2 = \sum_{i=1}^{n} \sum_{i=1}^{m} \frac{(O_{ij} - E_{ij})^2}{E_{ij}}, \quad df = (n-1)(m-1)$$

Where

$Eij = RC/G$

χ^2 = Chi-square

O = observed value

E = expected value

df = degree of freedom

n = number of row

m = number of column

2.) Spearman's rank correlation

$$r_s = 1 - \frac{b\sum d2}{n(n2-1)}$$

Where

d = different ranking number

n = number of sample

3.) Pearson's correlation coefficient

$$r_{xy} = \frac{\sum (X_i - \bar{X})(Y_i - \bar{Y})/(n-1)}{\sqrt{[\sum (X_i - \bar{X})^2/(n-1)][\sum (Y_i - \bar{Y})^2/(n-1)]}}$$

RESULTS AND DISCUSSIONS

The results are presented into two sections: qualitative and quantitative. While qualitative results are intended to help in setting environment for better understanding, quantitative results provide facts and figures. Accordingly discussions are made complementing each other through information triangulation under quantitative results.

1. Qualitative Results

The results from the qualitative data through focus group meeting and key stakeholder meetings are summarized as below:

1.1 Focus Group Meeting

Focus group meetings on historical timeline, resource mapping, SWOT analysis and identification of problem and prioritization yielded following results.

1.1.1 Historical Timeline

Timber subsidy existed since five decades ago without people's role in forest management. In general, people's participation in development programs was initiated through decentralization policy in the country. Despite initiation of different approaches to participatory forestry management (CF and PF), SRTA continued ever since its introduction in 1969.

1.1.2 Resource Mapping

Outputs of resource mapping depicted adequate forest areas with high potential for CF establishment. Currently local forests were said to have heavily pressurized from timber collection within and outside communities. Open accessibility forced local forests with inferior quality of trees, which cannot be used

for house construction. Source of timber for SRTA is only from natural forests and small pockets of government plantations are restricted for allotting to rural use.

1.1.3 SWOT Analysis

In SWOT analysis, weaknesses overshadowed strengths. Predominant strengths of current SRTA policy were affordable royalty (price) and open accessibility for timber collection. Strong legal support for SRTA also marked beneficiaries to obtain more timber. However, lack of roles in forest management developed complacent attitude and depended on government for everything. Timber harvesting was said to have done in ad hoc manner without any harvesting/management plans. The increasing demand attributed to shortage of timber and diversion of rural timber to commercial purposes

While opportunity of SRTA was largely attributing to the reduction of rural poverty through better housing, forest degradation was identified as a critical threat. Political interferences were spotted as another possible threat to further deterioration of local forests if SRTA is continued for political reasons. Further, uncertain future timber supply was foreseen as a biggest threat to sustainable forest management and chances of undermining national commitment of maintaining 60 percent of forest cover at all times.

1.1.4 Problem Identification and Prioritization

Three main problems prioritized among the list of problems and constraints were the shortage of timber, lack of people's participation and no proper management plan/harvesting plans for timber extraction under SRTA policy. The shortage of timber was mainly due to the increasing demand and open accessibility. People's participation was a setback since there is no encouragement of the involvement of people. Instead government controls resource allotment without any management plans and difficulty in monitoring SRTA.

1.2 Key Stakeholder Meeting

The results of the key stakeholder's meeting from two distinct tools (force-field analysis and problem-tree analysis) are as follows:

1.2.1 Force-field Analysis

Force-field analysis showed the SRTA remained status quo due to strong voices from elected people's representatives (*Chimis*) in the past. Rules pertaining to SRTA were often amended in favour of rural people. Obtaining timber almost for free and no obligation for receiving SRTA was noticed as powerful helping force for SRTA While lack of people's participation in management and misuse of SRTA was other way round, resistant to change subsidy policy helped to continue until now.

1.2.2 Problem Tree Analysis

Key stakeholder's meeting identified main causes of the problem (shortage of subsidized rural timber) as ever increasing demand, less production due to improper management plans and lack of people's participation in local forest management. The brief justifications are as presented below:

1. Increasing demand of timber subjected mainly due to the increase in population, rapid development and easily affordable due to heavy subsidy.

2. SRTA limited to natural forests and there is no production from plantations. Most of the natural forests are inaccessible and accessible areas are heavily pressurized. Present SRTA policy did not encourage tree-plantation and existing commercial plantations refrained for SRTA.

3. The current SRTA policy lacked proper management plans for timber harvesting. Ownership lies with government and local people do not bother to

manage them. Instead, open accessibility offer possibility to explore from other areas and ultimately add more problems to the scarcity of timber.

The above causes lead to the shortages of timber for SRTA and eventually results into following effects (increase illegal activities and continue poverty). Some rationale for these effects are as explained below:

1. When there is limited resources (shortage of timber), people compete indiscriminately for remaining trees and increase people-forest conflicts. In such process, illegal activities increase when legal opportunity fails to supply. Thus, mismanagement of the forests might over-rule and lead to unsustainable forest management.

2. Shortage of timber directly affects rural livelihood and there is a chance of continuing rural poverty. At this stage, guiding development philosophy of gross national happiness (GNH) would be greatly challenged. Lack of timber cannot afford to construct traditional houses and compromise cultural integrity. Likewise, environmental conservation would be thoroughly abused. Thus, all these problems could threaten SFM and undermine constitutional commitments of maintaining 60% forest cover at all times.

2. Quantitative Results and Discussions

The quantitative results are shown into three main sections. The first section illustrates general situations of forest resources to understand on the implications of SRTA towards sustainable forest management. The second section shows outcomes of SRTA, people's attitudes on current level of people's participation and sustainability of local forests. The last section portrays people's views on future participation in forest management and willingness to participate in CF.

2.1 Forest Resources and Conditions

The following outcomes are outlined under this section; forest products and sources of collection, the availability and dependency on local forest resources, people's opinions on forest conditions, causes of forest depletion and constraints.

2.1.1 Forest Products and Sources of Collection

Different forest products were found collected annually from local forest at the study site. In general, wood products were found extracted more including timber for construction, small-wood and firewood. It was observed that a household collected an average volume of 118.89 cft per year. The dominant forest products that extracted in the study area were firewood and small-wood. The detail forest products collected are shown in Table 5.

Table 5 Types and quantities of forest product collection

Sl.#	**Products**	**Units**	**Annual extraction (total)**	**Average per household**	**Standard unit**
1	Timber				
	-*Drashing* (standing tree)	Nos,	150	0.60	118.89 cft/yr
		cft	150	0.60	0.60 cft/yr
	- Sawn timber	cft		-	-
	- Logs				
2	Small wood	Nos,	1584	6.39	12.20/yr
3	Firewood	Backload	15553	62.71	5.64m^3/yr
4	NWFP				
	Bamboo	Culmns	905	3.65	3.65 culms/yr
	Mushroom	Kg	1984	8	8kg/yr
	Ferns	Bundle	4960	20	6.3kg/yr
	Thysanolaena sp. (broom grass)	Nos,	1240	5	10kg/yr
5	Grazing (Cattle)	hr	-	6	2190hr/yr

*n = 248

The assessment of product source indicated that the collection sources were mainly from outside FMUs for all the product types. The sources and types of products are as indicated below in Table 6.

Table 6 Sources of forest product collection

Forest Products	Source of forest product collection (%)					Total
	FMU	Outside FMU	Other *Dzongkhag*	CF	PF	
Timber	0.46	95.39	0.46	-	3.69	100
Smallwood	-	92.99	-	-	7.53	100
Firewood	-	67.23	-	10.92	21.84	100
NWFP (ferns, mushroom &bamboo)	-	51.02	-	10.20	38.78	100

* n = 248

2.1.2 The Availability and Dependency on Local Forest Resources

On an assessment of the opinions of people on availability and dependency on forest resources, result showed high dependency (a lot) for scarce resources. A case in timber is shown below in Figure 5.

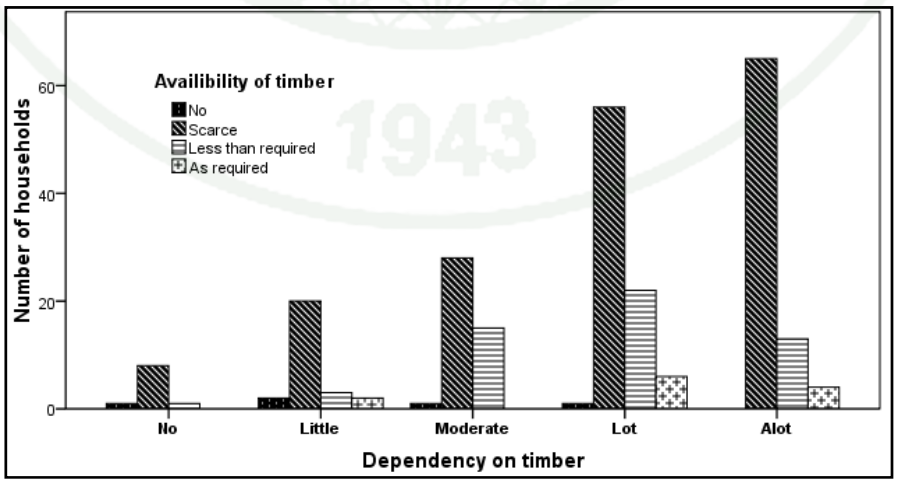

Figure 5 Opinions of people on the availability and dependency of timber

Chi-square test showed significant association between dependency of timber and availability of timber (χ^2 = 21. 533, p =0.043). High dependencies pose negative impact to the availability of timber resources and attribute to forests under pressure (Appendix Table E1).

Spearman's rank correlation also revealed negative correlation (r_s = -.135, P =.033) between timber from SRTA and availability of timber in local forests (Appendix Table E2). The result indicated more timber extraction through SRTA would have negative impact on the availability of timber.

2.1.3 Forest Conditions

Forest condition assessed through structured questionnaires noted decreasing trends of forest resources. In general, 58.7 percent of the households felt decrease in forest area itself including vegetation (composition, species, and structure), soil/land and water resources. At least 32.7 percent expressed constant particularly in terms of regeneration at the initial stage but difficult to get established. 8.6 percent perceived increase forest resources mainly due to the appearance of wild animals in the agricultural fields. The detail views of people on forest conditions are shown in Figure 6.

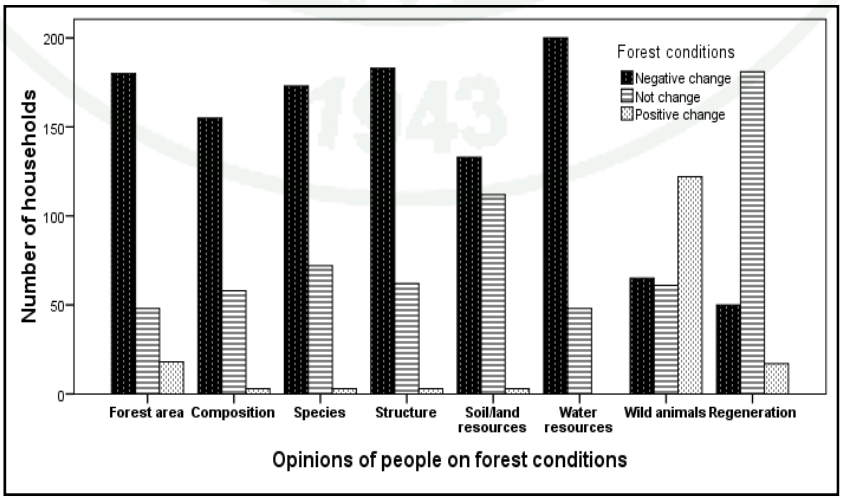

Figure 6 Opinions of local people on different aspects of forest conditions

2.1.4 Causes of Forest Depletion and Constraints

The evaluation of opinions on different causes of forest depletion and problems/constraints levels are shown in Table 7. The shortage of timber (36.18%) and drying up water source (27.64%) were ranked very severe while soil and land erosion (19.45%) and others (19.09%) were viewed as severe. Further in assessment of opinions on the cause and depletion, increasing population ranked high followed by open accessibility in very high category contributing 32.94 percent and 17.48 percent(Table 8).

Table 7 Perception of people on the constraints of forest resources

Sl.#	Problems of forest resources	Degree of problems of forest resources (%)				
		No	Little	Moderate	Severe	Very severe
1	Shortage of timber	5.68	17.34	7.15	22.57	36.18*
2	Scarcity of NWFP	35.37*	26.45	24.18	8.86	2.85
3	Drying up of water sources	3.06	8.24	13.31	20.14	27.64*
4	Loss of species	23.58	16.48	25.82*	9.89	2.85
5	Soil & land erosion	17.47	15.74	14.61	19.45*	14.87
6	Others	14.85	15.74	14.93	19.09*	15.61
	Total	100.00	100.00	100.00	100.00	100.00

*Major people's perception within the group

Table 8 Perception of people on the causes of forest depletion

Sl.#	Causes of forest depletion	Degree of causes for forest depletion (%)				
		No	Little	Moderate	High	Very High
1.	Increasing population	0.44	0.07	1.64	12.42	32.94*
2.	Resource competition	0.44	1.18	5.88	21.63*	17.08
3.	No management plans	2.41	4.74	17.17*	14.35	8.25

Table 8 (Continued)

Sl.#	Causes of forest depletion	Degree of causes for forest depletion (%)				
		No	**Little**	**Moderate**	**High**	**Very High**
4.	Grazing pressures	0.99	9.41	13.92*	12.42	11.83
5.	Weak law enforcement	0.55	8.82	18.49*	13.29	3.41
6.	Open accessibility	2.41	4.41	11.47	12.42	17.48*
7.	Illegal harvesting	14.24	23.90*	13.08	7.28	3.41
8.	Natural disaster	26.51*	25.94	11.47	3.36	3.41
9.	Forest fires	52.03*	21.53	6.87	2.85	2.20
	Total	100.00	100.00	100.00	100.00	100.00

*Major people's perception within the group

The relation between the family-size and quantity of timber allotment through SRTA was significant (r=-0.126, p=0.048). Thus, it indicates increasing population results to decrease in timber availability (Figure 7 and Appendix Table E3).

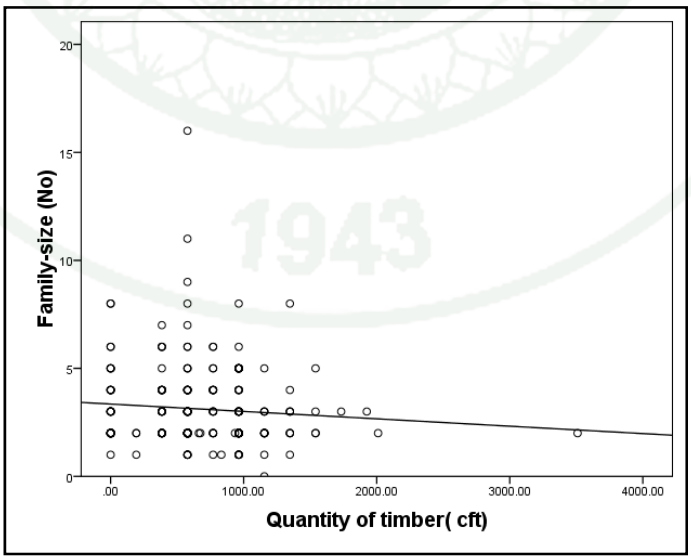

Figure 7 Relationship between family-size and quantity of timber under SRTA

Forests contribute an important role in rural communities for supplementing their subsistence agriculture farming. Ever since the decentralization of SRTA program to the *Dzongkhags* (2001-2009), around three quarters of the total households had been accessible to the subsidy timber. Annually, an average volume of 118.89 cft (3.37m^3) timber through SRTA was found extracted by a single household which is relatively lower than national average 259.67 cft (DoFPS, 2010b and RGoB, 2005). The low annual volume could be due to unavailability of timber in broadleaved forests. Further, commercial logging is ban in broad leave forest on the ground of low regenerative capacity in southern Bhutan (RGoB, 1974). However, at national level, it is estimated that very high level of timber subsidy is provided to rural house construction annually (DoFPS, 2010b). In general, rural population is highly dependent on local forest for timber and other resources.

People's opinion on the dependency on forest resources showed very high (alot) for the scarce resources. The similar views were reported by many of earlier authors (Chhetri *et al.*, 2009; Dhital, 2009; DoFPS, 2010b). The dependency and availability also showed significant correlation. People become more dependent when the resources are readily available. Similar views were expressed in earlier study on proximity of forest resources (Colfer, 1995). The result from this study also revealed that high dependency on nearby forest resources increases unavailability. The annual requirement of timber through SRTA far exceeded the annual production. The backlog of timber volume was reported to be 2,181,194 cft in Bumthang Dzongkhag alone (Dhital, 2009; DoFPS, 2010b). The main source of timber through SRTA is outside FMUs, thus resources are under tremendous pressure.

The assessment of forest product source from structured questionnaire and resource mapping indicated that the collection sources were mainly from outside FMUs for all the product types. At present the forest outside FMUs are poorly managed. The allocation of rural timber (SRTA) was reported as demand driven rather than consideration of silvicultural aspects (Schindele, 2004). With the assessment of current forest condition based on people's view, it was found declining in condition along with area, soil/land and water resources. More specifically,

vegetation (species, composition, structure) was found decreasing while constant regeneration was not able to establish due to anthropogenic pressure. On the other hand, more wild animals (rabbits, wild boar, elephants, and monkeys) were found appearing in the cultivated land. The appearance of wild animals to the cultivated areas was due to deterioration in natural habitat and food scarcity (Shaw, 1985). The outcome of both SWOT and force field analysis indicated no management or harvesting plan for resources outside FMUs.

Similar gaps in current systems of management outside FMUs were also realized earlier (FRDD, 2005). However, planning guidelines prepared specifically for the management of forest areas outside FMUs were found not materialized. Thus, evaluation of opinions on different constraints level, problem identification by focus group and problem tree analysis by key stakeholder's meeting showed very severe shortage of timber and other forest resources. The primary causes were identified mainly due to the increasing population and open accessibility to forest resources. The relationship between family-size and timber allotment through SRTA also confirmed statistically significant indicating increasing population results to decrease in timber availability.

In general, the current state of local forests resources are over-utilized and under managed with very low productivity leading to unsustainable practices. The various studies (Colfer, 1995; Harrison and Suh, 2004; Penjore, 2007; Zare *et al*., 2008; Ozturk, 2010) claimed local people dwelling nearby forests without their involvement in management have high possibility for degradation. Thus, the need of people whose livelihoods depend on the forest must be incorporated into sustainable forest management.

2.2 Subsidized Rural Timber Allotment and its Implications

Impact of SRTA to local community and assessment of attitude towards SRTA are two broad outcomes presented under this section.

2.2.1 Impact of SRTA to Local Community

Following details are explained under this section; quantity and distribution of timber through SRTA, impact of SRTA on rural housing, sufficiency and demand.

Quantity and Distribution of Timber through SRTA

On assessment of timber allotment through SRTA in study site, 85.03 percent of total quantity was used for new construction while 14.97 percent for repair/extension. Annually, a total volume of about 19,000 cft of timber was utilized altogether for new construction and repair/extension. The detail of quantity for new construction and repair/extension is shown below in Table 9;

Table 9 The allotment of timber through SRTA for the period of 2001-2009

Sl.#	**SRTA**	**Quantity(2001-2009)**		
		Converted into cft	**Quantity/yr**	**Percentage**
1.	New/re-construction			**85.03**
	-Drashing	136974.4	15219.38	
	- Cham	3183.75	353.75	
	-Tsim	338.94	37.66	
	- Dangchu	95.5	10.61	
	Sawn timber	300	33.33	
	Logs	-	0.00	
	Sub -total	**1,40,592.6**	**15621.40**	
2.	Repair/ Extension	24,761.52	2751.28	**14.97**
	Sub-total	**24,761.52**	**2751.28**	
	Grand total (1+2)	**165,354.10**	**18372.68**	**100**

The total quantity of timber distributed differently for two social categories (social livelihood and CF membership) was assessed. Timber distribution in social livelihood found all three groups (poor, medium, rich) were allotted with timber through SRTA in moderate (501-1000 cft) quantity level. However, high benefit level (>1000cft) was availed by lesser (17.70%) of rich section. While poorer section with higher representation (34.3%) availed lesser in high quantity level (Table 10).

The assessment of quantity level between member and non member of CF showed highest (78.95%) in moderate category by member of CF. In contrast, non member received lesser (59.39%) in moderate level and at least 17 percent of the non members had not even availed timber. Thus, irrespective of membership in CF, SRTA policy posed more pressure to local forest resources.

Table 10 Timber distributions through SRTA for social categories

Sl.#	Categories of People	Representation (%)	Benefit level (%)				Total
				Low	Moderate	High	
1.	**Social status**						
	Poor	34.30	22.35	9.41	57.65*	0.59	100
	Medium	48.00	12.61	15.13	62.18*	0.08	100
	Rich	17.70	13.64	4.55	63.64*	8.18	100
2.	**CF membership**						
	Member	7.7	5.26	5.26	78.95*	0.53	100
	Non-member	92.3	17.03	11.79	59.39*	1.79	100

* Majority of people within a group benefitted from SRTA. None, Low, Moderate, High indicate no allotment, < 500, 501 -1000, >1001,cft., respectively

Impact of SRTA on Rural Housing

The assessment of type of house constructed, 76 percent constructed permanent houses(mostly concrete house) and almost 14 percent built semi-permanent (*Dacha zhikhom* or ekra*)* houses (picture shown in Appendix Figure G1). Only 10 percent of the timber total timber were used for temporery structure(hut) (Figure 8).

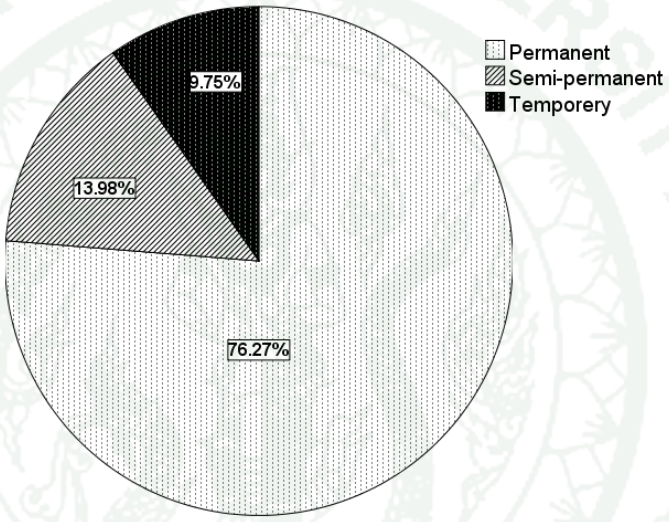

Figure 8 Types of houses constructed from SRTA

The correlation between the types of houses and SRTA showed positively significant (r_s = 0.125, p = 0.048) (Appendix Table E4). Increasing timber allotment through SRTA increases the quantity and quality of houses. Impact assessment of SRTA on livelihood also yielded a positive correlation ((r_s =.142, P =.026) (Appendix Table E5) with statistically significant. It indicated presence of timber supply (SRTA) attribute to better social livelihood.

Sufficiency and Demand

The evaluation of response on sufficiency of SRTA for different type of house constructed showed that all three categories (permanent, semi-permanent and

temporary) were in not enough level. Also, both member and non member of CF expressed the insufficiency with majority in "not enough" response level (Table 11).

Table 11 Assessment on sufficiency of timber from SRTA

Sl.#	Categories of timber distribution	Representation (%)	Responses (%) Sufficiency of SRTA			Total
			Enough	Not enough	Timber not used	
1.	**Type of house constructed**					
	Permanent	76.27	32.69	53.21*	14.10	100
	Semi-permanent	13.98	14.81	44.44*	40.74	100
	Temporary	9.75	17.65	35.29	47.06*	100
2.	**CF membership**					
	Member	7.70	22.18	61.09*	16.72	100
	Non-member	92.30	28.27	48.17*	23.56	100

* Majority of people within a group

Further assessment on insufficiency of allotted rural timber through five possible reasons identified and rated accordingly (Figure 9). Nearly 36 percent confessed that they had requested less themselves, around 15 percent informed that their applications were rejected due to the legal entitlement and inconsistency of proper details required in applying for SRTA. At least 2 percent was found sold and 1 percent loaned to neighbors. However, almost 47 percent reacted that allotted timber were not enough because of the felling of small trees due to inaccessibility.

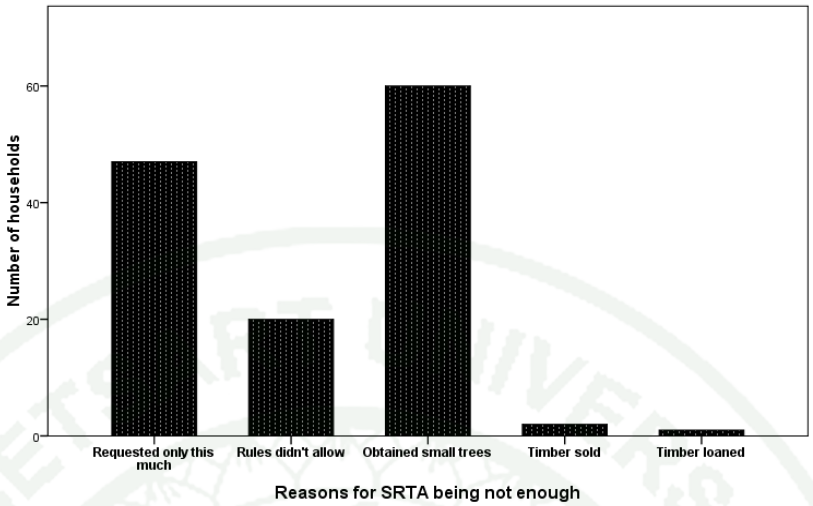

Figure 9 Reasons of the insufficiency of timber allotted through SRTA

The total demand from 248 sampled households amounted to 7, 08,848 cft for three construction types (new/reconstruction, repair/ extension and other farm infrastructure). About 67 percent of demand was for new/reconstruction, 23 percent for repair/extension and at least 10 percent for the other farm infrastructure (Table 12).

Table 12 Expected demand for rural timber supply within 25 years (until 2035)

Sl.#	Purpose of Timber Demand	Quantity		Percentage	Remarks
		Number of trees	Converted into cft		
1	New/re-construction	2424	476364	67	Average = 2858 cft/hh
2	Repair/ Extension	837	164487	23	
3	Other farm infrastructure	346	67995.9	10	
	Total	**3607**	**7,08,848**		

Remarks: 1 tree =196.52 cft (Conversion of timber based on timber calculator -FRDD, 2000)

The cross-tabulation of demand of timber and different demographic characteristics (social status, houses owners, and membership of CF) showed similar patterns of demands of timber within 25 years (Table 13). Almost all groups presented high demand (1001 to 3000 cft) ranging from 41.37 percent to 62.28 percent and at least three sub-groups; temporary house owners under types of house and CF members demand very high (above 3001 cft) with more than 50 percent.

On the other hand, there was no household from sub-groups; temporary/semi-permanent houses, high recipients of current SRTA and CF members not demanding timber within 25 years of time. In general, the response of all groups showed that the demand for timber in future would continue and increase.

Table 13 Relationship between demand of timber and demographic characteristics

Sl.#	Demographic characteristics	Rep.	Responses (%) Demand of timber(within 25 years)				Total
			No demand	< 1000cft	1001 to 3000 cft	>3001 cft	
1	**Social status**						
	Poor	34.30	4.71	3.53	56.47*	35.47	100
	Medium	48.00	1.68	0.84	57.14*	40.34	100
	Rich	17.70	2.27	-	50.00*	47.73	100
2.	**Houses owners**						
	Permanent	76.27	3.89	0.56	55.00*	40.56	100
	Semi-permanent	13.98	-	9.09	51.52*	39.39	100
	Temporary	9.75	-	-	47.83	52.17*	100
3.	**CF membership**						
	Member	7.70	-	-	47.37	52.63*	100
	Non-member	92.30	3.06	1.75	56.33*	38.86	100

*High timber demand

2.2.2 Assessment of Attitudes towards SRTA

Attitudes of people towards SRTA were assessed in relation to satisfaction, perception on future rural timber supply, current people's participation and opinions on sustainability of local forests. The details are as given below;

Satisfaction and Perception on Future Rural Timber Supply

The evaluation of satisfactory level for different beneficiary group showed that majority of the all groups (avg. 51.77%) had the mixed feelings (ok). About 38.16 percent of the beneficiary group was satisfied while only 3.07 percent were greatly dissatisfied. Among the group, only moderate group (1.99%) was strongly dissatisfied with the timber allotment through SRTA (Table 14).

Table 14 Level of satisfaction from timber allotted through SRTA

Benefits of SRTA	**Rep,**	**Satisfaction- timber allotment (SRTA)**					**Total**
		Strongly dissatisfied	**Dissatisfied**	**Mix feelings (Ok)**	**Satisfied**	**Greatly satisfied**	
None	16.13	0.00	2.48	75.02*	22.50	0.00	100
Low (<500)	11.29	0.00	10.72	46.41*	39.33	3.54	100
Moderate (501 - 1000)	60.89	1.99	5.96	47.68*	39.07	5.30	100
High (>1001)	11.69	0.00	6.93	37.98*	51.75	3.42	100
Average		**0.50**	**6.52**	**51.77**	**38.16**	**3.07**	

*Majority of households within the group

The views of SRTA and CF were analyzed with respect to future timber source. Majority of beneficiaries (55.83%) were for the replacement of SRTA by

CF, while 43.84 percent felt that current SRTA system should be continued. The other options such as purchasing timber from commercial sawmill and Natural Resource Development Corporation Limited (NRDCL) were not preferred at all. Although there is a majority of people favoring replacement of SRTA by CF, there is good portion of people supporting SRTA to be still continued. The detail is shown in Table 15.

Table 15 Perception of people on future rural timber supply

Benefits of SRTA	Rep,	Opinions on people on future rural timber supply			Total (%)
		Continue SRTA	Replace by CF	Phase out completely	
None	16.13	47.49	52.51*	0.00	100
Low(1-500)	11.29	39.33	60.67*	0.00	100
Moderate (501 - 1000)	60.89	43.70	54.97*	1.33	100
High(1001 and above)	11.69	44.82	55.18*	0.00	100
Average		43.84	55.83	0.33	100

*Majority of people opinions within a group

People's Participation and Sustainability

The study found positive relationship ($\chi^2 = 14.514$, $p = 0.024$) between present level of people's participation (Y) and benefits of SRTA(X) at significant level 0.05. The statistical test confirmed no or very little presence of people's participation in SRTA (Table 16). Majority of households with 87.09 percent responded no participation in current forest management govern by SRTA policy. At least 5.65 percent responded passive participation and 7.26 percent was said to be actively participating in SRTA towards SFM.

Table 16 Current Level of people's participation under SRTA policy

Present Level of Participation (Y)	Benefits of SRTA (X)				Total (%)
	None	Low (1-500)	Moderate (501 - 1000)	High (1001 and above)	
1. No participation	38	24	130	24	216 (87.09%)
2. Passive participation	1	1	10	2	14 (5.65%)
3. Active participation	1	3	11	3	18 (7.26%)
Total	**40**	**28**	**151**	**29**	**248**

Chi-square (χ^2) = 14.514*, df = 6

Similar opinions were observed in all categories of people; occupation, social status, education and age groups towards present level of participation (Figure 10).

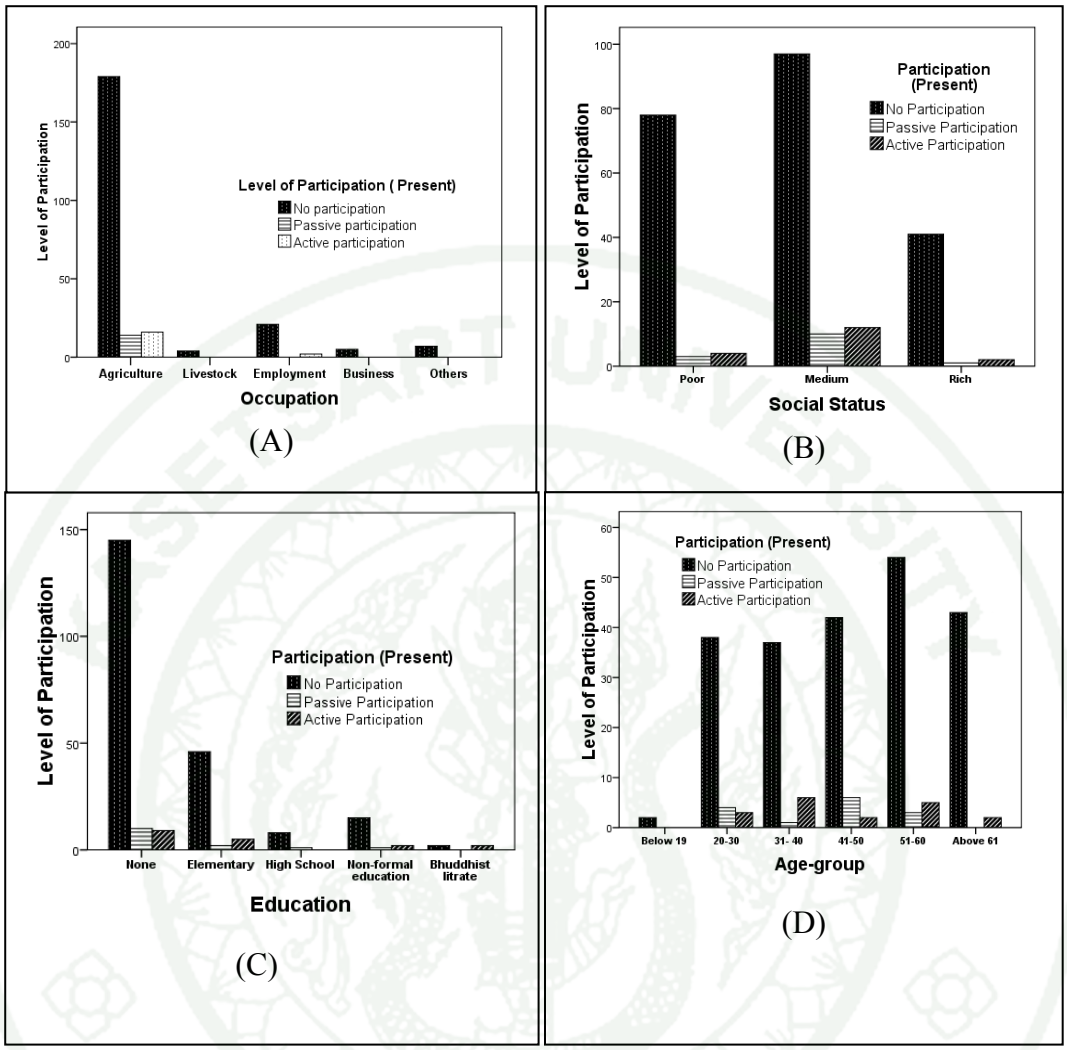

Figure 10 Perception from different groups of people on current level of participation; Occupation (A), Social status (B), Education (C), Age-group (D),

In assessment of people's opinion on the sustainability of forest, almost 87.90 percent expressed that current forest cannot sustain at all (Table 17). While 8.87 percent had no idea about sustainability and very negligible (3.23%) were with the notion that current forest can sustain.

The statistical test also found association (χ^2 = 42.372, p = 0.001) between benefit of SRTA (X) and opinions of sustainability of forests under SRTA policy at the statistical level 0.001. Although rural people have the opinions of forests to be not sustainable, there is huge demand for timber from SRTA.

Table 17 Opinions of people towards sustainability of forest under SRTA policy

Sustainability of forests under SRTA policy(Y)	Benefits of SRTA (X)				Total (%)
	None	Low (<500)	Moderate (501 - 1000)	High (>1001)	
1. Yes	2	0	2	4	8 (3.23%)
2. No idea	3	4	13	2	22 (8.87%)
3. No	35	24	136	23	218 (87.90%)
Total	**40**	**28**	**151**	**29**	**248**

Chi-square (χ^2) = 42.372**, df = 6

Timber supply through (SRTA) emerged as major forest resource being extracted. The impact of the SRTA was found positive on the rural livelihood. Both housing quality and quantity has been improved for all social status (poor, medium and rich) since SRTA was started. The use of timber as housing materials was reported high in rural areas (National Statistics Bureau, 2007) where SRTA is only the source of timber. Quality house has direct implication on rural poverty. Traditional rural houses are timber intensive. Thus, SRTA undoubtedly contributed to overall poverty reduction (36.3% in 2000 to 23.2% in 2007) (PCS, 2007 and GNHC, 2009). The need of timber is inevitable and it cuts across every society.

High volume timber was found extracted by rich group. The diversion of rural timber was conceived as deflection from intended purposes. The current SRTA policy (ACC, 2009; DoFPS, 2010b) mentioned the diversion of rural timber to unintended purpose as one of the demerits. However, there was only negligible quantity observed deflected through loan or sale in the further assessment at the study site. The study also uncovered low volume of timber extraction by poorer section. The possible reasons for low extraction could be due to high timber processing cost,

inaccessibility and unavailability. Similar evaluation of timber quantity through SRTA between member and non member of CF showed higher quantity availed by member of CF. As per DoFPS, rural timber requirement for CF member has to be met from CF to the extent possible(RGoB, 2006). The historical timeline explicitly displayed the parallel existence of duo (SRTA and CF) although the SRTA policy has become obsolete and redundant in contemporary context.

The evaluation of response on sufficiency of SRTA for different groups of beneficiaries expressed "not enough". In problem tree analysis, shortage of timber was caused mainly by increasing demand, less timber production, and lack of proper management/harvesting plans for SRTA. The similar findings were also reported earlier where the need for alternative sources such as supplementing bamboo as the construction materials and exploration import of timber from India was emphasized (Dhital, 2009). The timber for SRTA is highly dependent on natural forests only. The scarce timber resource in the proximity has lead to extraction of small-sized trees and cause insufficiency as revealed by successive assessments.

With increasing rural construction activities, demand assessment for next 25 years was found high. However, subsequent investigation revealed an average requirement of 2,858.26 cft per household which is much lesser than the maximum ceiling (4000cft) of log volume in SRTA. Likewise, several studies of AHL in CF and legal entitlement also reported that entitlements was much higher than actual demand (Phuntsho and Sangye, 2006; Wangchuk, 2008; Wangdi, 2009). SRTA was described as an ad hoc and demand driven rather than considering sound scientific study (Schindele, 2005). In addition, Statz *et al.* (2007) pointed out that SRTA entitlements are guaranteed with legal policy. The high demand backed by legal policy was seen as a threat to sustainability. Hence, rationalization of legal entitlement through scientific study on production capacity of forest resources may have positive impact towards sustainability in distant future.

Despite providing high subsidy on rural timber, more than 50 percent expressed mixed feelings although 37.9 percent of the beneficiary group was satisfied.

The mixed feelings could be linked directly to scarce resources within reach. Out of three allotment options (standing trees, sawn timbers, logs) for SRTA, a great majority prefer standing trees due to low processing cost. However, requirement of timber failed to meet demand due to declining forest conditions in nearby settlements. Moreover two other sources for SRTA are less preferred because of unavailability and un-affordability. Perhaps a lengthy formal procedure for SRTA was felt as another major cause of dissatisfaction among beneficiaries as reflected in SWOT analysis. The long process for SRTA was described as harassment although system intended to maintain check and balance for reducing misuse of subsidy timber (Penjore, 2007). Thus, rural timber supply may have to optimize for better social livelihood and environmental conservation as well.

SRTA is currently seen as a benefit without any management obligations. The fear for contribution and obligation in CF also hold on people's opinion towards continuation of SRTA. In this study, opinions of people on probable sources of future rural timber supply centered round the need for both CF and SRTA. While more than 55 percent opted to replace SRTA by CF, almost 44 percent felt that current system be continued. It may be wrong to assume that all 44 percent lot is unaware on CF. Most of the current approved CFs as of now were heavily degraded forest which needed much attention for restoration(Samcholing Community Forest,2004). Some CFs were oriented towards meeting different objectives such as income generation and land/water resource management. Emphasis on fear to meet the demand from existing degraded CF also stick people's mind on SRTA. In addition, SWOT and Force-field analysis also listed political interference as major threat to paradigm shift of new interventions. For example, strong support from people's representative (*Chimis*) in the past went in favor of subsidy with series of amendments of rules.

Conversely only negligible percent (0.81%) felt the need to phase out SRTA completely without any replacement owing to the reasons of sustainability. Moreover, two other options (timber supply through commercial sawmills and NRDCL) were not preferred at all because of high price, transportation cost and non-

availability of those facilities in many places. However, role of general people is no were reflected and encouraged in the SRTA policy. The forest resource management is need in of strong political will of government and responsibility of people (Penjore, 2007 and Dhital, 2009). Thus, lack of people's participation in current SRTA policy put forward the question of sustainability.

2.3 Community Forestry and Participation

This section presents following outcomes of community forestry in relation to the people's participation. First, assessment of future levels of participation in local forest management. Second, views on willingness of the people's participation in community forestry activities and lastly expectation of people's participation in CFs.

2.3.1 People's participation and Willingness in Community Forestry

Around 88 % of total beneficiaries expressed the needs and interest for active participation in future. At least 3 percent of the total households surveyed were not interested in future participation (Table 18). Specifically, while more than 87 percent of none current beneficiaries felt participating in future forest management, more people (50%) from high beneficiaries showed little less interest for future participation. In general, majority of all levels of beneficiaries felt the need to participate in local forest management.

The statistical test also found relationship (χ^2 = 14.514, p = 0.024) between future level of people's participation (Y) and benefit of SRTA(X) at 0.05 significant level.

Table 18 Future level of people's participation in local forest management

Future Level of People's Participation(Y)	Benefits of SRTA (X)				Total (%)
	None	Low (<500)	Moderate (501 - 1000)	High (>1001)	
1. No participation	2	0	2	4	8 (3.23%)
2. Passive Participation	3	4	13	2	22 (8.87%)
3. Active participation	35	24	136	23	218 (87.90%)
Total	**40**	**28**	**151**	**29**	**248**

Chi-square (χ^2) = 14.514*, df = 6

Similar opinions were observed in all categories; occupation, social status, education and age groups towards future level of people's participation (Figure 11).

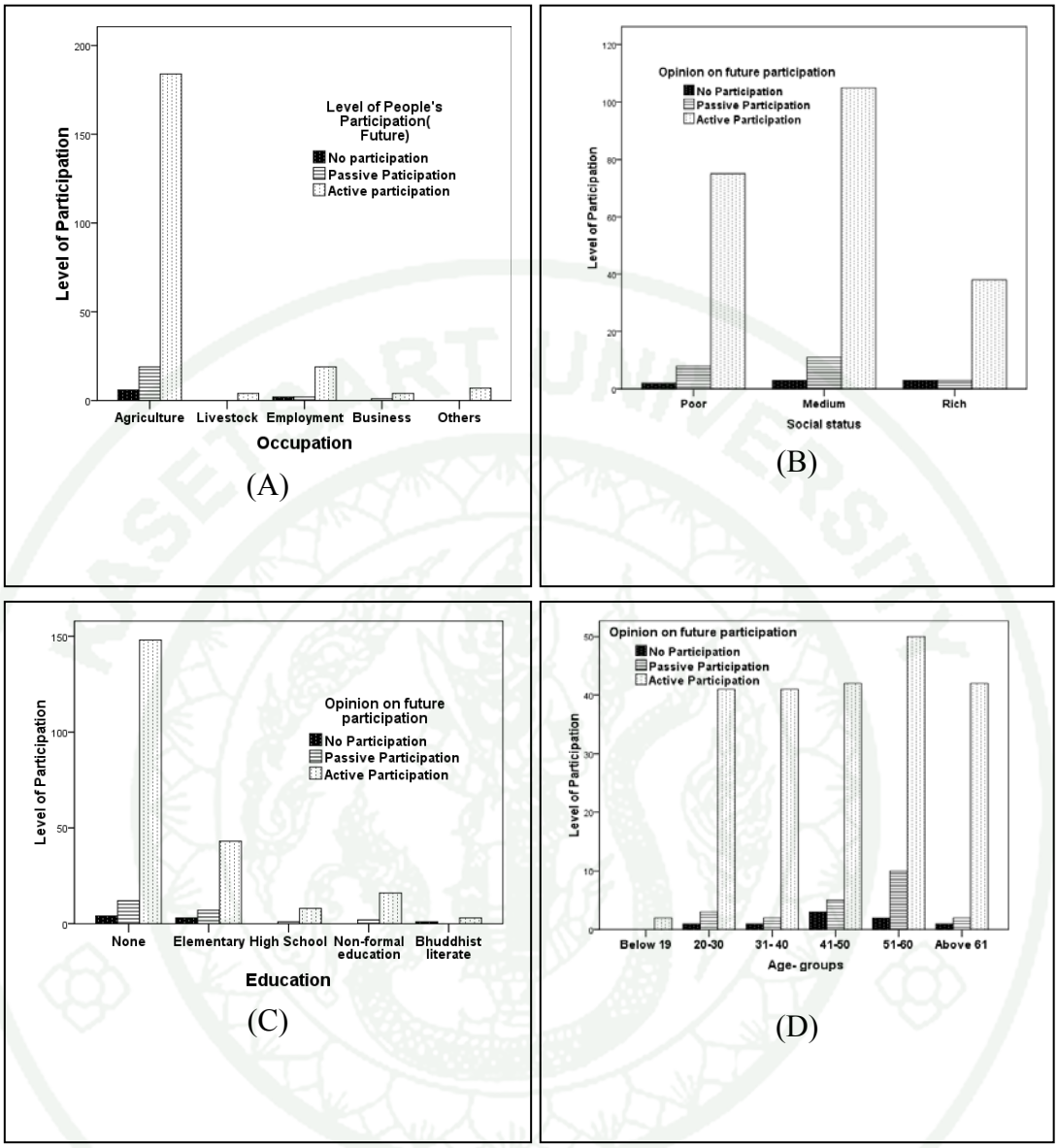

Figure 11 Perception from different groups of people on future level of people's participation; Occupation (A), Social status (B), Education (C), Age-group (D)

It can be inferred from opinions of people on willingness for participation that around 77 percent of the households would participate in community forest management activities; planning, decision-making, protection, production, benefit sharing, cost sharing and monitoring (Figure 12). Among all these activities, it was clear that benefit sharing cannot be avoided at all. At least 23 percent are resistant in involving in CF activities like planning, decision-making, cost sharing, protection and monitoring.

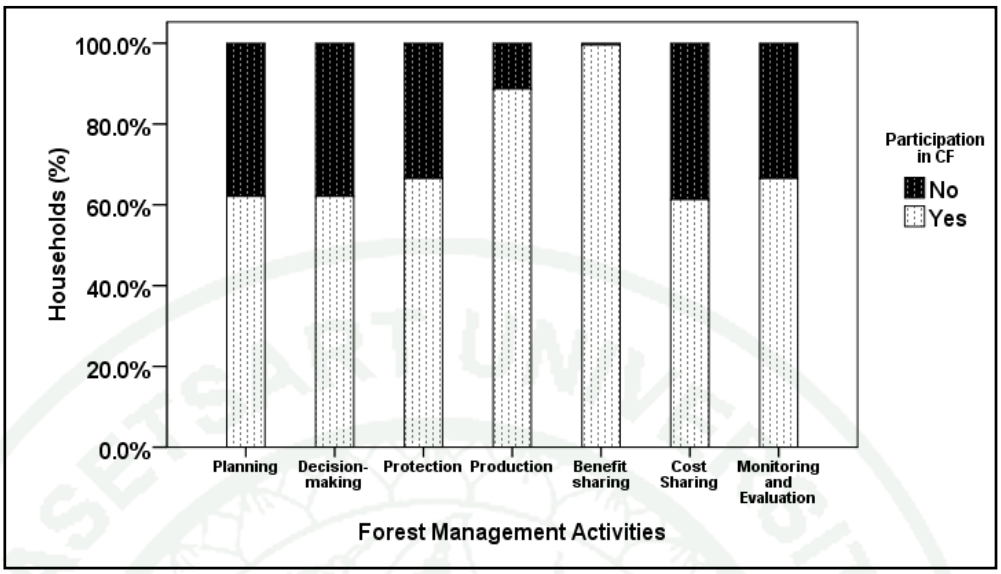

Figure 12 Assessment on willingness of people to participate in CF activities

2.3.2 Expectation of Participation in CF

It was found that almost 61 percent of the beneficiary had the expectation to participate in CF programs (sustainable forest management) (Figure 13). Nearly 26 percent of the respondents expressed that they would join CF to improve the productivity as well as protecting degraded land and water resources. Income generation was also an expectation for about 6 percent of the households while around 6 percent of the households expect sharing of benefits (timber and NWFP) after participating in CF programs.

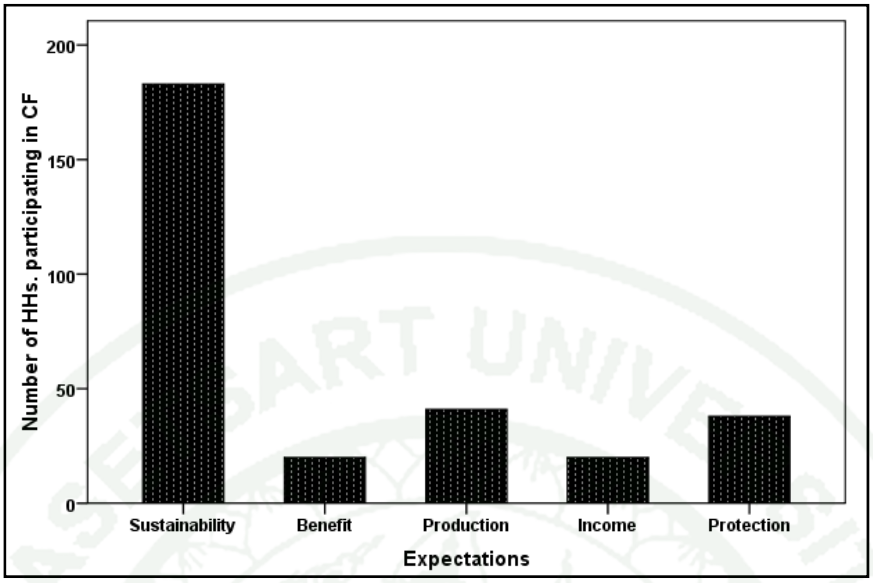

Figure 13 Expectation of people from participating in CF

Statistical test also prooved significant(r_s =.170, *P* =.007) and there is a positive correlation between the level of people's participation and opinion on future timber supply (Appendix Table E6). It indicates that increase in people's participation in forest management would increase in supply of rural timber from CF**.**

His Majesty, Fourth King of Bhutan said, "Peoples participation is the key to conservation and utilization of forest resources" (Namgyel, 1996 and Chhetri *et al*., 2009). The study confirms lack of participation which was expressed by almost 90 % of the beneficiaries. Different demographic variables considered in this study for participation responded to lack of beneficiary's role. Probably, the existing ownership of forest resources with government and no encouragement of people's participation make them more dependent. Thus, local communities are in devoid of sense of belongingness for locally available resources. The involvement of forest dependent localities is inevitable for sustainability (Colfer, 1995; Penjore, 2007; Zare *et al*., 2008; Chhetri *et al.,* 2009 and DoFPS, 2010a).

With reference to Arnstein's ladder of participation, the current participation in SRTA can be compared to first rung (Arnstein, 1969). It is "non-

participation" or level of very weak participation. The “non participation” level corresponded to passive participation in IIED typology of participation (IIED, 1994). The poor participation may be due to lack of opportunity in present context. Thus, a lot of manipulation and therapy are required, that may include the changes in policy itself or resorting to alternatives towards reaching “self mobilization”. It is the highest level where the local people are empowered for decision making arenas or managerial power. As a legitimate and ultimate guardian of local forests, best management lay in the hands of local community.

Sustainability can be defined as the developments that meet present need without compromising future quality of life. The present level of participation could be a threat for sustainability. The view on awareness of forest sustainability with present level of degradation was assessed. Almost 88 percent of the beneficiaries’ responded current cannot sustain under SRTA policy. It was evident from huge accumulation of timber volume for supply. The scarcity of timber within vicinity due to rapid extraction was the major cause. The open accessibility for the resources was also found to accelerate degrading which was in consistent with previous results (Turkelboom *et al*., 2001). The nationalization of forest resources led to loss of customary rights (Giri, 2004). The reverse trend from nationalization to decentralization would encourage participation and revival of customary posts and institutions. The devolution of resource rights to the grass root level has positive impact to sustainability. Considering the importance and genuineness for social livelihood development and environmental conservation, community forestry is contemporary intervention addressing the issues with lasting solutions.

Westoby (1987) defined that forestry is not about trees, it is about people. And it is about trees only as trees can serve the needs of people. Thus, managing resources is about managing people. The concept of people’s participation is not new in Bhutan. It existed from very early days. Although the participation has declined in general at community level, some form of strong participation is still seen in rural Bhutan (Dorji, 2003). It is mostly related to sharing and helping each other in any social activities which indicated strong sense of community feelings or cohesions.

The success of the association is largely determined by adhesion among the members. As suggested by several studies (Gilmour and Fisher, 1991; Chhetri *et al*., 1993; Jackson and Ingles, 1995; Malla, 2000; Egan *et al*., 2002; Gilmour *et al.,* 2004; Temphel and Bukeabum, 2006; Wangdi and Tshering, 2006; Chhetri *et al*., 2009 RGoB, 2010a), people's participation in community forestry is the better form of local forest management.

More than two decades of successful community forestry experiences in Bhutan inspired many people to take part in local forest management. More people are willing to participate in community forestry. With gaining further awareness and publicity, local people found that people's participation would ultimately increase assurance for future timber supply. Around 88 percent of the total beneficiary expressed the need and interest for active participation in future. The main idea behind their willingness was restoration of deteriorated local forest conditions. In the same way, obtaining ownership rights for the local forest was another opinion. The sharing of benefits received little attention although it is the main driving force (Figure 13). Currently, there are 259 community forests covering an area of about 31,334 hectares (77,082 acres managed by total of 12,546 households (SFD, 2010). With more than 72 percent of country's forest cover, there is huge potential for development and increasing number of CF. However, the current rural timber supply through SRTA may be detrimental to establishment of community forestry in Bhutan (DoFPS, 2010a).

In summary, CFs not only builds strong social capital but also instills a great ownership sense for local forests towards economic development and environmental conservation. The benefits of community forest were found immeasurable. The current SRTA was not favored due to lack of people's participation and therefore the unsustainable use of forest resources. The results of this study favored community forestry in many ways for sustainable forest management. Thus, overall well being of the people would be enhanced not only at local level but also globally in this era of rapid resource degradation.

CONCLUSION AND RECOMMENDATIONS

Conclusion

In general, forests play very important roles in enhancing social livelihood of rural people in Bhutan. The findings from this study can be summarized as follows:

1. The current state of local forests resources are over-utilized and under managed with ever increasing demand from growing population.

2. The SRTA policy had immense impact on rural livelihood status improvement although majority of the households were not satisfied.

3. People's participation neither existed nor encouraged in sustainable forest management under SRTA policy.

In brief, the impact of SRTA to the rural housing cannot be denied. Current SRTA unfortunately greatly compromised sustainability of forest resources. Participation of local people was overlooked. Local community, the best guardian of local forest remained deprived and handicapped in exercising of their role. CF has potential to deliver both sustainable management and secure livelihood for rural community. Sustainability can be best achieved when current "*resource users"* is transformed to "*resource managers"*.

Limitations of the Present Study

The study considered opinions of the beneficiaries and views of professionals' knowledge and experiences. Analysis based on memory for quantitative data was main limitation in this study. Since study was conducted in particular location (Sarpang), subsequent induction might have suffered a bit of inaccuracies in generalization.

Recommendations

Based on the above conclusions, the following recommendations are suggested.

1. Since community forests are governed by proper management plans and silvicultural norms, CF is appropriate for local forest resource management.

2. In order to continue improving social livelihood status and to maximize people's satisfaction, SRTA needs to be gradually replaced by community forests.

3. People's participation needs to be encouraged along with ownership rights and responsibility for sustainable forest management at all levels.

Suggestions for further study

Replication of the study with different social and cultural characteristics in other regions of the country could generate a wider perspective concerning sustainable rural timber supply. Further study on NWFP (including sand and boulders) would also be an alternative in terms of exploring rural timber through successful income generation from community forests in Bhutan.

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APPENDICES

Appendix A

Subsidized Rural Timber Allotment (SRTA)

Appendix Table A1 Entitlement of SRTA for new/re- construction of rural house

Option	Type of timber	Quantity(per hh)
A.	Sawn timber form	2,500 cft
B.	Log form	4,000 cft
C.	On standing tree basis	
i.	Trees (Girth 4'1" & above) for Drashing	8 Nos or 10 Nos
ii.	Trees (Girth 4'1" & above) for shingles	5 Nos
iii.	Cham sized trees (Girth 3' to 3'11")	80 Nos
iv.	Tsim (Girth 1' to 2')	80 Nos
v.	Dangchung (Girth below 1')	100 Nos

Source: Royal Government of Bhutan (2006)

Appendix Table A2 Entitlement of SRTA for repair/renovation/extension of rural house

Option	Type of timber	Quantity
A.	Sawn timber form	650 cft
B.	Log form	1000 cft
C.	On standing tree basis	
i.	Trees (Girth 4'1" & above) for Drashing	3 Nos
ii.	Cham sized trees (Girth 3' to 3'11")	10 Nos
iii.	Tsim (Girth 1' to 2')	15 Nos
iv.	Dangchung (Girth below 1')	20 Nos
v.	Trees (Girth 4'1" and above) for shingles	5 Nos

Source: Royal Government of Bhutan (2006)

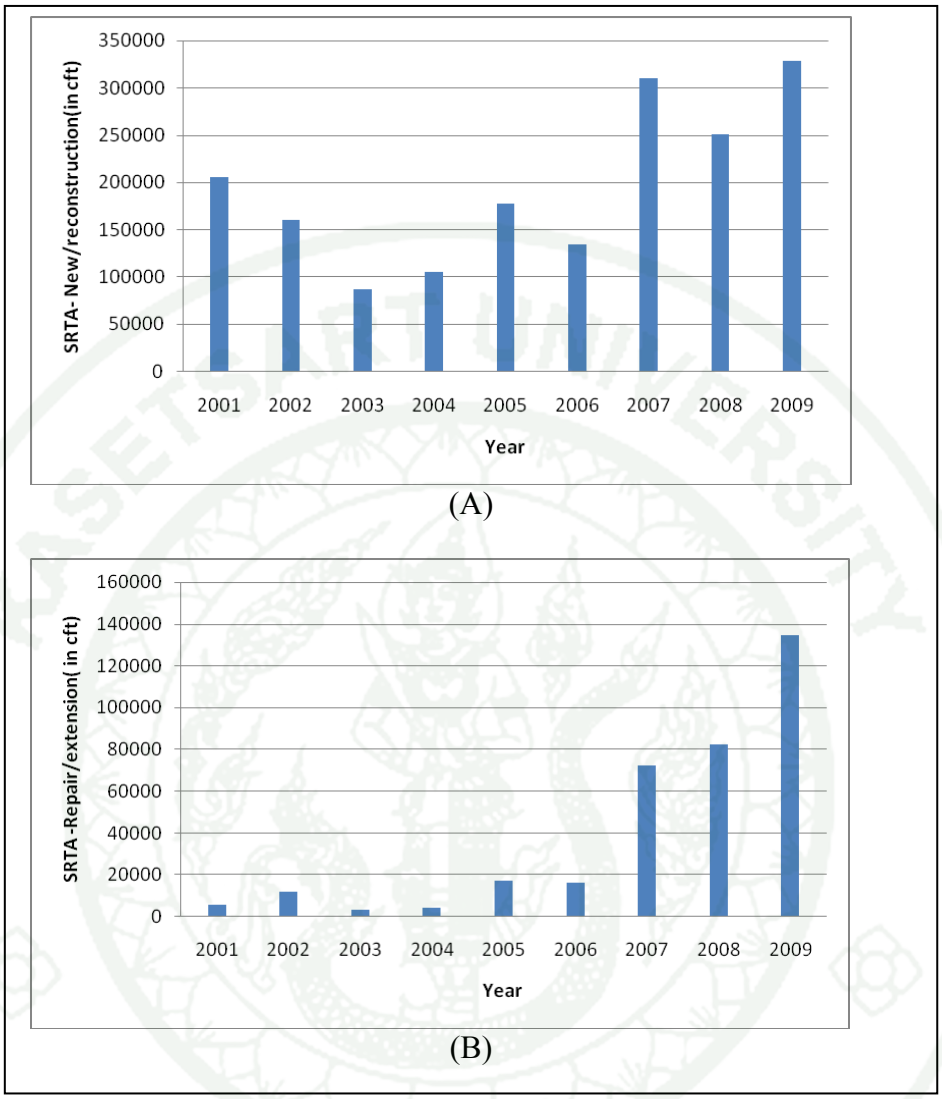
Appendix Table A3 Royalty rates applicable on timber for rural house construction

Sl.#	Type of timber	Girth	Rate
1	**Volume basis**		
a	Sawn timber		Nu. 1/-per cft
b	Logs		Nu. 0.80 per cft
2	**Standing tree basis**		
a	Trees	4'1" and above	Nu.40/- per tree
b	*Cham*-size tree	3' to 3'11"	Nu.30/- per tree
c	*Tsim*	1' to 2'	Nu.12/- per tsim
d	*Dangchug*/poles	Below 1'	Nu. 4/- per D/chu

Source: Royal Government of Bhutan

Appendix Table A4 Change in forestry laws/rules for public benefits

Sl#	Changes	Forest policy 1974	F&NCR, 2000	F&NCR,2006
1	Options for allotment	No option	No options for logs but added sawn timber	3 options provided to opt for 1 – standing trees/sawn timber/logs
2	Time period	Not specified	- Maximum 2 years valid permit (standing trees) - No specific time for allotment - 30 years interval for new construction	- Maximum 3 years valid permit(standing trees) - streamlined with specific time period - 25 years interval to avail new quota
3	Royalty	<u>Coniferous</u> 1 to 50 Nu. 2/- per tree 1 to 75 Nu. 3/- per tree 76 to 100 Nu. 5/- per tree above 100 Nu. 101- per tree <u>Others</u> 1 to 10 Nu. 201- per tree 11 to 20 Nu. 55/- per tree	As per classification- eg:- Nu, 120/- for broad leave Drashing	No classification- Nu, 40/- for both
4	Quantity (Maximum ceiling)	-100 nos, coniferous - 20 others	<u>New construction</u> -2000 cft sawn timber or - 8 drashing,80 cham, 80 tsim & 100 dangchu or - 4500 cft	<u>New costructon</u> - 2500 cft sawn timber or - 10 drashing,80 cham, 80 tshim, 100 dangchu or 4000 cft logs
5	Granted for repair/extension	No distinction of allotment	Granted for two distinct occasions- repair & new construction	Granted for two distinct occasions – repair & new construction



Note: Timber allotted for new/re-construction (2001-2009) (A) and timber allotted for repair/extension (2001-2009) (B)

Appendix Figure A1 Supply of timber through SRTA under Sarpang *Dzongkhag*

Source: Dzongkahg Forestry Sector (2010)

Appendix B
A typology of participation (IIED)

Appendix Table B1 A Typology of participation (IIED)

Typology	Characteristics of each Type
1.Passive Participation	People participate by being told what is going to happen or what has already happened. It is a one-sided announcement by an outside agency without any listening to people's responses. The information being shared belongs only to external professionals.
2. Participation in Information Giving	People participate by answering questions posed by outsiders using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research are neither shared nor checked for accuracy.
3. Participation by Consultation	People participate by being consulted, and outsiders listen to views. These outsiders define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making, and outsiders are under no obligation to incorporate people's views.
4. Participation for Material Incentives	People participate by providing resources, for example labour, in return for food, cash, or other material incentives. Much on-farm research falls in this category, as the farmer provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
5. Functional Participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of outsider-initiated social organizations. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on outsiders, but may become self-dependent.
6. Interactive Participation	People participate in joint analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes. These groups take control over local decisions, and so people have a stake in maintaining structures or practices
7. Self-Mobilization	People participate by taking initiatives independent of outsiders to change or develop systems. Such self-initiated mobilization and collective action may or may not challenge existing inequitable distributions of wealth and power.

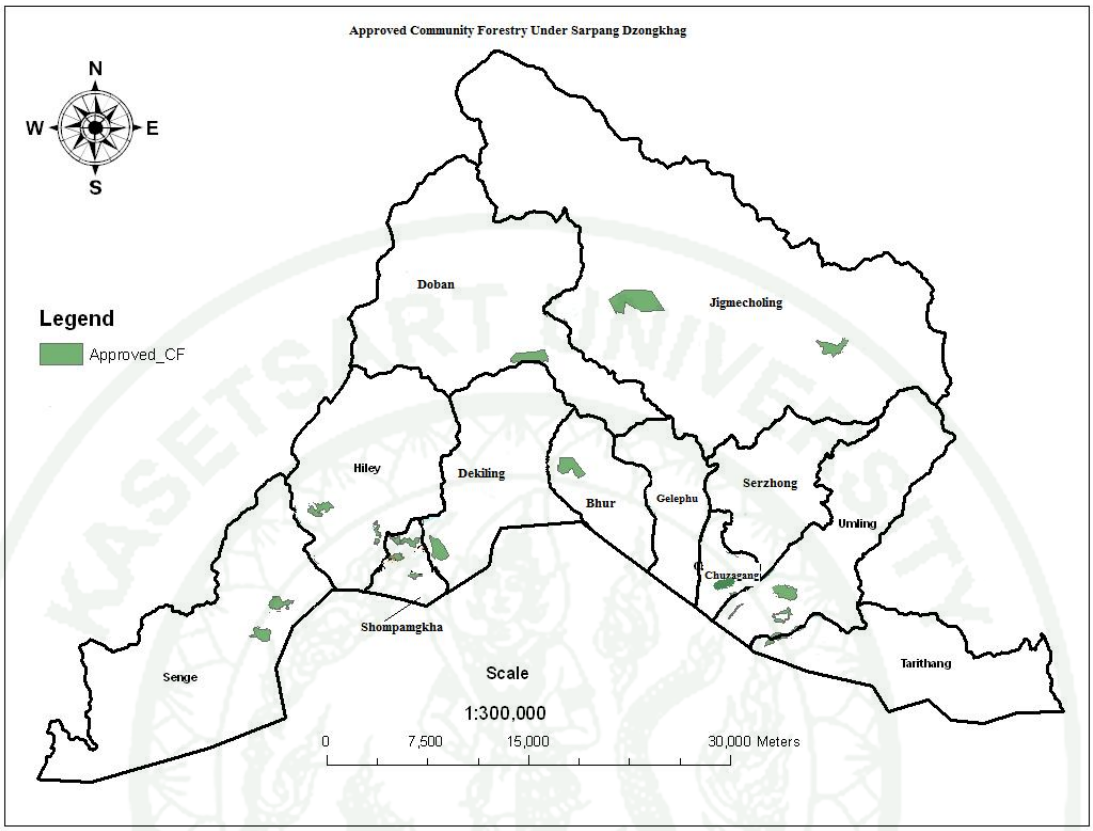
Source: International Institution for Environment Development (1994)

Appendix C
Approved Community Forests under Sarpang Dzongkhag

Appendix Table C1 Approved community forests under Sarpang Dzongkhag

Geog	Name of the community forest	No. of h.h	Area(Ha.)
Taklai	Gayser Tashicholing	22	47
	Tashithang	16	46
Umling	Samdrupcholing	33	43
	Dangling	49	153
C/gang	Chuzagang	35	31
Dovan	Lhayuel	88	181
Dkiling	Bumpaling	41	138
S/kha	Risumgang	49	79
Hiley	Rilangthang	36	98
	Lhaling	36	48
Singey	Norbugang	31	56
	Phuntshopelri	36	99
Bhur	Dunkarling	78	115
J/Choling	Tshangchu	24	40
	Total	**574**	**1174**

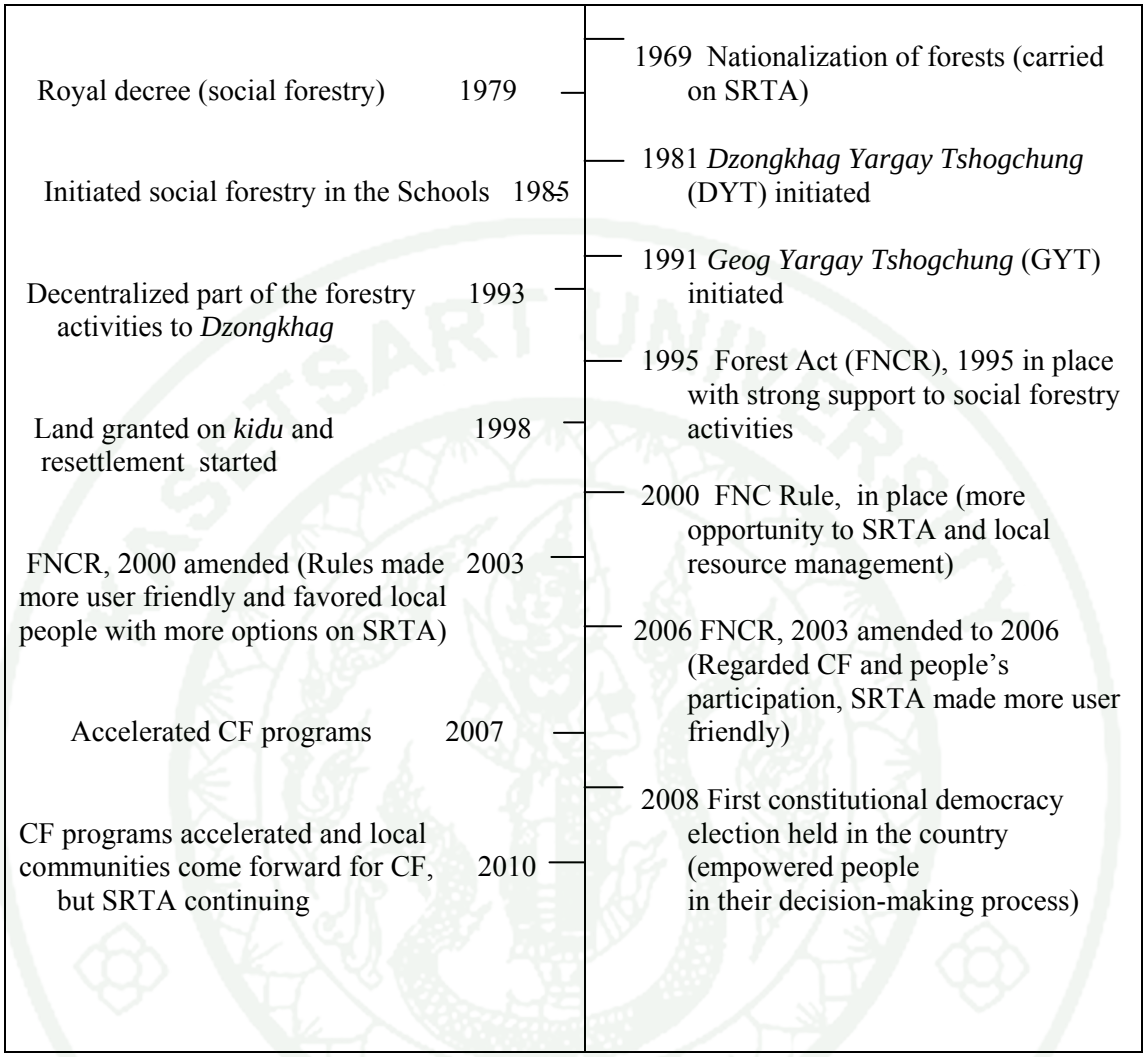
Source: Dzongkhag Forestry Sector (2010)



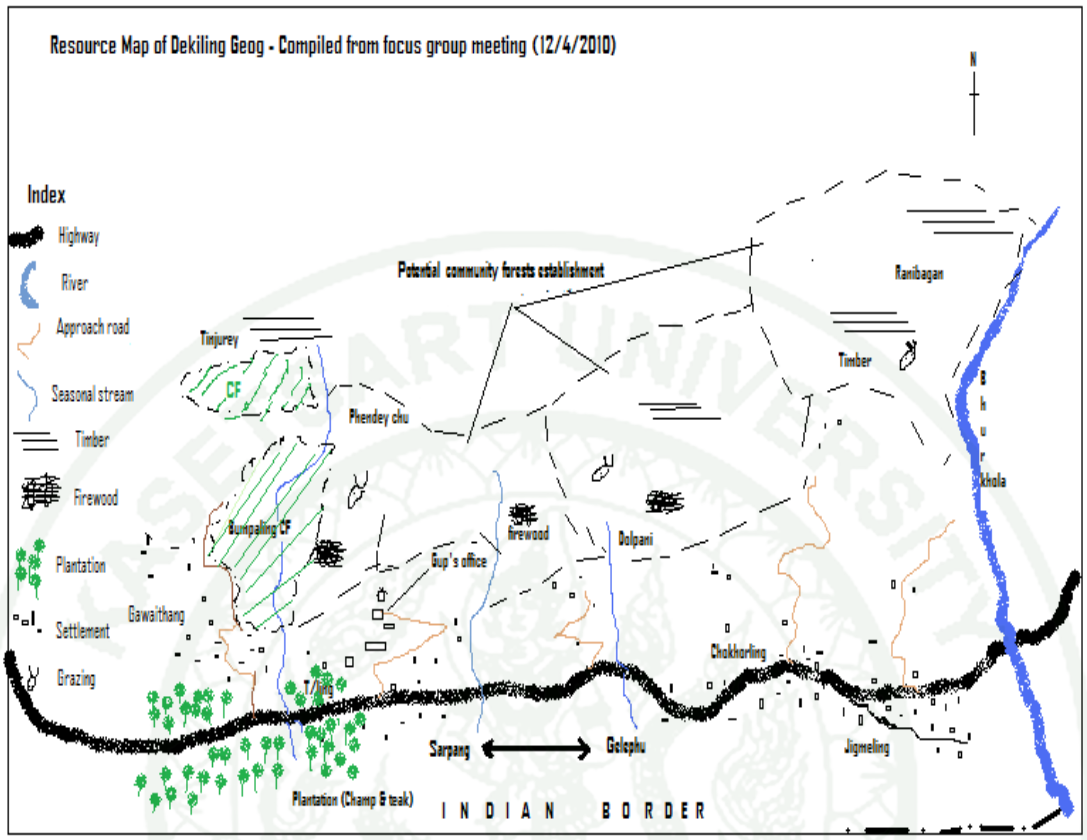
Appendix Figure C1 Map of Sarpang *Dzongkhag* showing approved community forests

Source: Dzongkhag Forestry Sector (2010)

Appendix D
Tools used for qualitative data collection and analysis



Appendix Figure D1 Historical timeline (Focus group meeting at Dekiling)



Appendix Figure D2 Resource mapping of Dekiling *geog* based on focus group discussion

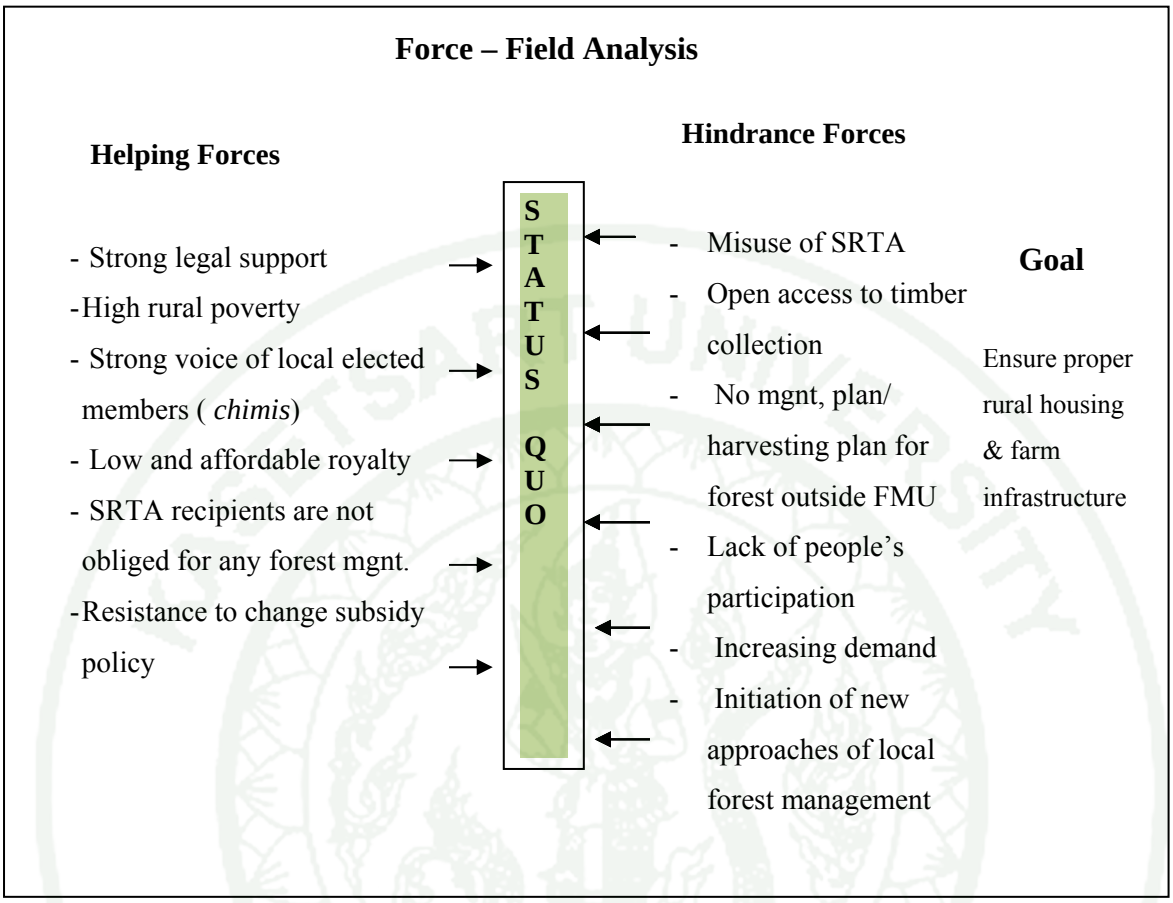
Strengths	Weaknesses
• Strong legal support • Free and fair allotment • Huge differences in rural and commercial timber • Proper rural housing and farm infrastructure development • Affordable royalty • Open access to timber collection	• Develop dependency on government for forest management always • Shortage in timber due to increasing population • No/passive participation in SRTA policy • Misuse and deflection of SRTA • Direct selling/loaning of timber • Conversion of construction timber to furniture • Houses built from rural timber utilized for shops/bars and renting • Difficulty in monitoring • Timber allotted to other areas • Long procedures • No management or harvesting plans for SRTA
Opportunities	**Threats**
• Better social livelihood • Poverty reduction	• Forests and environment degradation ✓ depletion of soil ✓ drying up of water sources ✓ loss of species • Political interferences • Undermine constitutional commitment of maintaining 60% forest cover at all times • Uncertain future timber supply and pose threat to SFM

Appendix Figure D3 SWOT Analysis (Focus group meeting at Dekiling)

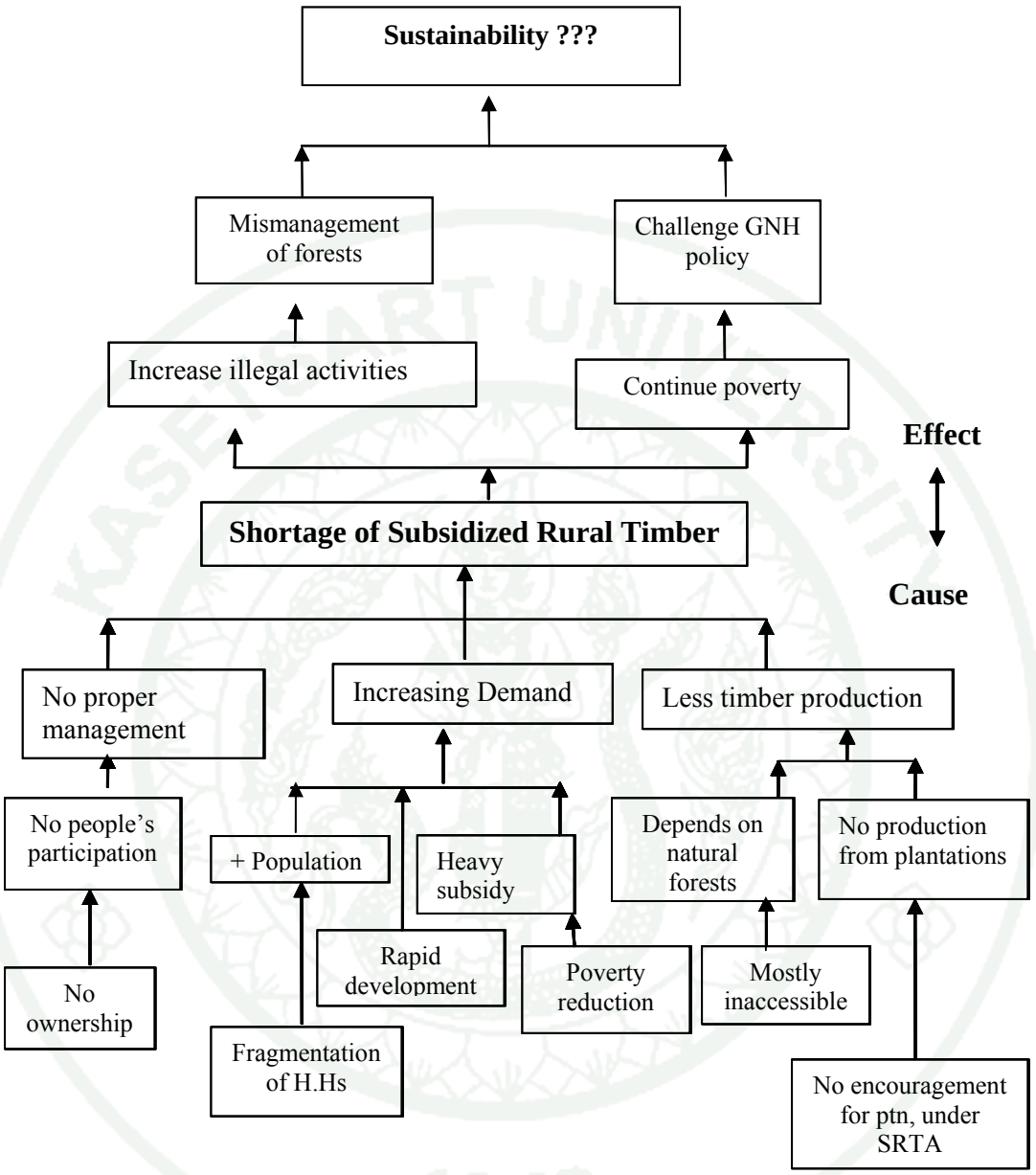
Identification and Prioritization of Problems and Constraints
(Brain storming in Focus Group Meeting)

1. Difficulty to understand and apply for SRTA
2. Multiple actors and long complicated procedures (*Prior approval for construction and timber verification*)
3. Actual timber requirement not granted as per requests
4. Splited households not allotted subsidy timber
5. Additional timber not granted (*some houses are incomplete due to insufficient timber*)
6. Shortage of timber for construction(**Ist**)
7. Open access to outsiders
8. Difficulty to find appropriate timber for marking (*remain small and rejected trees*)
9. Local forests dominated by undesired timber species
10. Increasing demand for SRTA
11. People are not encouraged for maintaining sustainability of local forest under SRTA policy (**IInd**)
12. Increasing competitions for remaining trees
13. Natural regeneration cannot keep pace with increasing pressure on subsidy timber
14. No proper management plans for SRTA (*harvesting/utilization and production*)(**IIIrd**)
15. Protection or control done by government officials

Appendix Figure D4 Identification and prioritization of problems and constraints



Appendix Figure D5 What hinders and helps maintain the status quo?



Appendix Figure D6 Problem tree analyses on shortage of subsidized rural timber

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Appendix Table D1 Findings of qualitative data collection

Sl. #	Approaches	Findings
1.	Resource Mapping	• Outside FMU was main source for forest resource collection • No defined territory for SRTA (Chuzagang, Umling, Gelephu, Bhur & Shompangkha) also collect from Dekiling geog • Adequate potential areas for CF as only one CF existed
2.	Historical Timeline	• Subsidy existed before 1969 and carried on to date with more privileges (quantum, time, options) • Participatory management (CF/PF) had progressed • SRTA existed without beneficiary roles in management
3.	SWOT analysis	• Strong legal support for SRTA • Price differences between rural and commercial timber • No management or harvesting plans for SRTA • No encouragement for people's participation in SRTA policy
4.	Force-field analysis	• SRTA remained status quo due to strong support from elected member (*Chimis*) • No participation and misuse of SRTA
5.	Problem Identification and prioritization	• Shortage of timber for construction • No encouragement for participation local forest management under SRTA policy
6.	Problem tree analysis	• Cause: increasing demand , less timber production & no proper management plans • Effect: increase illegal activities leading to mismanagement

Appendix E
Attribute tables of statistical analysis

Appendix Table E1 Relationship between dependency and availability of timber

		Availability of timber				Total
		No	Scarce	Less than required	As required	
Dependency on timber	No	1	8	1	0	10
	Little	2	20	3	2	27
	Medium	1	28	15	0	44
	Lot	1	56	22	6	85
	Alot	0	65	13	4	82
Total		**5**	**177**	**54**	**12**	**248**

Pearson Chi-square (χ^2) = 21.533*, df = 12

Appendix Table E2 Relationship between SRTA and availability of timber

Correlations				
			Subsidized Rural Timber Allotment	**Availability of timber**
Spearman's rho (r_s)	**Subsidized Rural Timber Allotment**	Correlation Coefficient	1.000	-.135*
		Sig. (2-tailed)	.	.033
		N	248	248
	Availability of timber	Correlation Coefficient	-.135*	1.000
		Sig. (2-tailed)	.033	.
		N	248	248

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix Table E3 Relationship between family- size and SRTA

Correlations			
		Subsidized Rural Timber Allotment	**Population (family-size)**
Subsidized Rural Timber Allotment	Pearson Correlation	1	-.126
	Sig. (2-tailed)		.048
	N	248	248
Population (family-size)	Pearson Correlation	-.126	1
	Sig. (2-tailed)	.048	
	N	248	248

Appendix Table E4 Relationship between type of house constructed and SRTA

Correlations				
			Subsidized Rural Timber Allotment	**Types of houses constructed from SRTA**
Spearman's rho(r_s)	**Subsidized Rural Timber Allotment**	Correlation Coefficient	1.000	.125*
		Sig. (2-tailed)	.	.048
		N	248	248
	Types of houses constructed from SRTA	Correlation Coefficient	.125*	1.000
		Sig. (2-tailed)	.048	.
		N	248	248

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix Table E5 Relationship between SRTA and livelihood status

Correlations				
			Livelihood status	**Subsidized Rural Timber Allotment**
Spearman's rho (r_s)	**Livelihood status**	Correlation Coefficient	1.000	.142*
		Sig. (2-tailed)	.	.026
		N	248	248
	Subsidized Rural Timber Allotment	Correlation Coefficient	.142*	1.000
		Sig. (2-tailed)	.026	.
		N	248	248

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix Table E6 Relationship between participation and future timber supply

Correlations				
			Opinions on Future Rural Timber Supply	**Future level of People's Participation**
Spearman's rho	**Opinions on Future Rural Timber Supply**	Correlation Coefficient	1.000	.170**
		Sig. (2-tailed)	.	.007
		N	248	248
	Level of People's Participation(Future)	Correlation Coefficient	.170**	1.000
		Sig. (2-tailed)	.007	.
		N	248	248

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix F
Household questionnaires

Appendix F Questionnaire for Household Survey

Appendix F1 Respondent profile

Respondent name:.....Thram no:……. House no : …….

Village:……..…….…….. Chiwog:

……District:….....

1. Gender

☐ a. Male ☐ b. Female

2. Age ……years

3. What is your highest educational attainment?

☐ a. None ☐ b. Elementary school
☐ c. High school
☐ d. None-formal ☐ e. Buddhist literate

4. No. of family members? *(including you)*

Male - age less than 13……,
14 - 60……
61 & above…… [Total……]
Female- age less than 13……,
14 - 60……
61 & above…… [Total……]

Total …….. persons

5. No. of labor in your family? *(age equal to 13 years and above)*

Male.....persons
Female.....persons
Total ……..persons

6. Are you the member of any group organizations/associations in the village/ geog ?

☐ 1. Agriculture group ☐ 2. Livestock group ☐ 3. Forestry group
☐ 4. Water user association ☐ 5. Health & sanitation ☐ 6. Development committee
☐ 7. Multi-sectoral task force member ☐ 8. Others(specify)……

Appendix F2 Socio-economic

1. What is your major occupation? *[tick and underline specific occupation within the main occupation, example, cropping from agriculture]*

☐ a. Agriculture (Cropping, Fruit orchard, Agro-forestry, Vegetable gardening)

☐ b. Livestock (Diary, Poultry, Piggery, Fishery)
☐ c. Employment (Government service, private company, off-farm labour)
☐ d. Business (NWFP, Agriculture, livestock, other)

2. How much is your annual income. *Please enumerate for each activity?*
(2.1+2.3+2.5+ 2.6)…….Nu./year

2.1. Income of agriculture .....Nu. /year
2.2. What are your crop/tree species planted? *(Please select more than 1 choice)*

☐ a. Paddy ☐ b. Maize ☐ c. Cassava ☐ d. Millet
☐ e. Arcanut (doma) ☐ f. Pineapple ☐ g. Litchi ☐ h. Jack fruit
☐ i. Mango ☐ j. Other
(specify)……

2.3. Income of livestock .....Nu./year

2.4. What are your livestock species? *(Please select more than 1 choice)*

☐ a. Cow ☐ b. Piggary ☐ c. Poultry ☐ d. Duck
☐ e. Fish ☐ f. Other
(specify)……

2.5. Income of other occupations.....Nu. /year
2.6. Do you have any income of the household from forest resources? (*Indicate under source of collection*)

Mention your household income from different types of forest products during the past twelve months

Sl.#	Forest Products		Unit	Price Nu. /unit	Sources of collection					
					GRF (Outside FMU)	FMU	PA (Protected area)	CF	PF	Other Dz.
1	Timber		cft							
2	Fuelwood		BL							
3	Small wood		No.							
	Flag poles									
	Fencing posts									
4	Bamboo		culm							
5	NWFPs/ Medicinal plants	a. b.								
6	Others (specify)									
	Total									

3. How much is your annual expenditure? *please enumerate for each activity.* (3.1 + 3.2) .....…….....Nu./year

3.1. Expenditure of agriculture .....Nu./year

3.2. Expenditure of family ..... Nu./year

4. Do you have debts?

☐ a. Yes ☐ b. None

If yes, how much?……Nu.

5. What are your loan sources? *(Please select more than 1 choice)*

☐ a.Bhutan National Bank☐ b. Bank of Bhutan ☐ c. BDFCL

☐ d. Village fund ☐ e. Relative ☐ f. Neighborhood

☐ g. Other *(Specify)*.....

6. Are you native resident of this area? ☐ a. Yes ☐ b. No if No, how you have settled here

☐ Land on *kidu* ☐ Purchased land ☐ Land substitution ☐ Share-cropping

7. Do you have your own land?

☐ a. Yes ☐ b. None

If yes, how many?……acres

If none, do you rent land for cultivation or other activities?

☐ a. Yes ☐ b. No

If yes, how much land do you rent?……acres

Appendix F3 Forests

1. From where do you collect forest resources for your livelihood? (*Indicate under source of collection*)
Note: Small wood- poles, posts, NWFP- specify three important NWFPs

Sl.#	Forest Products		unit	Sources of collection					
				GRF (Outside FMU)	**FMU**	**Protected area**	**CF**	**PF**	**Other Dzongkhag**
1	Timber		No.						
2	Fuelwood		BL						
3	Small wood								
a	Flag poles		No.						
b	Fencing posts		No.						
4	Bamboo		culm						
5	NWFPs/ Medicinal plants	a. b.							
6	Others								

2. How much do you depend on the forests for livelihood? [*tick the option*]

		0 – No , 1- Little, 2- Moderate, 3- Lot , 4- A lot					
	Dependency on forests	**0**	**1**	**2**	**3**	**4**	**Comments**
1	Timber						
2	Small wood						
3	Firewood						
4	Bamboo						
5	NWFP (other)						
6	Grazing						

3 What kind of trees is used for construction, firewood, poles and posts?

Sl.	**Species (Local name)**	**Purpose**			
		Construction	**Firewood,**	**Poles**	**Posts**

4. In your opinion, what do you think of the availability of the forest resources?

Sl#	Availability of forest resources	0 – No ,1- Scarce , 2- Less than required , 3- As required, 4- More than required					
		0	1	2	3	4	Comments
1	Timber						
2	Small wood						
3	Firewood						
4	Bamboo						
5	NWFP (other)						
6	Grazing fodder/grass						

5. Referring to the above resources (If not abundant), how do you think about the problems of forest resources?

Sl.#	Problems of forest resources	0 – No ,1- Little ,2- Moderate, 3- Severe, 4- Very severe					
		0	1	2	3	4	Comments
1	Shortage of timber						
2	Scarcity of NWFP						
3	Drying up of water source						
4	Loss of species						
5	Forest degradation						
6	Soil & Land erosion						
7	Other(specify)						

6. Linking to the above problems, what could be the causes of the above problems?
[*Tick and identify at least three most severe problems]*

Sl#	**Causes of the problems**	0 – No, 1- Little, 2- Medium, 3- High, 4- very high						
		0	**1**	**2**	**3**	**4**	**Prioritize**	**Comments**
1	Increasing population							
2	Competition for resources							
3	No proper management							
4	Grazing pressure							
5	Weak law enforcement							
6	Open access							
7	Illegal harvesting							
8	Natural disaster							
9	Forest fires							
10	Other(specify)							

7. What do you think about the condition of the local forests now as compare to 10 to 20 years ago?

Positive change (+), Not changed (0) , and Negative change (-) *[note: + or – can show severity by adding upto +++ or - - -]*

Components	**Change in forest conditions**			**Comments (why)**
	Positive	**Not changed**	**Negative**	
Forest area				
Vegetation (composition)				
Vegetation (Species)				
Vegetation (structure)				
Regeneration				
Soil				
Water				
Wild animal				
Others (specify)				

8. What is your opinion on the sustainability of the forests around your villages or the forests used for timber harvesting (outside Dekiling geog)?

Opinion	**Category (*tick one*)**	**Comments**
a. Sustain well		
c. Cannot sustain at all		
d. No idea		

Appendix F4 Forest Products (Timber)

1. Information on housing

Total number of houses own…….
Number of houses constructed (after 2000)……..
House repaired (after 2000)……..
House under construction……..
Plan for new house construction (until 2030)…….

2. Did you get any subsidized rural timber (*kidu* timber) from the year 2000?

New /re-construction		Repair/extension	
Yes	No	Yes	No

2.1 If yes, when, from where and how much?

Note: source- FMU(Forest management unit,PA(Protected area),OFMU(Outside FMU)

Option	Subsidy timber received	Year	Source FMU/CF/PA/OFMU
a. standing tree(nos,)	D/shing - Cham - Tshim - D/chu- s/lap-		
b. sawn timber/ (cft)			
c. logs(cft)			
d. other uses			

3. Did you use all timber harvested or collected all sawn timber or logs from saw mills/NRDCL? Yes [ ] No [ ]

If yes, where did you use?

	Category (tick)	Nos, of houses constructed or repaired
a. New house construction		
b. Repair/extension of old house		
c. Built temporary hut		
d. Partially used and partially not used		

4. What type of house that you constructed with particular subsidy timber?

	Type of House (tick)	Comments
a. Permanent house		
b. Semi-permanent -		
c. Temporary hut		

5. Where is the timber if house not constructed or constructed temporary hut?

	Where(tick)	Comments
a. Stacked for constructing later		
b. Loaned to neighbors		
c. Sold		
d. other (reason(s)		

6. In case of the completed house construction, Was/Is the timber allotted enough for your intended purpose? Yes [ ] No [ ] If no, why not enough?

	Category (tick)	Comments
a. Requested only this much		
b. Rules did not allow		
c.Obtained small trees		
d. Timber sold		
e. T imber loaned		

7. Did you harvest all the approved number of trees? Yes [ ] No [ ]

7.1. If no, why all the allotted trees are not harvested?

	Category (tick)	Comments
a. Could not manage myself (domestic problem)		
b. Time lapsed		
c. No right tree(s) found for marking-		
d. other reason(specify)		

7.2. How many trees are not felled and not processed although you have valid permit/approval? Or sawn timber/ logs(cft) not collected;

Option	Tree(s) not harvested	Comments
a. standing tree(nos,)	D/shing - Cham - Tshim - D/chu- s/lap-	
b. sawn timber/ (cft)		
c. logs(cft)		
d. other uses		

8. Do you think that you need more timber in future? Yes [ ] No [ ]

8.1. If yes what for and how much? (Within 25 years or until 2035)

Purpose	Sawn timber(cft)	Logs(cft)	Standing trees(Nos)
New /reconstruction/renovation			D/shing - Cham - Tshim - D/chu- s/lap
Repair/extension			D/shing - Cham - Tshim - D/chu- s/lap
Other farm infrastructure			D/shing - Cham - Tshim - D/chu-

8.2.Is there any possibilities for your household member(s) to be fragmented or broken down and apply for timber? Yes [ ] No [ ]

Note: within 2020 years' time

Reason	Option(tick)	How many parts?
Increase in family size		
Marriage affairs		
Normal expansion		
Other(specify)		

9. How do you perceive about the subsidized rural timber allotment (SRTA) program and its implementation?

If not applicable, note NA in comments

Sl#	SRTA program and its implementation	1 – Very difficult ,2 - Difficult, 3- ok, 4- Easy (same as before), 5- Very easy					
		1	**2**	**3**	**4**	**5**	**Comments**
1	Understanding rules on SRTA						
2	Applying for SRTA						
3	Marking of trees						
4	Processing timber (from standing trees)						
5	Procuring timber from sawmill						
6	Procuring timber from NRDCL						
7	Transportation of timber						
8	Other(specify)						

Appendix F5 People (Social aspects)

1. How do you feel about SRTA policy and its implementation in the fields?

Tick against the opinion

Sl#	SRTA policy/activities	1 – Strongly dissatisfied, 2 - Dissatisfied , 3- Undecided, 4- Satisfied, 5- Strongly satisfied					
		1	**2**	**3**	**4**	**5**	**Comments**
1	Timber allotment (SRTA)						
2	Awareness and capacity building programs						
3	STRA process						
4	Time schedule for SRTA						
5	Marking of trees						
6	Passing of timber						
7	Transparency of SRTA						
8	Impacts of SRTA						
9	Monitoring/evaluation						

2. In general, people feel that the below mentioned are some of the common problems of SRTA. What is your opinion on this?

Tick against the opinion

Sl#	Assumed problems	1 – Strongly disagree ,2 - Disagree ,3- No idea,4- Agree 5- Strongly agree					
		1	2	3	4	5	**Comments**
1	Shortage of timber						
2	Lengthy procedure						
3	Competition for timber						
4	Misuse/deflection of timber						
5	No people's participation (SRTA)						
6	Open access to any forests						
7	Weak monitoring on SRTA						
8	Other(specify)						

3. Can you please tell me, how do you **participate in SRTA policy** towards **sustainable forest management (SFM)?**

Sl#	Activities	**Weight** 0-No participation, 1- Passive [attend meeting/training], 2- Slightly active[follow with others], 3- Active[involve voluntary], 4- Very active [lead and link with concern authorities]					
		0	**1**	**2**	**3**	**4**	**Comments**
1	Planning						
2	Decision making						
3	Protection						
4	Production						
5	Harvesting /Benefit sharing						
10	Monitoring & evaluation						

4. If you are given to rate on the **level of participation of local forests management**, where do you rate yourself for level of participation? Please **include CF participation if you are the member of CF and other forestry activities**!

Sl.#	Forestry Activities	**Weight** 0-No participation, 1- Passive [attend meeting/training] 2- Slightly active[follow with others], 3- Active[involve voluntary], 4- Very active [lead and link with concern authorities]	
		Weight	**Comments**
1	Resource mapping		
2	Prepare harvesting plan or management plan		
3	Timber harvesting		
4	Fair sharing/equity		
5	Tree planting / restoration		
6	Grazing control		
7	Protection from illegal felling		
8	Protection from fire		
9	Monitoring and evaluation		
	Total		

5. If Government wants to phase out the subsidy timber considering sustainability issues, how do you agree on the following proposals?

Sl#	Options	1 – Strongly disagree , 2 - Disagree, 3- Undecided,4- Agree, 5- Strongly agree					
		1	2	3	4	5	Comments
1	Continue SRTA						
2	Replace SRTA by CF management						
3	Phase out completely						
4	Supply all timber requirement through NRDCL						
5	Purchase timber from commercial sawmills						

6. Are you the member of CF? Yes [ ] No [ ]

6.1. If you are the member of CF, what made you to participate in CF program?

Options	Category (*tick one*)	Comments
a. Lack of timber & other resources		
b. For sustainable forest management		
c. Peer pressure from neighbours		
d. Forced by concern authorities		
e. Thought of big incentive		
f. To get ownership of local forests		
g. other(specify)		

6.2. If no, why have you not participated in CF program?

Options	Category (*tick one*)	Comments
a. Not interested		
b. Not got opportunity		
c. Do not have forests around		
d. Do not know what is CF?		
e. No manpower to participate		

6.3. What kind of activities do you want to participate in forest management? (*tick and say why?)*

Sl.#	Forestry Activities	Participation		
		Yes	No	Comments
1	Planning			
2	Decision-making			
3	Implementation			
3.1	Protection(illegal, fire & grazing)			
3.2	Production (plantations of trees, NWFP)			
3.3	Benefit sharing (timber /NWFP)			
4	Monitoring and evaluation			

8. What would be your expectations for joining the CF programs?
Priority – 1, 2, 3,4 & 5 (5- high priority, 1- least option)

Options	Priority	Comments
a. Maintaining the sustainability of local forests		
b. Sharing of benefits (timber/NWFP)		
c. Improving productivity of local forests		
d. Generation of income		
e. Improve soil and water conditions (protection)		

Appendix G
Pictures of the types of houses and events during data collection

(A)

(B)

Appendix Figure G1 Pictures showing types of houses constructed from timber through SRTA; Permanent(double-storied)(A), Permanent(single-storied)(B),Semi-permanent(C), Temporary hut(D)

(A)

(B)

(C)

(D)

Appendix Figure G2 Pictures showing data collection events; Group work (key stakeholder's meeting)(A), Focus group meeting (B), Plenary session(key stakeholder's meeting)(C), Interview (structured questionnaires)(D)

CURRICULUM VITAE

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BIRTH DATE : August 11, 1973

BIRTH PLACE : Mongar, Bhutan

EDUCATION :

YEAR	INSTITUTE	DEGREE/DIPLOMA
1995	NRTI, Lobesa	Diploma (NR, specialized in forestry)
2005	Australian National Univ.	Graduate Diploma (Resource, Env, and Society)

POSITION /TITLE : *Dzongkhag* Forest Officer

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