

---

Ministry of Environmental Conservation and Forestry  
Forest Department



*Mitigation of Climate Change Impacts through Restoration of Degraded Forests and  
REDD-Plus Activities in Bago Yoma Region, Myanmar (Phase II) (2013-2014)*

Report on Assessing Impacts of Private Forest Plantations on Livelihood  
of Local Communities in Kyauktaga Township,  
Bago District, Bago Region, Myanmar

*Prepared & Submitted by:*

Ngwe Thee  
Staff Officer  
Planning & Statistics Division  
Forest Department

**August, 2013**

## Executive Summary

Forest Department of Myanmar has called for private investment in plantation forestry by granting forest land concession right since 2006-07. On the other hand, rural peoples of the country, representing about 70% of total population, rely on forest resources and forest land for their livelihood. This study was carried out to investigate how private forest plantation programme impacted on livelihoods of local communities by conducting key informant interviews, and quantitative household survey among randomly selected 158 sample households.

The study showed positive impacts that private forest plantations could create employment to local people, but the trend was going down. Working in private forest plantations became second most important livelihood strategy constituting 19.2% of total household income, and 35.3% of households were involved in this strategy. In addition, average total household income has increased with a median of 687,500 Kyat in 2008 to 807,875 Kyat in 2012 ( $p < 0.05$ ). Similarly, average non-farm income has risen ( $p < 0.001$ ). Also average household income of plantation workers increased with a median of 504,500 Kyat in 2008 to 725,000 Kyat in 2012 ( $p < 0.001$ ).

The study also revealed negative impacts that landholding per household decreased from 3.2 acres in 2008 to 2.3 acres in 2012 and average farming income and off-farm income declined ( $p < 0.001$ ). Similarly, most NTFPs collected also reduced in quantity, but the distance to travel for collection increased. The farmers whose paddy fields were inside reserved forest no longer had access to formal agricultural loan after developing private forest plantations.

## Acknowledgement

This work has come out as an output of Master of Rural Development Management, with direct or indirect contribution of many individuals and organizations.

First and foremost, I would like to express my sincere thank to Ministry of Environmental Conservation and Forestry (MOECAAF) for permitting me to pursue further study in abroad and to conduct this research work.

Secondly, I am also indebted to Dr. Thaung Naing Oo, Deputy Director, for supporting small supplementary research grant that made my research work more convenient, particularly during data collection period.

Furthermore, I owe my deepest gratitude to my advisor, Associate Professor Dr. Suchint Simaraks for his invaluable guidance and advice during my research work.

Moreover, my special thank goes to U Nyunt Win, Staff Officer, Kyauktaga Township Forest Department and staff for supporting all necessities during preparation and data collection period. Also I would like to thank Moe Pyae Kyaw and Zeyar Htun, undergraduate students from University of Forestry, who helped collect the data for this Independent Study, and all key informants and respondents from Taunthonlon village, Inwainggyi village, NRDC and Yuzana Company.

## Table of Contents

	<b>Page</b>
Executive Summary	i
Acknowledgement	ii
Table of Contents	iii
List of Tables	v
List of Figures	vii
List of Abbreviation	viii
1. Introduction	1
2. Rationale of the study	2
3. Objectives	3
4. Operational definitions of the study	3
5. Profile of study area	4
5.1 Profile of Kyauktaga Township	4
5.2 Historical background of study villages	7
6. Literature review	11
6.1 Concept of livelihoods	11
6.2 Livelihood assets	12
6.3 Livelihood strategies	15
6.4 Livelihood outcomes	15
6.5 Income diversification	15
6.6 Plantation forestry in Myanmar	16
6.7 Forest resources and rural livelihood	20
6.8 Role of NTFPs and forest land in rural livelihood in Myanmar	21
6.9 Linkage between forest land concession, afforestation and local people's livelihoods	25
7. Conceptual framework of the study	26
8. Methodology	28
8.1 Research design	28
8.2 Selection of study area	28
8.3 Sampling and sample size	28
8.4 Data collection	29
8.5 Data analysis	30

**Table of Contents (Contd.)**

	<b>Page</b>
9. Results: Impacts of private forest plantations on livelihood of local communities	31
9.1 Impacts on livelihood assets	31
9.2 Impacts on livelihood strategies	45
9.3 Impacts on livelihood outcome	50
10. Discussion	58
10.1 Discussions related to livelihood assets	58
10.2 Discussions related to livelihood strategies	62
10.3 Discussions related to livelihood outcome	63
11. Conclusion	63
12. Recommendations:	64
12.1 Recommendations for secured access to land	64
12.2 Recommendations for sustainable use of forest resource	65
12.3 Recommendations for sustainable employment and livelihood	65
12.4 Recommendations for avoiding possible conflicts	66
12.5 Recommendations for future research	66
References	67
Appendix I: Photo plates	70
Appendix II: Key informant interview guides	75
Appendix III: Questionnaire for household interview	80

## Lists of Tables

	<b>Page</b>
Table 1 Status of land use in Kyauktaga Township	4
Table 2 Status of encroachment inside Aingdon Kun Reserved Forest	5
Table 3 Area of teak plantations annually established during EPP	18
Table 4 Teak special plantation establishment (1998-99 to 2005-06)	18
Table 5 Area of forest plantation established by Forest Department during the period of 1981- 2012 (March)	19
Table 6 State and region-wise private forest plantations development in Myanmar	20
Table 7 Estimated consumption of fuelwood in Myanmar	22
Table 8 Annual production of charcoal during the period of 2005-06 to 2010-11	22
Table 9 Production and its value of bamboo stems and bamboo shots in Myanmar	23
Table 10 Encroachment area inside forest land (As of December, 2012)	24
Table 11 Distribution of households by landholding size in 2008 and 2012	33
Table 12 Mean harvest of NTFPs per household in 2008 and 2012	34
Table 13 Mean distance for collecting NTFPs	35
Table 14 Household assets and goods in 2008 and 2012	37
Table 15 Types of housing	38
Table 16 Health status of household members in 2012	38
Table 17 Educational level of household members in 2012	39
Table 18 Drop out rate at primary education level (up to 2012)	39
Table 19 Status of participation in organization by village (2012)	42
Table 20 Status of saving (2012)	43
Table 21 Per household livestock population in 2008 and 2012	44
Table 22 Coping measures related to cattle grazing	45
Table 23 Number of households involved in different livelihood strategies in 2008 and 2012	48
Table 24 Distribution of households by income groups	51
Table 25 Household income distribution by income types in 2008 and 2012 (Overall)	52
Table 26 Household income distribution by income types in 2008 and 2012 (Taungthonlon Village)	54

**Lists of Tables (Contd.)**

	<b>Page</b>
Table 27 Household income distribution by income types in 2008 and 2012 (Inwainggyi Village)	55
Table 28 Results of normality tests	56
Table 29 Results of Wilcoxon Signed Rank Test on different types of household incomes in 2008 and 2012	56
Table 30 Number of the plantation workers' households with respect to income groups in 2008 and 2012	67

## List of Figures

	<b>Page</b>
Figure 1 Location map of private forest plantation in Kyauktaga Township	6
Figure 2 Transect map of Taungthonlon village	9
Figure 3 Transect map of Inwainggyi village	10
Figure 4 Components and flow in livelihood	11
Figure 5 Diagram showing conceptual framework of the study	27
Figure 6 Venn diagram of Taungthonlon village	41
Figure 7 Venn diagram of Inwainggyi village	41
Figure 8 Crop calendar for Taungthonlon and Inwainggyi villages	47
Figure 9 Work calendar of private plantation workers	47
Figure 10 Income distribution by livelihood strategies in 2008	49
Figure 11 Income distribution by livelihood strategies in 2012	50
Figure 12 Mean household income by income types in 2008 and 2012	52
Figure 13 Mean household income by income types in Taungthonlon village in 2008 and 2012	54
Figure 14 Mean household income by income types in Inwainggyi village in 2008 and 2012	55

---

### List of Abbreviations

CSO	Central Statistical Organization
CSR	Corporate Social Responsibility
DFID	Department for International Development
DPDC	Division Peace and Development Council
FAO	Food and Agriculture Organization
FPIC	Free, Prior and Informed Consent
FRA	Forest Resources Assessment
GDP	Gross Domestic Product
IHLCA	Integrated Household Living Condition Assessment
INBAR	International Network for Bamboo and Rattan
NFMP	National Forest Master Plan
NRDC	National Resources Development Company
NTFPs	Non-Timber Forest Products
PAS	Protected Area System
PFE	Permanent Forest Estate
PPF	Protected Public Forest
PRA	Participatory Rural Appraisal
RF	Reserved Forest
RRA	Rapid Rural Appraisal
RS & GIS	Remote Sensing & Geographic Information System
TPDC	Township Peace and Development Council
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
VPDC	Village Peace and Development Council

## 1. Introduction

Myanmar is still one of the countries in South-East Asia Region possessing rich forest resources. Forest Resource Assessment- FRA (2010) showed that 46.96% of the total country area (31.77 million hectares) is covered with different types of forest in 2010. Up to December 2011, the status of Permanent Forest Estate (PFE) which was legally constituted as Reserved Forest (RF) and Protected Public Forest (PPF) has reached to 163,550 km<sup>2</sup>, 24.17% of the total land area. In addition, a total area covering 37, 895 km<sup>2</sup>, 5.60 % of total land area of the country has been constituted as Protected Area Systems (PAS) for conserving biodiversity and protecting environment in the country. The main purpose of constituting Reserved Forests and Protected Public Forests is to conserve the forest resources so as to ensure contributing to country economy and fulfilling basic needs of the people from the forestry sector. The 1995 Myanmar Forest Policy stipulates to keep 30% of the total land area of the country under RF and PPF, and 5% under PAS.

In Myanmar, forest resources make a substantial contribution to country's economic sector both at subsistence and commercial scale, as well as in a tangible and intangible way. Forestry sector stands at the one of the largest earnings in the country through export of logs and processed timber. It also contributes to meeting forest product demand of the country for the domestic use. In addition, it provides woodfuel and charcoal which are the main sources of the bio-energy used in Myanmar. About 70% of total population are residing in rural areas and mainly use the woodfuel for cooking. The annual consumption of woodfuel per household is estimated to be 2.5 cu-ton (4.5 m<sup>3</sup>) for rural households where as 1.4 cu-ton (2.5 m<sup>3</sup>) for urban residents (National Forest Master Plan-NFMP, 2001-02 to 2030-31). Among the intangible benefits, its contribution makes a number of forms including protection of slope, water catchments, control of soil erosion and siltation thereby protecting downstream agriculture, as also the streams, rivers and lakes.

Like other developing countries, deforestation and forest degradation resulting from agricultural expansion, encroachment, over-exploitation, conversion of forest land into other use etc., are major issues that hinder sustainable forest management of the country. The annual deforestation rate between 2005 and 2010, accounts 0.95% of the total forest cover (FRA 2010, FAO). Although limited information on forest degradation is available, according to the satellite imageries it is more significant than deforestation in Bago Yoma area where natural teak-bearing forests grows very well.

Plantation forestry has always been the supplement to the natural forest management. It is asserted in the 1995 Myanmar Forest Policy that existing natural forests will not be substituted with forest plantations. Plantation forestry has a complementary role to natural forest in order to control deforestation and forest degradation. Accordingly, the objectives of plantation establishment in Myanmar have been to rehabilitate degraded forest lands, restore deforested areas and supplement various timber yields from the natural forests.

Historically, Myanmar initiated the formation of teak plantation as early as 1869 on a small scale using “taungya” method. Large-scale plantation forestry began in 1980 and about 30,000 ha of forest plantations have annually been formed by public sector since 1984. Decreasing timber supply from natural forests and inadequate resources from public sector to invest in forest plantations, call for Forest Department to encourage private sector investment in plantation forestry.

## **2. Rationales of the study**

In Myanmar, rural population accounts for about 70% of the country population. The livelihoods of the rural people, more or less, used to depend on natural forests and forest lands. The shifting cultivation in natural forests is a major livelihood strategy for most indigenous peoples in hilly region of the country. In addition, timber, non-timber forest products (NTFPs) and bush meat are also significantly contributing to their livelihood. Similarly, encroachment for agricultural expansion in relatively low land forest area is very common in Myanmar. Thus, the livelihood of local peoples still much relies on the forest land and forest resources. According to the statistics, agricultural encroachment inside forest land reached to 1.62 million acres or 0.65 million hectares by the end of December 2011 (Planning and Statistics Division, Forest Department).

Since 2006-2007, along with the development of market-oriented economy in Myanmar, Forest Department has been encouraging private investment by national companies and entrepreneurs in commercial forest plantations with a view to supplying increasing demand of teak and other hardwoods of the country, contributing to the national economic development, and conserving environmental stability. As of February 2012, almost 44,000 hectares of private forest plantations has been established by over 100 private companies/entrepreneurs all over the country. For this purpose, the department grants forest land concessions to the private companies and

entrepreneurs in the degraded forests in which some parts have been already encroached by the local people for their livelihoods.

Therefore, land concession for developing private commercial forest plantation usually takes away the land and forest resources used by the local peoples. This situation is challenging livelihood of local people.

However, linkages between the developing forest plantations and livelihood of the people might be positive or negative. It can create job opportunities and income generation where forest resources are very scarce and unemployed rate is high. At the same time, it can negatively affect on livelihood of local peoples, especially when they highly depend on the forests land and when these forest lands are confiscated by the companies / entrepreneurs under the concession right. In this context, it is important to know how local peoples cope or adjust with these conditions. So far, no research work has been conducted for this purpose. It is therefore essential to study on impacts (positive or negative) of private forest plantations on livelihood of local peoples.

### 3. Objectives

- 1) To assess livelihood assets, livelihood strategies and livelihood outcome of the local communities residing near by the private forest plantation before and after establishing plantations
- 2) To identify impacts of private forest plantation programme on livelihood of local communities

### 4. Operational definitions of the study

**Livelihood:** Livelihood comprises the capabilities, assets and activities required for a means of living (Chambers, R and G. Conway, 1991).

**Livelihood assets:** Livelihood assets refer to natural capital, human capital, physical capital, financial capital and social capital (DFID, 2001).

**Livelihood Strategies:** Livelihood strategies mean different activities and choices of the people for the achievement of their livelihood goals (DFID, 2001).

**Livelihood outcome:** Livelihood outcome in this study means increased income (DFID, 2001).

**Impact:** Impact refers to any positive or negative changes in livelihoods of local community, particularly change in livelihood assets, livelihood strategies and livelihood outcomes as a result of development of private forest plantation.

**Private forest plantation:** A private forest plantation is defined as forest crop or stand which is established by private companies or individual entrepreneurs, with a primary objective of producing timber for commercial purpose, on forest land under forest land concession granted by Forest Department by means of planting teak and/or other hardwood species regardless of age of planted trees and their canopy cover.

**Forest land:** Forest land means land including Reserved Forests and Protected Public Forests (Forest Law, 1992).

**Income:** Income refers to farm income, off-farm income and non-farm income. It encompasses both income in-cash and in-kind (Ellis, F., 2000).

**Land holding:** Land holding in this study refers to area of land to which farmer accesses for agricultural purpose regardless of legal identities.

## 5. Profile of study area

### 5.1 Profile of Kyauktaga Township

Kyauktaga Township is located in Bago District, Bago Region. It comprises of two towns namely Kyauktaga and Penwagon, encompassing 13 wards and 313 villages belonged to 47 village tracts. A total population of 24, 2013 are residing in the Township. It is 1,093.06 square miles (699,558 acres) in area and Table 1 shows status of land use in Kyauktaga Township.

**Table 1** Status of land use in Kyauktaga Township

No.	Land use	Area (acre)
1	Reserved Forest and Protected Public Forest	493,729
2	Agricultural land	145,499
3	Uncultivated land (settlement, pasture, road, railway, dam and reservoirs, water body, factories and others)	60,256
4	Land at disposal	74
	<b>Total</b>	<b>699,558</b>

Source: Forest Department, Kyauktaga Township, 2013

Among the Reserved Forests and Protected Public Forests, Aingdon Kun Reserved Forest consists of 120 compartments, covering an area of 174,919 acres. Like many other Reserved Forests in the country, Aingdon Kun Reserved Forests has been affected by encroachment at large scale. The data obtained from Kyauktaga

Forest Department shows that total encroachment area inside the Reserve accounts for 2,116.8 acres (Table 2).

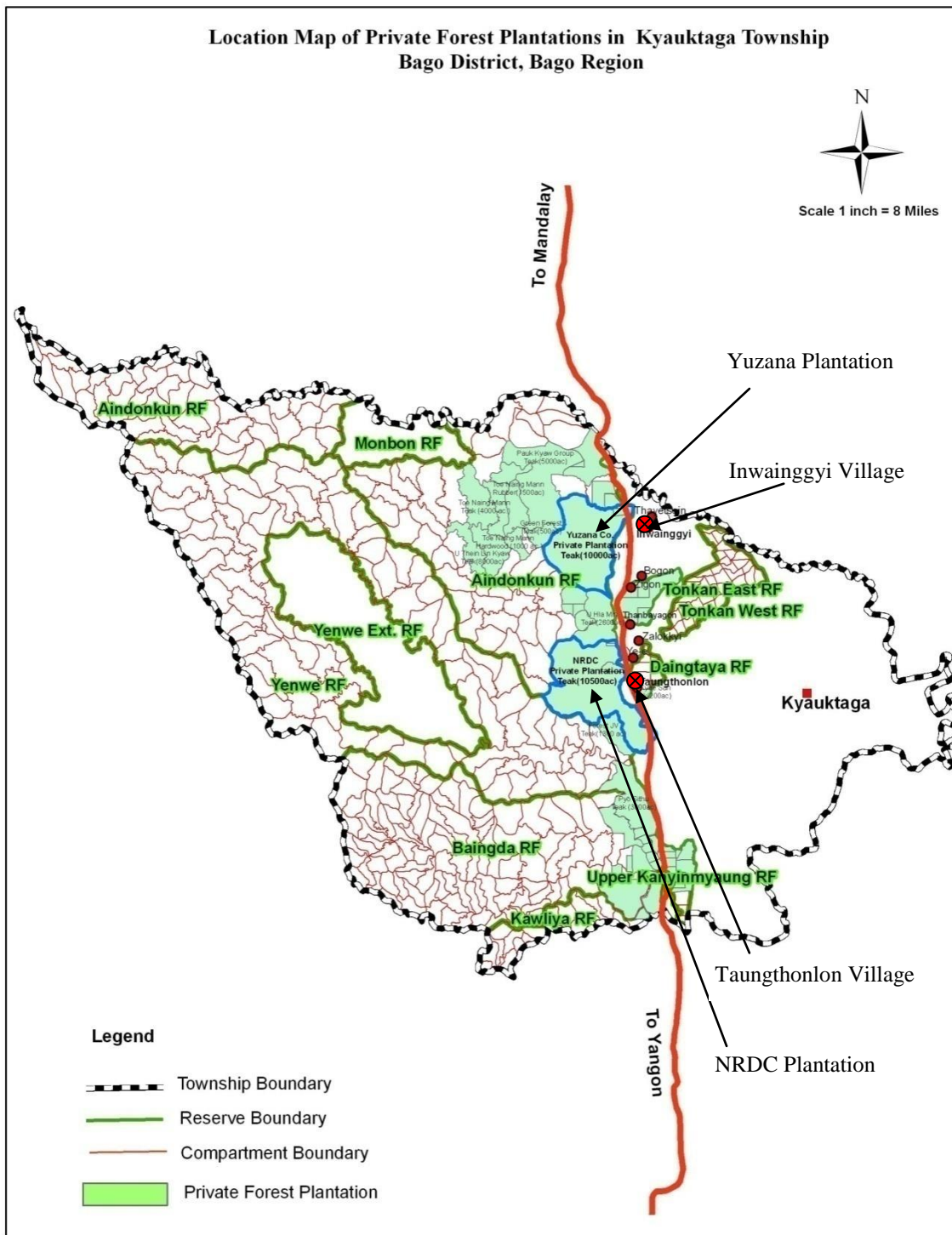
**Table 2** Status of encroachment inside Aingdon Kun Reserved Forest

Encroached village			Encroached land area (acres)						
Size	No. of village	No. of HH	Settle-ment	Paddy field	“ya” plots	Orchard	Perennial plantation	Religi-ous	Total
50 HHs and above	2	220	59.6	327.9	26.5	6.4	2.4	-	422.8
Below 50 HHs	8	341	42.1	793.1	157.0	690.0	-	11.8	1,694.0
<b>Total</b>	<b>10</b>	<b>561</b>	<b>101.7</b>	<b>1,121.0</b>	<b>183.5</b>	<b>696.4</b>	<b>2.4</b>	<b>11.8</b>	<b>2,116.8</b>

Source: Forest Department, Kyauktaga Township, 2013

HH=household

Although Forest Department has launched private forest programme starting from 2006-07, it was found that private forest plantation companies and entrepreneurs started to invest in 2009-2010. As of May 2013, 31 private investors have been allowed for establishing private teak plantation and the total permitted area reaches to 67,450 acres in the Township, of which 33,550 acres to be developed by 12 investors are inside the Aingdon Kun Reserved Forest. According to statistics of Forest Department, a total 23,607 acres of private teak plantation representing 35% of the permitted areas has been established in the Township, including 10,888 acres in Aingdon Kun Reserved Forest (Planning & Statistic Division, Forest Department, 2013). Figure 1 shows the location map of private forest plantation in Kyauktaga Township.



**Figure 1** Location map of private forest plantation in Kyauktaga Township

Source: RS&GIS Section, Forest Department, 2013

## 5.2 Historical background of study villages

In this study, two villages namely Taungthonlon village and Inwaingyin village were selected as study villages (Figure 4.1). The transect maps which provide general pictures of land use in the study villages are also described in Figure 2 and Figure 3 .

Taungthonlon village is located at milepost 88/6 on the roadside of Yangon-Mandalay highway and belonged to Inpetle village tract in Kyauktaga Township. It had been a ruined once due to insurgencies by 1960. The villagers fled from the village and stayed in Gyogon and Inpetle Village for several years. After revolutionary council had taken the State's power in 1962, the veterans were initially settled in the village, and then followed by the villagers. The village is composed of two blocks: one is the old village and another one is the recently relocated part from Kayuk-saung-aing village. Kyuak-saung-aing village was formerly located about half mile from Taungthonlon old village to west on the foot of Bago Yoma. In 2006-2007, the village was relocated and merged with Taungthonlon by administrative authorities for the reason that no village was allowed in the west of Yangon-Mandalay Highway. Currently, the total households in the village is 134, of which about 50 % are in the old block of the village and the rest 50% are in the newly relocated one, with the total population of 591. Over 90% of villagers are Bamar and the rest belongs to Kayin. The village has never experienced of natural disaster events. However, the crops were damaged due to rats in ripening season of rice in two consecutive years of 2010 and 2011. Particularly, crop damage was found to be serious in "taungya". In those years, bamboos in the forest flowered and produced seeds. As a result, rats were abundant due to food availability.

Inwainggyi village belongs to Sinzaloke village tract in Kyauktaga Township, located about 1 mile in east to 99/4 milepost of Yangon-Mandalay highway. It has been over hundred years that the village was established. Historically, Inwainggyi was Shan village and it was robbed about 65 years ago. Then, Shan people left the village and Bamar from nearby villages of Bantbwegon and Onshitgon settled in the village. There are 6 small wetlands ("*In*") around the village, namely Inyashe, Thein-in-gyi, Thein-in-lay, Inwainggyi-in, Kyu-in and Kyaukkhe-in. Of them, Inyashe is the biggest one and now the sizes of "*Ins*" are shrinking due to sedimentation. There is no water in dry season. Although nearby villages such as Aungmingala, Sinzaloke, Daingtaya village had frequently experienced of flood from Kun Chaung and Sittaung River before construction of Kun Chaung dam, there has been no disaster events in

Inwainggyi village over the last several decades. After construction of the dam, no more flood occurred in these villages too. The village has 129 households and about some 40% of them are staying on farm in group of huts, called “Sintheinn”, inside the Aingdonkun Reserved Forest. Among them, some are natives of Inwainggyi village and some came from Kanyutkwin, Tawkywein and Kyunkon to reclaim agricultural land and do farming inside the reserve forest. Some of them settled about 20 years ago. Now, they are under the administration of Inwainggyi village. In addition to those households, there are some more households from Thayetsein, Tumaung and Sarpyin village, who are staying and doing farming in Sintheinn. Thus, altogether there are about 70 households. All households in Inwainggyi belong to Bamar.

Transect direction= East to West; L=Left; R=Right

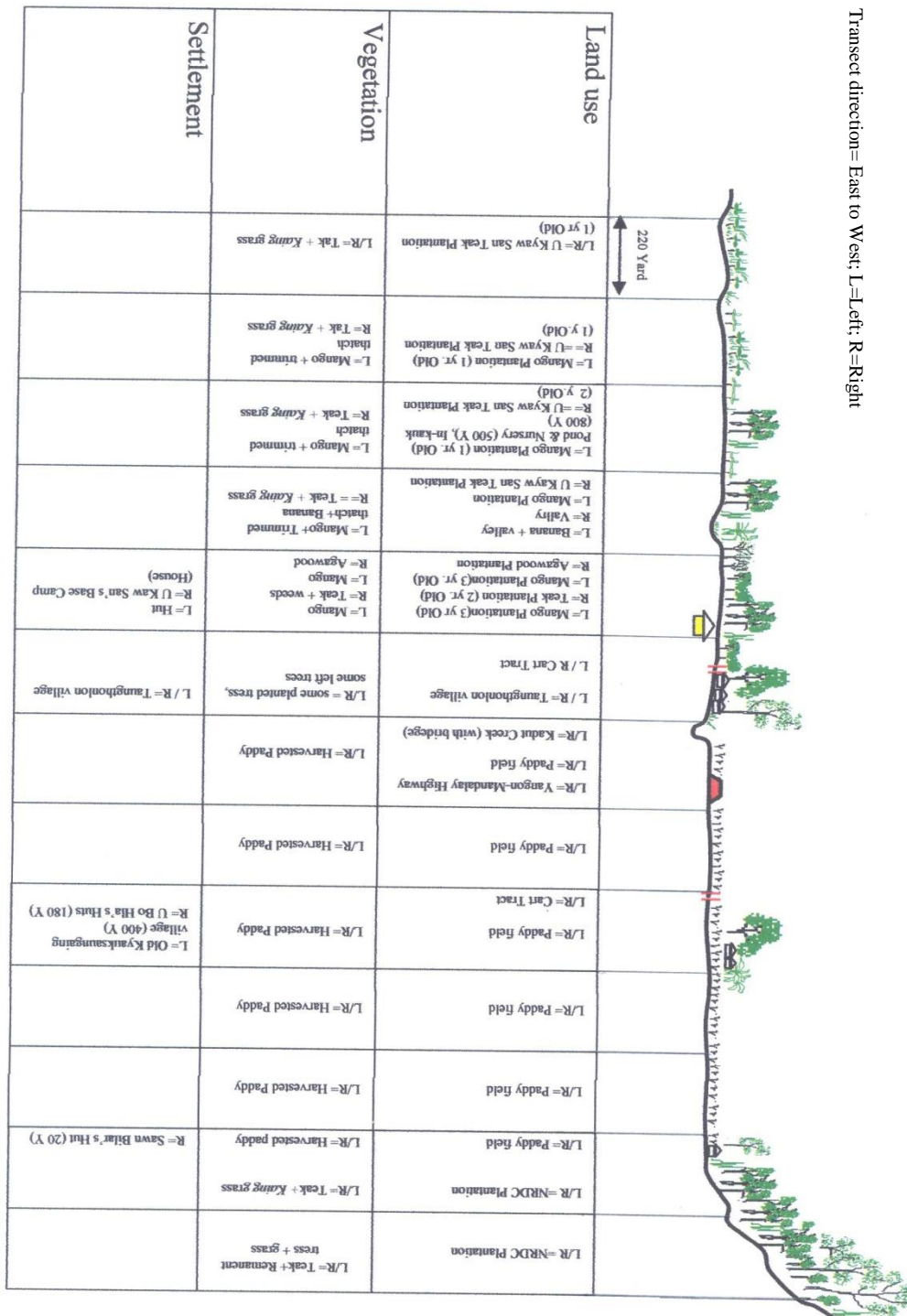


Figure 2 Transect map of Taungthonlon village

Transect direction= East to West; L=Left; R=Right

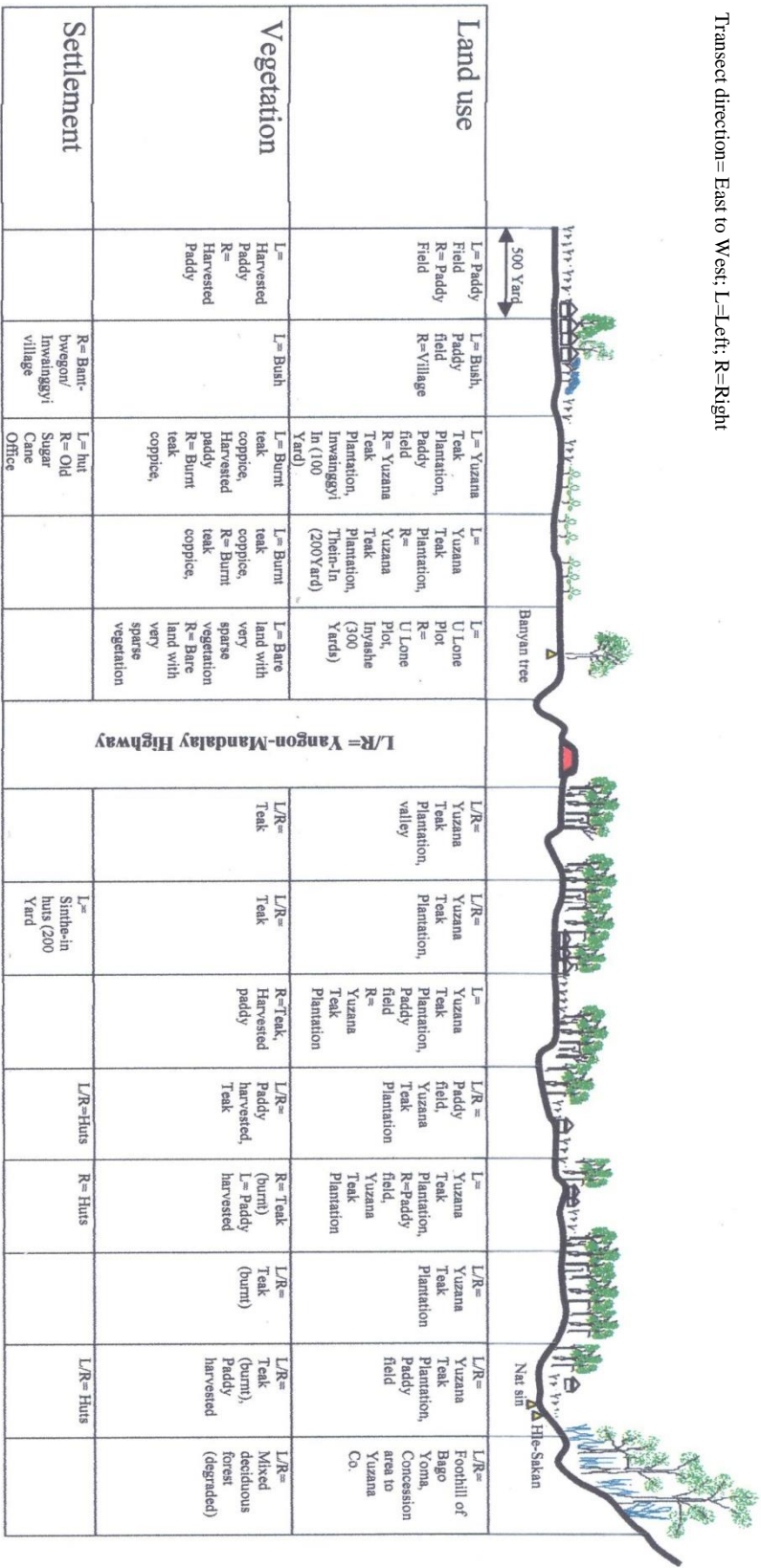


Figure 3 Transect map of Inwanggyi village

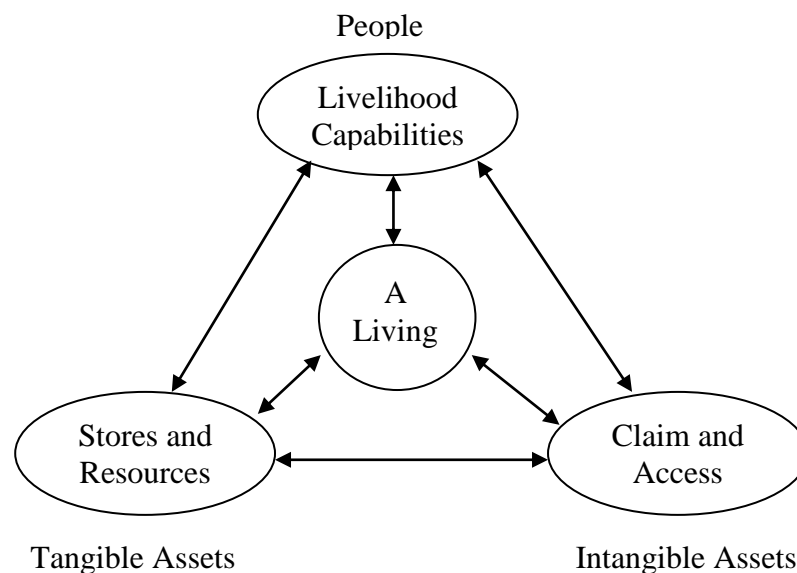
## 6. Literature review

### 6.1 Concept of livelihoods

Although there are many different definitions of livelihoods (Baumann, P., 2002), simplest definition of livelihood is a means of gaining a living. Chambers, R. and G. Conway (1991) provided a more comprehensive definition of livelihood as mentioned below:

*“Livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living”.*

From the above-mentioned definition, capabilities are enabling conditions or means to achieve livelihood objectives. Stores and resources refer to tangible assets and claims and access to intangible ones. Stores include food stocks, stores of value (eg. gold, jewellery), saving in the bank and credit scheme. Resources include land, water, trees, livestock, farm equipments, tools and domestic utensils. Claims are the demands and appeals which can be made for materials, moral and other practical supports or access. Access is opportunity in practice to use resource, store or service, or to obtain information, materials, technology, employment, food or income. Figure 4 provides general understanding on concept of livelihood together with its components and their flow.



Source: Chambers. R and G. Conway (1991)

Figure 4 Components and flow in livelihood

Most researchers in the field of development studies and social science adopt this definition or slight variant on this, and Carney (1998) also presented one with

slightly modification based on the work of Chambers. R and G. Conway (Baumann, P. 2002). Similarly, Ellis, F. (2000) modified Chambers, R. and G. Conway's definition as follows:

*“A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household.”*

## **6.2 Livelihood assets**

The livelihood assets are the means of production available to a given individual, household or group that can be used in their livelihood activities. These assets are the basis on which livelihoods are built and, in general, the greater and the more varied the assets base the higher and more durable the level of social security (Soussan, J. & Blaikie, P.). There are five capitals of livelihood assets which are commonly described, namely human capital, social capital, natural capital, physical capital and financial capital.

### ***Human capital***

DFID (2001) described human capital that represents the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives. Human capital influences on the amount and quality of labour available at a household level. This varies according to household size, skill levels, leadership potential, health status, etc. Many people regard ill-health or lack of education as core dimensions of poverty and thus overcoming these conditions may be one of their primary livelihood objectives.

According to Ellis, F., 2000, human capital refers to education level, health status of individuals and populations. Thorpe, A. & Van Anrooy, R., (2009) define human capital as the skills and knowledge (not just acquired through formal education processes and training opportunities, but also acquired informally through social contacts) allied to the physical ability to labour productively.

Investment in human capital is often characterized by public sector because education and health service are usually supplied by the state although benefits have both private and public dimensions (Ellis, F. 2000).

### ***Social capital***

Social capital is relatively new concept that departs from the narrow definition of economic assets and it is also a subject of continuing debate over its definition

(Ellis, F. 2000). Although the notion that social relations, networks, norms, and values matter in the functioning and development of society has long been present in the economics, sociology, anthropology, and political science literature, the concept of social capital embodying multidisciplinary views has been put forth only in the past 10 years (Grootaert, C. & Van Bastelaer, T. 2001).

According to DFID (2001), social capital means the social resources upon which people draw in pursuit of their livelihood objectives. These are developed through networks and connectedness, either vertical (patron/client) or horizontal (between individuals with shared interests). They increase people's trust and ability to work together and expand their access to wider institutions, such as political or civic bodies; membership of more formalized groups which are formed based on mutually-agreed or commonly accepted rules, norms and sanctions; and relationships of trust, reciprocity and exchanges that facilitate co-operation, reduce transaction costs and may provide the basis for informal safety nets amongst the poor.

Ellis, F. (2000) also provided the definition of social capital that refers to social network and associations in which peoples participate and from which they can derive support that contributes to their livelihood. Thorpe, A. & Van Anrooy, R., (2009) defined social capital as "social resources" that households are able to call upon in pursuit of livelihood objectives and these resources range from kinship networks and informal connections, to membership in more formal organizations. Grootaert, C & Van Bastelaer, T. (2001) mentioned that the social capital of a society includes the institutions, the relationships, the attitudes and values that govern interactions among people and contribute to economic and social development.

### ***Natural capital***

The natural resource base or environment has relatively recently come to be thought of as a capital stock in the pure economic sense (Ellis, F. 2000). Natural capital is the term used for the natural resource stocks from which resource flows and services useful for livelihoods are derived. There is a wide variation in the resources that make up natural capital, from intangible public goods such as the atmosphere and biodiversity to divisible assets used directly for production (trees, land, etc.). Clearly, natural capital is very important to those who derive all or part of their livelihoods from resource-based activities such as farming, fishing, gathering in forests, mineral extraction, etc.(DFID, 2001).

Moreover, Ellis, F. (2000) briefly describes natural capital as natural resource base (land, water, trees) that yields products utilized by human populations for their survival, and Thorpe, A. & Van Anrooy, R. (2009) as the natural resource stocks, from which income and/or consumption opportunities are derived.

### ***Physical capital***

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods. Infrastructure can help people to meet their basic needs and to be more productive. Affordable transport; secure shelter and buildings; adequate water supply and sanitation; clean, affordable energy; and access to information (communications) are essential components of infrastructure for sustainable livelihoods: Infrastructure is commonly a public good that is used without direct payment. Producer goods are the tools and equipments that people use to function more productively (DFID, 2001).

Ellis, F. (2000) expressed that physical capital refers to assets brought into existence by economic production processes, for example tools, machines, land improvements like terraces or irrigation canals.

### ***Financial capital***

Financial capital refers to the financial resources that people use to achieve their livelihood objectives. There are two main sources of financial capital as mentioned below:

*Available stocks:* Savings can be held in several forms: cash, bank deposits or liquid assets such as livestock and jewellery. They are the preferred type of financial capital because they do not have liabilities attached and reliance on others. Financial resources can also be obtained through credit-providing institutions.

*Regular inflows of money:* Excluding earned income, the most common types of inflows are pensions, or other transfers from the state, and remittances (DFID, 2001).

According to Ellis, F (2000), financial capital refers to stocks of cash that can be accessed in order to purchase either production or consumer goods, and access to credit. Similarly, Thorpe, A. & Van Anrooy, R., (2009) stated financial capital as the financial resources, including cash and credit opportunities, available to the household.

In addition, Ellis, F. (2000) stressed that access status of individual or household with respect to savings, loans or other forms of finance or credit clearly

make a big difference to the livelihood choices that are open to them, and therefore financial capital is recognized as an important component of individual or family assets.

### **6.3 Livelihood strategies**

The term used to denote the range and combination of activities and choices that people make in order to achieve their livelihood goals. Livelihood Strategies include: how people combine their income generating activities; the way in which they use their assets; which assets they chose to invest in; and how they manage to preserve existing assets and income. Livelihood Strategies are diverse at every level. For example, members of a household may live and work in different places, engaging in various activities, either temporarily or permanently. Individuals themselves may rely on a range of different income-generating activities at the same time, and are likely to be pursuing a variety of goals (DFID, 2001).

### **6.4 Livelihood outcomes**

Livelihood Outcomes are the achievements – the results – of livelihood strategies. Outcome categories can be examined in relation to the following categories: more income, increased well-being, reduced vulnerability, improved food security, more sustainable use of the natural resource base, social relations and status, dignity and (self) respect (DFID, 2001).

### **6.5 Income diversification**

Sources of income may diverse and vary individually or from household to household. However, Ellis, F. (2000) explained income diversification into three categories: farm income, off-farm income and non-farm income.

***Farm income:*** This refers to income generated from own-account farming, whether on owner-occupied land or, on land accessed through cash or shared tenancy. Farm income includes livestock as well as crop income, and comprises both consumption-in-kind of own-farm output and cash income obtained from output sold. Normally, farm income is measured as net income after deduction of production costs: expenditures in cash or in-kind on rented land, variable inputs such as seeds, fertilizers, pesticides etc. and hired labors, from gross income. Family labor inputs

are not deducted in this way when the objective is to describe the net contribution of farming to household income.

**Off-farm income:** Off-farm income refers to wages or exchange labour on other farms (within agriculture). It includes labor payment in-kind such as harvest share system and other non-wage labour contracts. It may also include income obtained from local environmental resources such as firewood, charcoal, house building materials, wild plants, bush meat and so on. These can be measured and a value attached to them.

**Non-farm income:** Non-farm income refers to non-agricultural income sources. Common kinds of non-farm income are: (1) non-farm rural wage or salary employment; (2) non-farm rural self-employment or business income; (3) rental income obtained from leasing land or property; (4) urban-to-rural remittances arising from within national boundaries; (5) other urban transfers to rural household, for example, pension payments to retiree; (6) remittance arising from cross-border and over-seas migration.

## **6.6 Plantation forestry in Myanmar**

### **6.6.1 Policy stipulations related to plantation forestry**

In 1995, Myanmar Forest Policy was promulgated in accordance with sustainable development principles adopted in UNCED. The policy explicitly highlights its objectives and measures in paragraph 3. Among them, “Forest Regeneration and Afforestation” is one of the key areas on which the policy emphasized. The policy clearly identified and mentioned the two objectives of forest regeneration and afforestation as follows:

- 1) To pursue sound programme of forest development through regeneration and rehabilitation operations to optimize productivity from natural forest;
- 2) To encourage planting of fast growing multipurpose tree species in degraded forest lands, rebuilding forest and farm lands to meet industrial and domestic demand, as well as restore ecological balance.

In order to achieve the above-mentioned objectives, the policy also stipulates its measures such as establishing plantation cooperatives and providing institution finance for establishment of man-made forests on degraded/denuded lands; and reforestation to restore degraded land and meet rural needs. However, it highlights

that only a combination of plantation forestry and natural forest management is the most efficient use of forest resource base in the country.

### **6.6.2 Historical background and status of plantation forestry**

Historically, in order to create teak plantations in conjunction with cultivation of agricultural crops on hill slopes, the so-called “taungya” system was adopted in Myanmar in 1869. The term “taung” in Myanmar language actually means hill and “ya” means a plot of agricultural land on a slope (Wint, S. M.).

Referring to (Blanford, 1958), P.K. Ramachandran Nair (1993) confirmed that “taungya” was originally local term in Myanmar for shifting cultivation, and it was subsequently used to describe the afforestation method. He mentioned “taungya” system as a forerunner to agroforestry, and development of the system dated back over 150 years ago when Dietrich Brandis, German Forester, arrived in Burma in 1856. By that time, shifting cultivation was widespread in the country and there were several court cases against the villagers for encroaching on the forest reserves. After realizing the detrimental effect of shifting cultivation on the management of timber resources, Brandis encouraged the practice of "regeneration of teak (*Tectona grandis*) with the assistance of “taungya”. The villagers were given the right to cultivate food crops in the early stages of plantation establishment, and at the same time they promoted afforestation on the cleared land by sowing teak seeds.

Generally, Myanmar foresters agreed that forest plantation using “taungya” system was an efficient and successful method to establish forest plantation in the form of compensatory plantations on a small scale at low cost. During the 45 year-period (1896-1941) before the Second World War, the average area planted per year was only about 1000 ha (Wint, S. M.).

However, the large-scale plantation had initiated by 1980s, along with development of East Pegu Yoma Project (EPP) which was a large-scale teak plantation project implemented from 1979-80 to 1984-85. The project was co-financed by the Myanmar Forest Department and World Bank loan. The main expectations of the project were: to earn more foreign exchange by producing more teak and hardwood; to remove about 20,000 ha of shifting cultivation land from reserved forests; to distribute more timber for local use; to develop plantation techniques for fast growing species so as to provide fuel wood, charcoal and local use timber in short-term; to have more teak dominant forests in the future and to develop wood base industry in the future. Totally 16,914 ha of teak plantations were

established during the project as shown in Table 3 and 1720 households of land-less families were organized as basic “taungya” workers (Forest Department, 1989).

**Table 3** Area of teak plantations annually established during EPP

Year	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	Total
Area (ha)	708	1,725	2,769	3,829	3,963	3,920	16,914

Source: Ministry of Forestry, Forest Department, 1989 (adopted from Kaung, B. & Cho, K. M, 2003).

Apart from teak plantation, the project also established 2,879 ha of non-teak hard wood plantations on a research level to establish nursery technique for those species and to study development of those species.

The next milestone development in plantation forestry of Myanmar is launching teak special plantation project in 1998-99. The main objectives are: to increase area of quality teak forests while maintaining the country’s natural habitat of teak; and to increase annual timber yield while contributing to environmental stability. The project was implemented with public financing (Forest Department’s budget) in seven divisions, namely Sagaing, Bago (East), Bago (West), Magway, Mandalay, Yangon and Ayeyawady. Initially, the project period was set up for 40 years from 1998-99 to 2037-38, together with annual planting target of 20,000 acre (approximately 8,000 ha). However, the project was able to run up to 2005-06, later on it was dissolved under normal plantation programme of Forest Department. The status of region-wise teak special plantation establishment during the period of 1998-99 to 2005-06 is presented in Table 4.

**Table 4** Teak special plantation establishment (1998-99 to 2005-06)

Region	Sagaing	Bago (East)	Bago (West)	Magway	Mandalay	Yangon	Ayeyawady	Total
Area (ha)	5,261	9,713	10,927	13,355	15,783	3,237	6,475	64,751

Source: Planning & Statistics Division, Forest Department

Along with changes in political, social and economic situation, there has been increasing high demand in timber and firewood. In addition, protecting watershed

areas of newly constructed dams and reservoirs became an important task for the Forest Department. Currently, the Forest Department has been developing four types of forest plantations, namely Commercial Plantation, Village Supply Plantation, Industrial Plantation and Watershed Plantation.

Between 1981 and 2012, the total area of different types of plantations established by the Forest Department reaches 0.87 million ha (2.14 million acres) all over the country. Table 5 shows the area of forest plantation with respect to different types established by the Forest Department for the said period.

**Table 5** Area of forest plantation established by Forest Department during the period of 1981- 2012 (March)

Sr.	Types of Plantation	Area (ha.)	Percent
1	Commercial plantation	475,059	54.92
2	Village supply plantation	135,951	15.71
3	Industrial Plantation	72,489	8.38
4	Watershed Plantation	181,540	20.99
	Total	865,039	100.00

Sources: Natural Forest and Plantation Division, Forest Department, 2011

Up to 2005-06, forest plantations were developed by the public sector, and therefore the Forest Department is the only organization in the country which is responsible and has a mandate for establishment of all types of plantations mentioned above (Forest Law, 1992, Section 13) whereas the Dry Zone Greening Department has been establishing village supply plantation and watershed plantation, except commercial and industrial ones, since its establishment in 1997.

However, budget and manpower are major constraints to successful implementation and maintenance of such a large extent of forest plantation from the public sector. On the other hand, Myanmar has reformed its economic policy and it encourages the market-oriented economy. In line with newly reformed policy, the Forest Department invited private investments in plantation forestry in 2006-2007.

Up to 2011-12, over 100 national entrepreneurs/companies invested in this area and total area of nearly 44,000 ha of private forest plantation has been established all over the country. Of which, 65% of total area stands for private teak plantations and the remaining 35% non-teak other hardwood plantations. Generally, private forest plantations fall under the categories of commercial and industrial plantations. Table 6 shows the status of State and Region-wise private forest plantations development in the country.

**Table 6** State and region-wise private forest plantations development in Myanmar

Sr.	State/Region	Teak plantation (ha.) <sup>1</sup> (as of 24-2 2012)	Non-teak other hardwood plantation (ha.) <sup>2</sup> (as of 24-2 2012)	Total (ha.)
1	Kachin	659.65	558.88	1,218.53
2	Kayah	20.23	105.22	125.45
3	Kayin	598.95	614.51	1,213.46
4	Chin	121.41	242.01	363.42
5	Sagaing	3,345.61	1,750.30	5,095.91
6	Taninthayi	-	289.88	289.88
7	Bago (East)	12,838.93	3,047.96	15,886.89
8	Bago(West)	2,448.40	512.75	2,961.15
9	Magway	1,521.65	1,266.45	2,788.10
10	Mandalay	1,522.87	3,139.31	4,662.18
11	Mon	161.88	397.41	559.29
12	Rakhine	-	427.60	427.60
13	Yangon	1,679.48	733.65	2,413.13
14	Shan(south)	101.17	324.45	425.62
15	Shan(North)	839.74	388.75	1,228.49
16	Shan(East)	-	69.61	69.61
17	Ayeyawady	2,509.11	1,431.09	3,940.20
	<b>Total</b>	28,369.08	15,299.83	43,668.91

Sources: 1/ Planning and Statistics Division, Forest Department

2/ Natural Forests and Plantation Division, Forest Department

### 6.7 Forest resources and rural livelihood

The majority of the poor people in the world are concentrated in the rural areas and they depend on forest resources for their livelihood. It is estimated that 60 million people of indigenous people are totally dependent on forest resources, 350 million people are highly forest-dependents World Bank (2008). Forests can provide rural people a wide variety of goods such as fuel, food, medicines, housing materials, composts fertilizer, fodders, and as well as cash. Especially, dependency on forest resources increases during economic and social hardship times to the rural people.

Related to rural income from developing countries, World Bank (2008) reported that the wild food, fodders for animals and fuel are the most important products and accounts for 70 percent of forest income and household forest income

increased with the increased distance from markets. Smallholders living in forest margin in different parts of the world earn 10-25 percent of their household incomes from non timber forest products.

However, household forest income is likely to decline with the changes in quantity and quality of forest due to various causes, or when sedentary agricultural activities from hunting and gathering forest products are introduced. Such shift to agricultural land use indicates decreased availability in forest resources due to forest degradation. Although agricultural expansion increases income opportunity, this activity in turn causes deforestation and forest degradation which decreases forest income for the rural household.

Therefore, forest resources known as natural assets are of importance for the rural people especially for the poor who are inaccessible to financial, physical and human capital. The use of forest as natural insurance or safety net is important because livelihoods are characterized by unusually high levels of environmental, agricultural, epidemiological and market uncertainty (World Bank, 2008).

## **6.8 Role of NTFPs and forest land in rural livelihood in Myanmar**

### **6.8.1 Use of NTFPs**

Like other developing countries in the world, rural people representing 70 % of total population in Myanmar remains dependent on forest resources for their livelihood. Recorded or unrecorded extraction and utilization of timber and NTFPs significantly contributes to their livelihood. Among them, firewood and charcoal are important forest products for their day-to-day life. Similarly, bamboo is also essential housing materials for grass-root rural people in Myanmar.

#### ***Firewood***

Although Myanmar is a gas exporting country, domestic provision of natural gas and electricity is so far limited and inadequate. This leads to continued use of firewood and charcoal as main sources of energy. According to NFMP, the annual consumption of woodfuel per household between 1990 and 2000 is estimated at 2.5 cu-ton (4.5 m<sup>3</sup>) for rural households where as 1.4 cu-ton (2.5 m<sup>3</sup>) for urban residents. Myanmar Forestry Outlook Study (2009) reported that estimated consumption of fuelwood in Myanmar for 1990, 2000 and 2005 was 35.20, 40.56 and 44.59 million m<sup>3</sup> respectively, as shown in Table 7.

**Table 7** Estimated consumption of fuelwood in Myanmar

Fuelwood consumption	unit	1990	2000	2005
Total consumptions	(m <sup>3</sup> )	35.20	40.56	44.59
Total population	million	40.78	50.13	55.40
Per capita consumption	(m <sup>3</sup> )	0.86	0.81	0.80

Source: Kyaw Tint and CSO (various issues) / adopted from Myanmar Forestry Outlook Study (2009)

### **Charcoal**

Next to firewood, charcoal is still at the stage of second most important energy source for cooking both at urban and rural residents. Usually, all urban people purchase charcoal from the local markets. However, some rural people are involved in charcoal burning for their own consumption or for trade purposes. Thus, charcoal burning is also one of the livelihood options for the rural forest dependent peoples. So far, data of charcoal production for personal consumption is not available in Myanmar. The official records of Forest Department shows that annual charcoal production for trade purpose is between 210,000 and 300,000 cubic ton during the period of 2005-06 to 2010-11 as shown in Table 8.

**Table 8** Annual production of charcoal during the period of 2005-06 to 2010-11

(Cubic ton)

Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Charcoal production	232,583	296,877	268,561	265,906	210,334	211,744

Source: Forest Department

### **Bamboo**

Bamboo is a multipurpose forest product which can be utilized not only for housing purpose but also for food and income generation by producing value-added products. FAO & INBAR (2006) reported that bamboo production and its value in 2004-05 was estimated at 9,550 thousand metric tones, which is worth about 229,210 million Kyats. About 30 percent of production of bamboo stems accounts for raw materials needed for production of utensils, handicrafts, and for construction.

Apart from bamboo stems, collecting and selling of bamboo shots also contribute to rural livelihood: not only ensuring food security of household but also enhancing household income by selling them in the local markets. However,

production data of non-wood bamboo product such as sheaths and branches which are used for making hats and utensil etc. are so far unreported for the whole country.

Table 9 provides the production and its value of bamboo stems and bamboo shoots during the period of 2000-01 to 2004-05.

**Table 9** Production and its value of bamboo stems and bamboo shoots in Myanmar (2000-01 to 2004-05)

Sr.	Particulars		2000-01	2001-02	2002-03	2003-04	2004-05
1	Bamboo	Production (000, metric tonne)	8,480.832	8,809.955	9,116.737	9,371.410	9,550.440
		Value (million Kyats)	60,796.57	179,723.09	213,331.64	224,913.84	229,210.56
2	Bamboo shoot	Production (000, metric tonne)	0.819	0.865	0.913	0.964	0.973
		Value (million Kyats)	44.638	54.208	65.831	79.945	87.591

Source: Global Forest Resources Assessment 2005, Myanmar Country Report on Bamboo Resources (FAO/INBAR, 2006)

### ***Wild food and other products***

In addition to above-mentioned NTFPs, thatch, rattan, resin, varieties of medicinal plants, wild food such as mushroom, yam, honey as well as bush meat are also indispensable resources for the livelihood of forest dependent people. However, many of NTFPs are undervalued or unreported.

### **6.8.2 Role of forest land in rural livelihood in Myanmar**

According to Forest Law (1992), Forest Land includes Reserved Forest and Protected Public Forest, which are legally constituted for the production of sustained timber yield, environmental protection, and as well as for supplying basic needs of the people from forestry sector. Although Forest Lands are designated with aforementioned objectives, it can be said that in reality legal enforcement is still inadequate for several reasons, including increased population with high poverty rate which accounts for 26% of country's population (IHLCA Report, 2011). Therefore, encroachment for agricultural activities inside Forest Land is a very common issue in Myanmar. Encroachment can be observed in two forms: one is shifting cultivation

and another one is sedentary agricultural cultivation. Shifting cultivation is a major livelihood strategy for the indigenous people living in hill regions where population is relatively sparse. On the other hand, sedentary agriculture is common in the area where population is considerably dense with the shortage in land holding outside Forest Land. According to the statistics of Forest Department, encroachment figure all over the country as of December 2011 reaches 6,548 km<sup>2</sup>, representing 4% of the total Forest Land as shown in Table 10. Moreover, grazing is another common form of use of Forest Land by rural people. Most of rural farmers residing near forests used to pasture their cattle in the forest land. In addition, they can harvest fodders to feed their domesticated animals that are kept in their house. It encourages their livelihood with income diversification. Regardless of legal status, Forest Lands therefore play an important role in achieving goals of rural livelihood under current situation.

**Table 10** Encroachment area inside forest land (As of December, 2012)

Sr.	State/Region	Forest Land	Encroachment	Percentage to
1	Kachin	16,291.47	340.56	2.09
2	Kayah	6,344.60	143.33	2.26
3	Kayin	9,045.40	197.76	2.19
4	Chin	5,168.74	110.34	2.13
5	Sagaing	29,198.17	1,719.85	5.89
6	Taninthayi	12,794.35	283.26	2.21
7	Bago (East)	10,898.92	257.76	2.36
8	Bago(West)	5,177.15	91.39	1.77
9	Magway	10,515.58	598.25	5.69
10	Mandalay	9,600.35	444.58	4.63
11	Mon	2,155.71	261.61	12.14
12	Rakhine	6,865.01	160.64	2.34
13	Yangon	1,075.06	1.24	0.11
14	Shan(south)	19,126.93	201.77	1.05
15	Shan(North)	6,393.97	154.17	2.41
16	Shan(East)	5,697.29	61.71	1.08
17	Ayeyawady	7,201.03	1,520.17	21.11
	<b>Total</b>	<b>163,549.72</b>	<b>6,548.37</b>	<b>4.00</b>

Source: Planning & Statistics Division, Forest Department (2012)

## **6.9 Linkage between forest land concession, afforestation and local people's livelihoods**

Cromwell, E. (2002) stated that a majority of people in the developing world live on or use land over they have insecure tenure. Tenure security protects people's investments in the land and property they occupy against political or commercial exploitation. Rights to land can be an important source of asset-based security for the poor.

Concerning land concession in Lao PDR, Cor. H. Hanssen (2007) pointed out that through granting land concessions, hundreds of thousands of hectares have been alienated from local communities; they have lost the land, or access to the land, or the right to use it. This has had a negative impact on the livelihoods of especially the poorest communities and the poorest within communities.

Similarly, Prachvuthy, M. (2011) conducted a study on Impacts of Economic Land Concessions on the Livelihoods of Indigenous Communities in Northeast Provinces of Cambodia and it has been reported that economic land concessions are not providing great benefits for local communities and that they had in fact harmed their traditional livelihoods. Only one-third of company jobs have gone to indigenous peoples, with the other two-thirds going to in-migrant workers, who are challenging the indigenous way of life.

Dahal.G.R et al (2011) also suggested that decisions to allow large-scale commercial intervention in forests forest lands - such as the establishment of industrial plantations, large-scale commercial industrial, mining and logging- should not be guided by interests seeking to raise government revenue and profit for investors. Rather, decision makers need to consider longer term, socioeconomic and environmental benefits, and whether such interventions will provide any benefits to local residents while seeking the rights and traditional practices of local people.

Moreover, Hopley, M. (2007) pointed out that according to evidence the privatization and enclosure of common pool resources are driving livelihood transformation in quite negative ways, increasing inequality, and generating conflict. Also she stressed that the challenge facing forestry is not just the restoration of trees or forest biodiversity but the growth of a political and social landscape that facilitates people's abilities to make choices to secure their livelihoods

On the other hand, Hoogenbosch, L. (2010) highlighted that the plantations in Ghana's High Forest Zone offer workers a stable livelihood with permanent wage

labor and the ability to grow food crops between the trees, and that plantations are managed in different ways and therefore represent different strategies to contribute to the workers' livelihood.

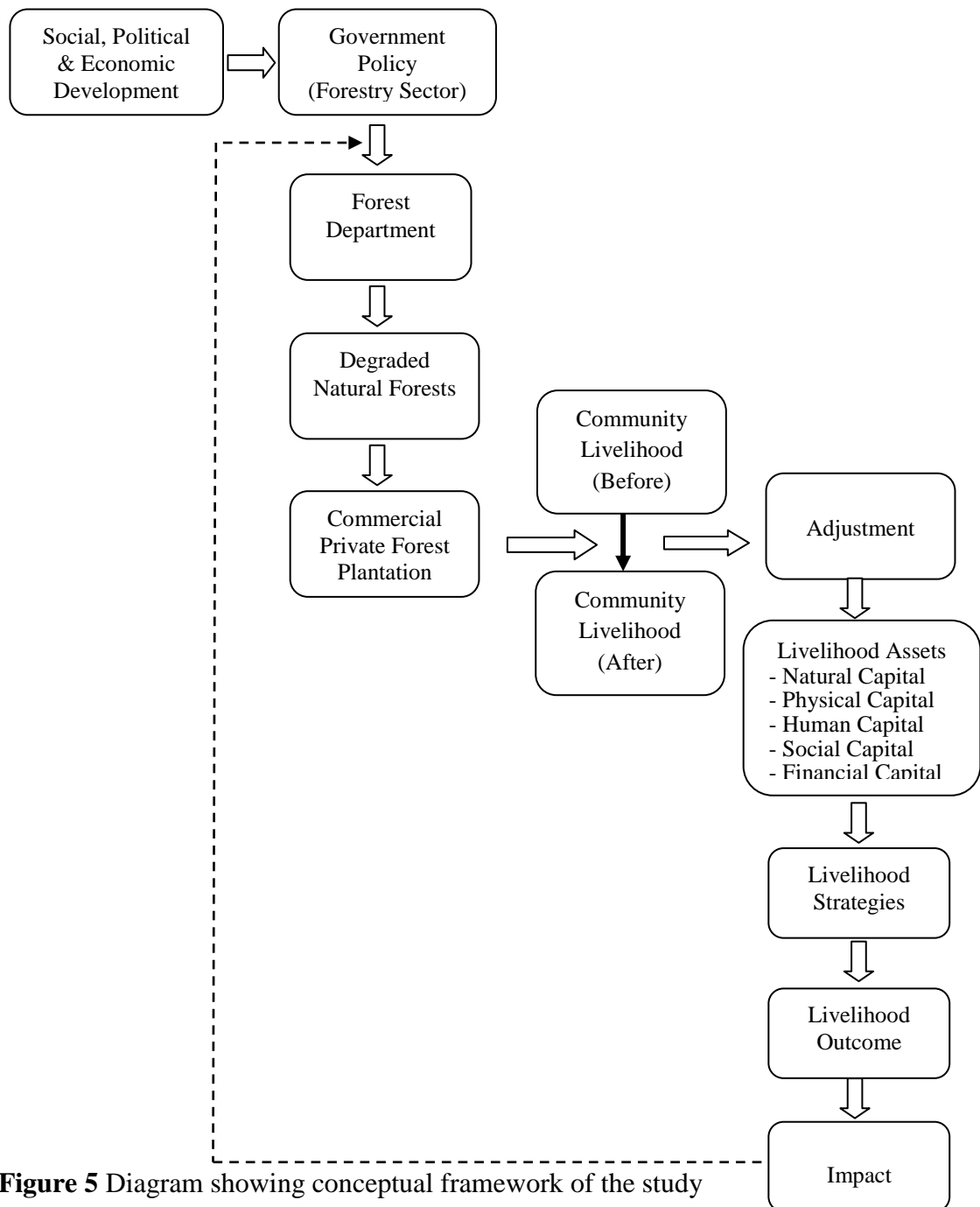
Schirmer (2006) highlighted commonly-reported perceptions of impacts of afforestation that afforestation provides increased quantity of employment in a region and can revitalize declining rural communities by providing new industry and employment opportunities. Consequently, it can improve local/regional service provision too. On the other hand, it has also been mentioned that afforestation takes up land needed for other uses such as agriculture, and reduces people's ability to live/subsist off the land by reducing their access for various agricultural/subsistence activities

Therefore, it is clear that developing private forest plantations under forest land concession might have both positive and negative impacts on the livelihoods of local communities. But, their magnitude and direction may vary with the extent of social and environmental safeguards that are incorporated into forest land concessions policy and practice of individual private company and entrepreneur.

## **7. Conceptual framework of the study**

The illustration of the conceptual framework of the study is provided in the Figure 5. The main concept is that along with social, political and economic development in the country, the government policy related to forestry sector has also changed. In line with newly adopted policy, Forest Department grants concession rights of state owned forest land to private companies/ entrepreneurs for developing forest plantation, especially in the degraded forest area. However, encroachment inside forest land is very common issue in the country, and rural livelihoods are somehow dependent on these degraded forest areas, by doing shifting cultivation or sedentary agriculture and/or collecting a wide range of forest products. In this case, development of private forest plantation may bring about limited access to livelihood assets (especially to natural capital) of local communities. But, on the other hand, this would enhance livelihood diversification for the rural people by creating job opportunity. Thus, it's important to know how local communities cope or adjust with this situation; how development of private forest plantation causes change in livelihood assets (natural, financial, physical, social and human capital) of local

communities as well as their livelihood strategies and ultimately livelihood outcome. This impact needs to be reported back for review and improvement of forestry related policy, in particular related to forest land concession for development of private forest plantation.



**Figure 5** Diagram showing conceptual framework of the study

## 8. Methodology

### 8.1 Research design

The study was conducted by using both qualitative and quantitative methods. Qualitative approach was used in studying livelihood impacts of private forest plantations by organizing key informant interviews. On the other hand, quantitative approach was applied in studying livelihood impacts of private forest plantations during household survey.

### 8.2 Selection of study area

The study area is geographically located in Kyauktaga Township, Bago District, Bago Region. The Aingdon Kun reserved forest is situated in Kyauktaga Township and largest private plantation area falls under this reserved forest. Among others, private forest plantation established by National Resource Development Company (NRDC) in Aingdon Kun reserved forest is 10,500 acres (4,249 ha.) and the one developed by Yuzana Company is 10,000 acres (4,047 ha.) respectively. They are the largest ones in the country.

Concerning selection of study area, the assumption adopted in this study area is that the nearest local communities to the largest plantations might have more impact. Therefore, selection of study villages was carried out using the criteria of “nearest to the largest private forest plantations”. Only two target villages, i.e. each village nearest to each plantation, were selected as representative communities in this study. According to the preliminary investigation carried out on 27-28 December, 2012, the following two villages were selected as target villages:

- 1) Taungthonlon village which is nearest to NRDC’s plantation
- 2) Inwainggyi village which is nearest to Yuzana’s plantation

### 8.3 Sampling and sample size

There are altogether 263 households in two target villages: 134 in Taungthonlon village and 129 in Inwainggyi village. Sample size was calculated at 5% precision level by using Taro Yamane formula (Yamane, 1967):

$$n = \frac{N}{1 + N e^2}$$

Where;           n = sample size,  
                   N= total population of household  
                   e = precision level

Thus, the result of sample size calculation is 158. Then, it was proportionately allotted for the each target village: 81 households for Taungthonlon village and 77 households for Inwaingyi village. After that sample households were randomly selected.

## **8.4 Data collection**

### ***Collection of secondary data***

Secondary data related to private forest plantation were mainly collected from Headquarters of Forest Department before conducting field data collection. Some additional secondary data related to the study was also obtained from Local Forest Department of Kyauakta Township while collecting primary data.

### ***Collection of field data***

Field data collection was carried out by using RRA /PRA tools. For the qualitative research, key informants are identified on the basis of their organizational and community positions, reputations, knowledge of issues under study, or the fact that they are individuals described by others as knowing a lot about this place or thing (William F. Elmendorf and A.E. Luloff, 2001). Therefore, in order to collect data at village level, key informants who have good knowledge about village as well as about private forest plantation were selected. Then, group intrview comprising 5 key informants was organized in each village in order to study about general profile of villages. Further more, more key informant interviews were also conducted with company personnel from Yuzana and NRDC; one farmer involved as leader in land use conflict with Yuzana; and three “taungya” cutters in private forest plantation companies. In addition, transect walk was also carried out along with one villager from each village to know about land use status of the study villages.

For conducting household survey, questionnaires were prepared to ensure that its scope covers livelihood assets, livelihood strategies and livelihood outcomes for assessing impact of private forest plantation. Also they were pretested among 10 households in Taungtholon village in order to know their validity and workability. Then, they were improved based on the findings during the pretest phase. Data were collected from the sample households by using questionnaires along with personal

interviews to household head or his spouse. Before interviewing, they were briefly explained about research work and got their prior informed consents. Then, interview was conducted.

### **8.5 Data analysis:**

The data collected was compiled in Microsoft Office Excel. Then, data cleansing was undertaken so as not to affect on data analysis by invalid and incomplete data (<http://en.wikibooks.org>). Thus, data obtained from 6 newly established households were omitted from data analysis because these households had not yet established in 2008. Similarly, incomplete data from 2 other households were also excluded when analyzing. Finally, the total number of households was 150 after performing data cleansing process, 76 in Taungthonlon village and 74 in Inwainggyi village. Then, coding data, processing and analysis were carried out in SPSS Programme (version 17.0) as well as in Microsoft Office Excel 2007. Descriptive statistics was used for analyzing livelihood assets, and livelihood strategies. Inferential statistical analysis was carried out for analyzing livelihood outcome before and after establishment of private forest plantation, i.e. household income in 2008 and 2012. In this study, all incomes for both years were calculated by using constant prices in 2012 so as to avoid the effect of price on the income. In order to choose an appropriate statistical test, firstly normality tests for income differences between 2008 and 2012 were performed. As samples were related ones and all results of normality tests were not in normal distribution, Wilcoxon Signed Rank Test (1945) was chosen for analyzing total income, farm income, off-farm income and non-farm income. In addition, analysis on household incomes for private plantation workers was also carried out by doing normality test and Wilcoxon Signed Rank Test (1945) to determine whether there was significant difference between their incomes in 2008 and 2012.

Moreover, notes taken during key informant interviews were refined after field data collection. Triangulation was also carried out to improve the reliability of these qualitative data by using findings of key informant interviews to villagers, company personnel as well as findings during household interviews and secondary data. Then analysis was done at village level.

## **9. Results: Impacts of private forest plantations on livelihood of local communities**

### **9.1 Impacts on livelihood assets**

#### **9.1.1 Natural capital**

##### *Access to land*

The cultivated land belonged to Taungthonlon village is about 200 acres and mainly located on roadside to the west of village. Before private forest plantation, there were some villagers who had been cultivating in reserved forest. When the companies came in under land concession right to establish private forest plantation, they persuaded villagers to sell the land to them. Altogether, about 20-25 acres of farmland and another 20-25 acres of orchard are purchased by the NRDC at 80,000 Kyat/acre. Thus, the land holding of village reduced to certain amount after developing private forest plantation.

As for Inwainggyi village, it is geographically located about three miles in east to Bago Yoma and just one mile from the boundary of Aingdon Kun Reserve. Thus, the village is rich with natural resources. Forest encroachment for agricultural purposes has been a normal practice since long time ago. Not only villagers from Inwainggyi but also those from other villages encroached and reclaimed the land for agriculture inside the reserve. Some has settled for about 20 years. Since before Yuzana Company entered this area, there had been a large extent of paddy fields and other farm plots on which usually farmers grow sesames inside the reserve forest. Therefore, the cultivated land of Inwainggyi village was about 500 acres, about 250 acres inside the Reserve and another 250 acres outside the Reserve.

In 2009, Forest Department issued permission to Yuzana Company for establishing 10, 000 acres of private forest plantations. The area fell under compartment 1-7 of the Reserved Forest. The permitted land included 595 acres of paddy field, being cultivated by 79 farmers from Inwainggyi, Bantbwegon, Thayetsein, Moemakha, Sinzaloke, Senseik, Gyogon and Sarpyin village. However, among them the majority are from Inwainggyi village.

Then, the Company informed Chairman of Village Peace and Development Council (VPDC) about their land concession permit to establish private forest plantation, so that the farmers must leave their plots inside the Reserve. Also the Company proposed to pay the cost of land clearing as compensation to the farmers at the rate of 100,000 Kyat/acre for the paddy fields. But the company did not directly

meet and inform the farmers for getting their consent. The farmers did not agree on the proposal for compensation. Thus, the case was put forward to Kyauktaga Township Peace and Development Council (TPDC).

Finally, almost all farmers except seven accepted the compensation at the said rate for the paddy fields in 2010. But, they did not receive any compensation for “ya” (a plot of agricultural land on a slope) where they previously grew sesames. Then they left their lands and moved back to the village. In late 2010, the Chairman of Bago Division Peace and Development Council (DPDC) instructed TPDC to allow the farmers to grow paddy if forest plantations were not developed on ground. By that time, the Company rent paddy fields to tenant farmers without growing teak trees.

No sooner had the instruction been known, the farmers came into their lands again. Then, the Company personnel and farmers negotiated with the help of Official from Myanmar Agriculture Service. But they did not reach agreement. The farmers asked for 300,000 K/ acre, but the Company did not agree on the farmers’ proposal. Since then the farmers has been working on their farms without returning compensation to the Company.

As a result, farmers could not grow crops in 2009 and 2010 due to the conflict over land, and consequently land holding of the village had reduced during the said period. Starting from 2011, they got back their paddy fields, but their “ya” plots had been planted with teak trees by the Company.

Findings of household survey showed that an average landholding size in study area was 3.2 acres per household (SD=4.4) before establishing private plantation, i.e in 2008. After developing private forest plantation, this however decreased to 2.3 acres per household (SD=3.9) in 2012.

Table 11 indicates the changes in land holding size of household in two study villages in 2008 and 2012. It was found that the percentage of “landless” household in both villages increased between 2008 and 2012, from 63.2% to 71.1% in Taungthonlon village and 44.6% to 55.4% in Inwainggyi village. On the other hand, households with landholding size “above 10 acre”, and of “above 5 acres to 10 acres” declined in Taungthonlon village, from 2.6% to 0%, and from 15.8% to 9.7% respectively. Similarly, the decrease was also found in Inwainggyi village from 8.1% to 5.4 %, and from 28.4 % to 23% for the respective class of landholding size. As overall, percentage of “landless” households has risen up from 54.0% to 63.3% while

reducing in landholding classes of “above 10 acre”, “above 5acres to10 acres”, and “3 acres to 5 acres”.

**Table 11** Distribution of households by landholding size in 2008 and 2012

Year	Village	House- hold	Land holding					Total
			Landless	1 ac. -<3 ac.	3 ac. -5 ac.	>5 ac. - 10 ac.	>10 ac.	
2008	Taungthonlon	No.	48	2	12	12	2	76
		%	63.2%	2.6%	15.8%	15.8%	2.6%	100.0%
	Inwainggyi	No.	33	4	10	21	6	74
		%	44.6%	5.4%	13.5%	28.4%	8.1%	100.0%
	<b>Total</b>	<b>No.</b>	<b>81</b>	<b>6</b>	<b>22</b>	<b>33</b>	<b>8</b>	<b>150</b>
		<b>%</b>	<b>54.0%</b>	<b>4.0%</b>	<b>14.7%</b>	<b>22.0%</b>	<b>5.3%</b>	<b>100.0%</b>
2012	Taungthonlon	No.	54	4	11	7	0	76
		%	71.1%	5.3%	14.5%	9.2%	0%	100.0%
	Inwainggyi	No.	41	5	7	17	4	74
		%	55.4%	6.8%	9.5%	23.0%	5.4%	100.0%
	<b>Total</b>	<b>No.</b>	<b>95</b>	<b>9</b>	<b>18</b>	<b>24</b>	<b>4</b>	<b>150</b>
		<b>%</b>	<b>63.3%</b>	<b>6.0%</b>	<b>12.0%</b>	<b>16.0%</b>	<b>2.7%</b>	<b>100.0%</b>

Among 150 sample households, 117 households remained “unchanged” or “no decrease” in landholding size. For the remaining 33 households, 11 from Taungthonlon and 22 from Inwainggyi village, landholding size decreased between 2008 and 2012. Of 33 households, 27 household respondents mentioned private forest plantations as reason for reducing their landholding size while the rest 6 households provided other reasons.

#### *Access to forest resources*

As Taungthonlon village is situated on the foot of Bago Yoma (mountain range), the forest resources play an important role in livelihood of villagers. The firewood is an essential forest product to the villagers for cooking, but they don't usually use charcoal. Before the coming of private forest plantation companies, the firewood were collected in the area of U Kyaw San's plantation in Daingtaya Reserved Forest next to the village to the east, and NRDC plantation site in Aingdon Kun Reserved Forest, which is about 0.5 to 1 mile to west of the village. Now, it becomes more difficult to collect firewood. Collecting in the plantation area needs to get permission from companies. Only if the companies allow, collection can be done.

Otherwise, the villagers have to go farther distance to get the firewood. Similarly, bamboo gradually becomes rare since the companies came in. Previously, the bamboo is available within 3 mile distance from the village. Now, it needs to go up about 6-8 miles to cut bamboo. For the roofing material, U Kyaw San's plantation area has been where the villagers harvest thatch. Although thatch grows more abundantly in this area compared to the years before establishing plantation, it causes difficulty for the villagers to harvest since it needs to get permission to enter. For harvesting timber, it needs to go much far way. Although timber was previously available within 9-10 miles distance in some patches with remaining trees after timber harvesting companies left, now timber can be harvested only in the area about 20-25 miles from village.

In Inwainggyi village, firewood and thatch were available within the range of 0.5-2 miles in current plantation area before establishment of Yuzana Plantation. Now, it needs to go about 3 miles to cut firewood and to harvest thatch. Similarly, Bamboo is available within 3 miles distance from village, now it is about 5-6 miles to reach the place where bamboo is available. Previously, timber can be cut in the area which is about 5 miles from village, now the distance to go for cutting timber is farther up to 15 miles.

As for change in collection of NTFPs, Table 12 shows the mean harvested NTFPs per household for both consumption and sale. Apart from pole, Wa-u (Round yam) and vegetable, production of other NTFPs reduced in 2012. Compared to the mean harvest per household, there were decrease in 2012, about 22% in firewood, 84% in charcoal, 18% in bamboo, 24% in thatch and 39% in bamboo shoot.

**Table 12** Mean harvest of NTFPs per household in 2008 and 2012

NTFPs	Unit	2008		2012	
		Mean	SD	Mean	SD
Pole	no.	2.6	5.2	2.6	5.4
Firewood	cart-load	7.4	5.9	5.8	4.6
Charcoal	bag	8.5	51.4	1.4	17.1
Bamboo	no.	177.1	145.2	144.8	155.2
Thatch	"byit"	287.3	256.8	218.1	197.6
Bamboo shoot	viss	5.6	10.5	3.4	6.7
Wa-u (Round Yam)	viss	5.3	65.3	5.3	65.3
Assorted vegetables	value (kyat)	5,433.3	25,605.5	5,450.0	26,409.3

In addition, it was observed that the distance to travel for collecting NTFPs was farther after private forest plantation companies entered. Table 13 indicates the mean distances for producing NTFPs in 2008 and 2012. Regarding to situation of collecting NTFPs, among 144 households, 91% described that collecting NTFPs became more difficult after developing private forest plantation where as the rest 9 % said there was no difficulties.

**Table 13** Mean distance for collecting NTFPs

Year	Village	Mean distance in mile for producing NTFPs							
		Pole	Fire-wood	Charcoal	Bamboo	Thatch	Bamboo shoot	Wa-u (Round Yam)	Vege-table
2008	Taungthonlon	2.7	1.2	-	2.3	0.9	2.1	2.0	1.2
	Inwainggyi	1.7	0.8	4.0	2.2	1.1	1.7	-	2.7
	<b>Total</b>	<b>2.3</b>	<b>1.0</b>	<b>4.0</b>	<b>2.3</b>	<b>1.0</b>	<b>1.9</b>	<b>2.0</b>	<b>1.7</b>
2012	Taungthonlon	7.0	2.6	-	5.9	1.1	4.5	5.0	1.9
	Inwainggyi	4.9	2.9	6.0	4.9	2.0	3.2	-	2.7
	<b>Total</b>	<b>6.4</b>	<b>2.7</b>	<b>6.0</b>	<b>5.3</b>	<b>1.6</b>	<b>3.8</b>	<b>5.0</b>	<b>2.3</b>

### *Access to grazing land*

The villagers in both study villages used to practice free grazing their cattle in plantation areas. As the plantation developed, the grazing land shrinks. If one planted tree is damaged by the cattle, the owner must compensate 20,000-30,000K per tree. Thus, grazing practice has also been changed from “free grazing” to “controlled grazing” in which cattle were fed with collected fodders, hays, and grazed on farm sides with keepers.

#### **9.1.2 Physical capital**

##### *Infrastructure*

It was found that the road network around Taungthonlon village was too poor over the last decades. There were only 3 cart-tracts connecting to the Gyogon, Ye-e and Daingtaya village. It was also found that Inwainggyi village uses Thayetsein-Aungmingalar road, an all-weathered road, leading to old Yangon-Mandalay highway. Then, it can reach Kanyutkwin via Aungmingalar to north and Tawkywein to south. There is also Inwainggyi-Tumaung road, a village-to-village connection road. As new Yangon-Mandalay Highway road has emerged in 2006, infrastructure of road network in the vicinity of study villages has much more improved.

Regarding water resources, the study indicated that the agriculture in Taungthonlon was totally dependent on the rain; that there were 21 wells in the village then for domestic use of water and the water supply was found insufficient for the village due to low water table, especially in the dry season. As for Inwainggyi village, so far it relies on the natural rain and there is no irrigation facility. However, construction of irrigation canals for delivering water from Kun Chaung dam is underway. This project is being implemented by the Irrigation Department, Ministry of Agriculture and Irrigation. The main canal is about 3 miles far from the village and there will be three sub-canals for irrigation in Sinzaloke village tract. Thus, the village will be able to use irrigated water after completion of this project. For domestic water, there are 8 hand pumps in the village and it is sufficient for the whole village.

In addition, the study showed that there was no even a primary school in Taungthonlon village up to 2005. In 2006-2007, a primary school appeared under self-reliance scheme with village's initiative. In 2012, there were 2 primary schools in the village, one in the old block of village and the other one in the new block of the village. The students must go to Gyogon and Myochaung for continuing their middle school education and to Pado and Kyauktaga for high school education, which are about 10 and 15 miles from the village. There is no dispensary or village health station, the villagers rely on village health station of Gyogon for the health service. Kyauktaga and Pado are the market places where villages usually access. In Inwainggyi village, there is a primary school and students needs to go to Tumaung which is 2.5 miles far from the village for pursuing middle school education, and to Kanyutkwin which is about 6 miles in distance for high school level. There is a village health care station employed with midwife in Kyaringon only. It is about 4.5 miles far from Inwainggyi village. Kanutkwin and Tawkywein are the major markets places for the village.

According to the findings, neither positive nor negative impact of private forest plantations on development of village infrastructure was significantly found in village context. However, it was observed that U Kyaw San, a private forest plantation entrepreneur, helped construct village's main road with a wooden bridge to improve village infrastructure in Taungthonlon village. In addition, the feeder road from highway to his plantation can also be used by the villagers. Thus, not even significantly, it contributes to improving physical capital of the village to certain level.

### *Household assets and goods*

Table 14 depicts changes in household assets and goods in study villages between 2008 and 2012. It was found that number of “trawllergy”, cart and rice mill declined in 2012 while number of hand-tractor, motorbike, bicycle, grocery, radio, TV, portable DVD/EVD, generator and water pump/compressor increased. In addition, although there was no threshing machine, mobile phones and solar plate in 2008, some households in the study area owned such goods in 2012. Thus, it can generally be stated that household assets and goods improved between 2008 and 2012. However, there was no clear cut evidence that this improvement was impact of private forest plantation alone. Nevertheless, it could be generally concluded that it was a combined impact of development of private forest plantation and Yangon-Mandalay Highway during the said period. Also technology innovation that made peoples affordable to purchase things could be considered as a compounded factor to this.

**Table 14** Household assets and goods in 2008 and 2012

(Number per thousand households)

Village/ Year	Hand-tractor	Threshing Machine	Trawlery	Cart	Motorbike	Bicycle	Rice mill	Grocery	Mobile phone	Radio	TV	DVD/EVD	Sound Box set	Sewing machine	generator	Pump/compressor	Solar plate
<b>Taungthonlon</b>																	
2008	13	0	26	132	118	237	39	92	0	224	66	39	13	13	26	13	0
2012	13	0	26	158	408	329	13	118	66	342	118	158	13	13	39	26	13
<b>Inwainggyi</b>																	
2008	0	0	14	257	149	338	0	41	0	297	95	95	0	14	14	14	0
2012	41	14	0	203	324	351	0	68	0	324	122	243	0	14	27	14	27
<b>Total</b>																	
<b>2008</b>	<b>7</b>	<b>0</b>	<b>20</b>	<b>193</b>	<b>133</b>	<b>287</b>	<b>20</b>	<b>67</b>	<b>0</b>	<b>260</b>	<b>80</b>	<b>67</b>	<b>7</b>	<b>13</b>	<b>20</b>	<b>13</b>	<b>0</b>
<b>2012</b>	<b>27</b>	<b>7</b>	<b>13</b>	<b>180</b>	<b>367</b>	<b>340</b>	<b>7</b>	<b>93</b>	<b>33</b>	<b>333</b>	<b>120</b>	<b>200</b>	<b>7</b>	<b>13</b>	<b>33</b>	<b>20</b>	<b>20</b>

Similarly, it was observed that type of housing too improved after 2008. Among the houses constructed in 2008 and before, zinc sheet roofing accounted for 19.2 %, square swan timber post 15.4% and brick wall 2%. However, of those constructed after 2008, zinc sheet roofing represented 25.5%, square swan timber post 28.6% and brick wall 3.1%. Table 15 provides the more details about changes in

housing type. Thus, it could generally be stated that types housing also improved in study area. The possible reason would be increase in household income as a combined result of development of private forest plantation and highway.

**Table 15** Types of housing

Village	Constructed Year	Units Constructed	Zinc sheet roofing		Square swan timber post		Brick wall	
			No.	%	No.	%	No.	%
Taungthonlon	2008 & before	28	5	17.9	4	14.3	-	-
	After 2008	48	14	29.2	12	25.0	3	6.4
Inwainggyi	2008 & before	24	5	20.8	4	16.7	1	4.2
	After 2008	50	11	22.0	16	32.0	-	0
<b>Total</b>	<b>2008 &amp; before</b>	<b>52</b>	<b>10</b>	<b>19.2</b>	<b>8</b>	<b>15.4</b>	<b>1</b>	<b>2.0</b>
	<b>After 2008</b>	<b>98</b>	<b>25</b>	<b>25.5</b>	<b>28</b>	<b>28.6</b>	<b>3</b>	<b>3.1</b>

### 9.1.3 Human capital

#### *Health*

It was observed that malaria had been a threat to the villagers in Taungthonlon village before construction of highway. Now, malaria cases are quite rare because of health education programmes organized by health workers and distribution of mosquito nets treated with repellent. Similarly, there has no longer malaria case in Inwainggyi village since 2000. Respective midwives stationed at Gyogon and Kyaringon villages have been providing health care to the villagers of Taungthonlon and Inwainggyi. Thus, the findings showed that there was no significant health problem in both villages.

As for health condition of household members, it was observed that 91.49% were in good, 5.96% in fair and 2.55% in poor health. Comparison between two study villages showed that the percentage of household members in good health in Inwainggyi village was slightly higher than that in Taungthonlon village, representing 93.23% in the former and 90.0% in the latter. Table 16 provides health status of household members belonged to 150 sample households.

**Table 16** Health status of household members in 2012

Village	Good		Fair		Poor		Total
	No.	%	No.	%	No.	%	
Taungthonlon	342	90.00	26	6.84	12	3.16	380
Inwainggyi	303	93.23	16	4.92	6	1.85	325
<b>Total</b>	<b>645</b>	<b>91.49</b>	<b>42</b>	<b>5.96</b>	<b>18</b>	<b>2.55</b>	<b>705</b>

## Education

Regarding to education, the findings reveals that the number of people who does not have access to formal education becomes lesser in both villages, but the school drop out rate is still very high, especially in Taungthonlon village. High percentage of students left school before completing their primary education due to the family economic reason.

Among 705 household members belonged to 150 sample households, 67.8% representing both current students and out-students, were accessible to formal education, but some 18.58% were not accessible, and the rest 13.62% had not yet been enrolled for schooling. The percentage of household members accessible to formal education in Taungthonlong and Inwainggyi village were found almost the same. Drop-out rate at primary education level, i.e. leaving school before completing primary education, was found to be 24.06% to total numbers accessible to formal education as an overall. This rate was a little bit higher in Taungthonlon village than that in Inwainggyi village, representing 24.9% in the former and 22.97% in the latter. Table 17 depicts educational level of household member and Table 18 indicates drop-out rate at primary education level.

**Table 17** Educational level of household members in 2012

Village	HH members at Different Education Level				Access to Formal Education	No access to Formal Education	Not yet Schooling	Total	
	Primary	Middle	High	Graduate					
Taungthonlo	No.	201	49	6	1	257	70	53	380
	%	52.89	12.89	1.58	0.26	67.63	18.42	13.95	
Inwainggyi	No.	161	52	8	0	221	61	43	325
	%	49.54	16.00	2.46	0.00	68.00	18.77	13.23	
<b>Total</b>	<b>No.</b>	<b>362</b>	<b>101</b>	<b>14</b>	<b>1</b>	<b>478</b>	<b>131</b>	<b>96</b>	<b>705</b>
	<b>%</b>	<b>51.35</b>	<b>14.33</b>	<b>1.99</b>	<b>0.14</b>	<b>67.80</b>	<b>18.58</b>	<b>13.62</b>	

**Table 18** Drop out rate at primary education level (up to 2012)

Village	Access to formal education	Drop out rate at primary education level	
	No.	No.	%
Taungthonlon	257	64	24.90
Inwainggyi	221	51	22.97
<b>Total</b>	<b>478</b>	<b>115</b>	<b>24.06</b>

### ***Labor force***

The number of labor force is an important component to assess the human capital. Generally, household having more active labor force can earn more income and achieve their livelihood outcome. This study showed that average overall household labor force increased to 1.99 per household in 2012 from 1.68 per household in 2008. Similarly, average labor force increased to 2.03 from 1.69 per household in Taungthonlon village, and rose to 1.96 from 1.66 in Inwainggyi village respectively.

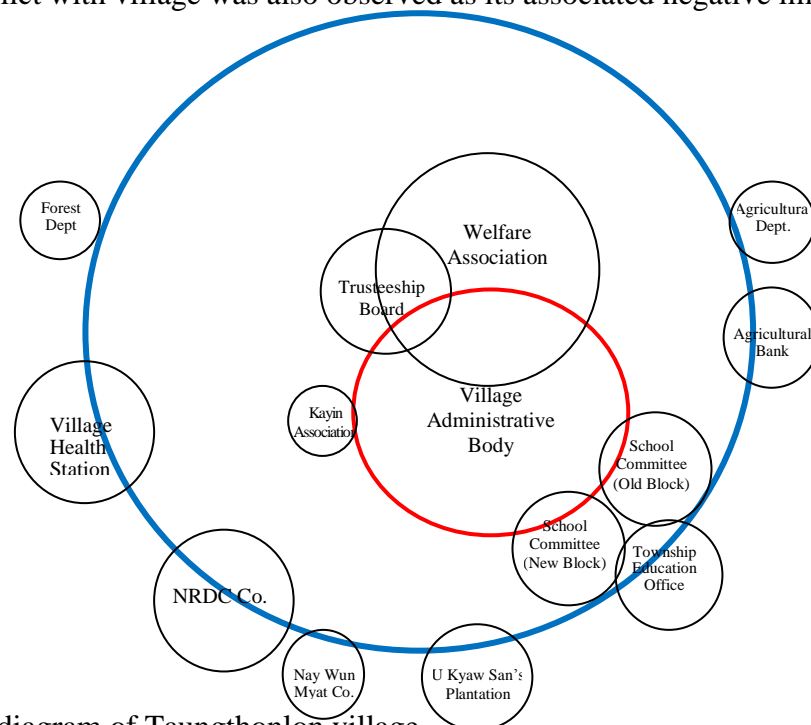
As for support of plantation companies to human capital of the village, NRDC usually provides the villagers logistic supports to go to clinic or hospital upon their request. Also medic of the company takes care of villagers when they come and consult. But Yuzana has no such supports to the nearby villages. Apart from NRDC and Yuzana, it was also known that Toe Naing Man Company had established a clinic at its work site and provides primary health care to the sick workers. In addition, the Company has arranged a school for the children of plantation workers. Although such initiatives are questionable in terms of significance and sustainability, it could be assumed as positive impacts. Otherwise, children who accompanied their parent would face lack of access to education and health service because workers have to stay at work sites quite far from the village.

#### **9.1.4 Social capital**

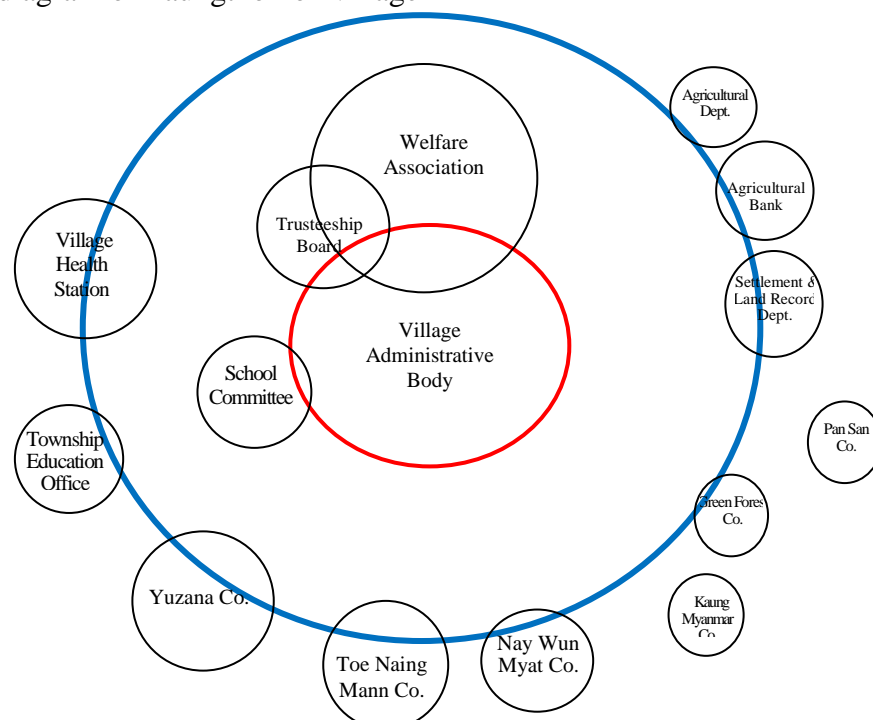
It was observed that Village Administrative Organization, Village Welfare Association, Trusteeship Board, School Committees are commonly founded organizations in both study villages. In addition, as Taunthonlon village has some Kayin households, Kayin Association is formed there. It has also been found that there are two school committees in Taungthonlon which have been working for village education separately. Regarding connection with external organizations, Village Health Station, Township Education Office, Agricultural Development Bank, Department of Agriculture are government organizations which deals with both study villages.

After the plantation companies came, it was found that both villages had linkages with more external organizations. Consequently the social capital had improved at village level. Figure 6 and Figure 7 show Venn diagrams of Taungthonlon and Inwainggyi village, illustrating how internal and external organizations connect with village communities and among themselves. The sizes of

circles represent importance for the village and overlap of circles indicates how close they linked or worked together. The findings showed that Taungthon had more connection with NRDC, and it was followed by “U Kyaw San” and “Nay Wun Myat”. Similarly, Inwainggyi had more relationship with Yuzana, and it was followed by “Toe Naing Mann”, “Nay Wun Myat” and “Green Forest”. The study also revealed that social relationship with companies contributed to better access to jobs. At the same time, conflict with village was also observed as its associated negative impact.



**Figure 6** Venn diagram of Taungthonlon village



**Figure 7** Venn diagram of Inwainggyi village

It was observed that 82% of 150 sample households participated in any of formal or informal organizations established in the village. Village Welfare Association, Village Administrative Body, Religious Association and School Committee were found as common organization in the study village. With respect to race, it has been found that 84.4% of Bamar households participated in any organization in the village where as only 44.4% of Kayin households did. Table 19 show the status of participation in organization by village.

**Table 19** Status of participation in organization by village (2012)

Village	Household	No participation	Type of Organization						Total
			Village Welfare Association	Village Administrative Body	Religious Association	School Committee	Health Organization	> One organization	
Taungthonlon	No.	14	47	5	6	0	0	4	76
	%	18.4%	61.8%	6.6%	7.9%	.0%	.0%	5.3%	100.0%
Inwainggyi	No.	13	54	1	1	1	1	3	74
	%	17.6%	73.0%	1.4%	1.4%	1.4%	1.4%	4.1%	100.0%
<b>Total</b>	<b>No.</b>	<b>27</b>	<b>101</b>	<b>6</b>	<b>7</b>	<b>1</b>	<b>1</b>	<b>7</b>	<b>150</b>
	<b>%</b>	<b>18.0%</b>	<b>67.3%</b>	<b>4.0%</b>	<b>4.7%</b>	<b>.7%</b>	<b>.7%</b>	<b>4.7%</b>	<b>100.0%</b>

As for receiving remittance from relatives, there was no household receiving remittance from their relatives in 2008. However 3.3% of total sample households received remittance from their relatives in 2012. Among study villages, 3.9 % of households in Taungthonlon and 2.7% of households in Inwainggyi received remittance.

### 9.1.5 Financial capital

#### *Access to loan*

The finding explains that all farmers from both study villages are normally accessible to agricultural loan through Agricultural Development Bank before private plantation companies came in. After their arrival, there occurred conflict over land between Yuana Company and farmers who have been doing farming inside Reserved Forest. Since then, they could not access to the agricultural loan. In order to get the loan, Chairman of the Village Bank Committee who is Chairman of VPDC as well (now Village Administrator), must endorse. Since Company's arrival, the endorsement was not issued by the Chairman to those farmers by giving reason that the land is under Forest Reserve and the Company has land concession right. Thus,

those farmers had to borrow money from outside sources at higher rate of interest where as interest rate of Agricultural Development Bank was 7% per year. Thus, this could be considered as negative impact of private forest plantation on access to the loan.

Nevertheless, the villagers used to borrow additional amount of money needed for household consumption, doing business and emergencies purposes from local money lenders within or outside the villages. The study showed that as overall 72 households representing 48.0% to the sample had to borrow cash from informal sources with an interest rate ranging from 5% to 15% per month. It was also found that the percentages of borrowing households in Taungthonlon village and Inwaingyi village were very closed, 47.4% in former and 48.6% in latter. The amount of household debt in the study area ranged from 20,000 Kyat to 800,000 Kyat, with an average of 221,338 Kyat (SD=164,954).

### *Saving*

Table 20 provides status of saving by study households. It was observed that out of 150 households, only 10 households, i.e. 6.7% of the sample households, were able to save from their income. Among 10 household respondents who gave answer that they could save, only seven provided the amount of saving. Six respondents provided in cash with minimum 100,000 Kyat to maximum 700,000 Kyat and the rest one did in kind valuing 1,000,000 Kyat in 2012.

**Table 20** Status of saving (2012)

Village	Household	Status of saving		Total
		Yes	No	
Taungthonlon	No.	5	71	76
	%	6.6%	93.4%	100.0%
Inwaingyi	No.	5	69	74
	%	6.8%	93.2%	100.0%
<b>Total</b>	<b>No.</b>	<b>10</b>	<b>140</b>	<b>150</b>
	<b>%</b>	<b>6.7%</b>	<b>93.3%</b>	<b>100.0%</b>

Out of 10 saving households, nine provided status of change in their saving, of which seven respondents gave answer that their saving amount became increased after private forest plantation companies invested whilst the rest 2 respondents said that there was no change in their saving for the said period. Then, 6 household respondents

answered the reasons of changes in their saving. Two households mentioned private forest plantation as main reason of increase in saving, another two households did small-scale trade (grocery) and for the rest, each household described farming and timber skidding as reasons for increased saving respectively. Thus, it could be generally concluded that the percentage of saving households was quite low, but private forest plantation could be regarded as one of main reasons contributing to saving.

### ***Livestock as liquid assets***

According to the findings, livestock population in the study area declined in 2012, in particular cattle population and chicken population, compared to 2008. Although it was found that average per household cattle population was 2.45, it decreased to 1.7 in 2012. Similarly, average per household chicken population also declined from 8.84 to 6.84 as presented in Table 21. However, pig population remained unchanged between 2008 and 2012.

**Table 21** Per household livestock population in 2008 and 2012

Livestock	2008		2012	
	Mean	SD	Mean	SD
Cattle	2.45	3.645	1.70	1.958
Pig	0.79	1.362	0.78	1.340
Chicken	8.84	16.214	6.84	11.279

Out of 150 sample household, 77 households accounting for 51.3% owned cattle in 2008. Among them, 55 households, i.e. 71.4% of cattle owners, pastured their cattle under free grazing practice in the concession area for private forest plantation. The remaining 22 households, 28.6% of the owners, had never grazed there. After developing plantations, it was found that their grazing practice had changed. It was found that 83.6 % of the households had changed from free grazing practice to controlled grazing, i.e. they fed their cattle with fodders collected or grazing on farm with keepers (some time without keepers if pasture is far from plantation). It was also observed that some households reduced their cattle size by selling them out due to no pasture. But some sold them out due to household economic, health problem or other

emergencies apart from pasture reason. Table 22 provides coping measures related to grazing cattle.

**Table 22** Coping measures related to cattle grazing

Coping measures related to cattle grazing	No. HH	% to grazing HH
Controlled grazing	46	83.6
Sold out due to no pasture	1	1.8
Sold out due to other reasons (economic or emergencies)	4	7.3
Controlled grazing & sold out due to no pasture	2	3.6
Controlled grazing & sold out due to other reason	2	3.6
<b>Total</b>	<b>55</b>	<b>100</b>

HH=Household

Therefore, the study showed that establishment of private forest plantation led to shrinking pasture land for villagers and change in grazing practice. It was also found that limitation in pasture due to private forest plantation was not main reason for decrease in per household livestock population, but economic reason or other emergencies were mainly responsible for that.

## 9.2 Impacts on livelihood strategies

The villagers in both study villages are earning their living on farming as major livelihood strategy. The main crops cultivated by the villagers are rain-fed paddy, black gram (Matpe) and sesames. The rice is normally grown in July and then harvested in November. It is followed by growing black gram, after harvesting rice, and harvested by the end of March. Generally, there are two seasons for growing sesames. In winter, sesames are grown in September and harvested in December while in the summer they are grown in January and harvested in April. Mostly, as the sesames growing plots fall under plantation concession area, production and income from sesames declined after private plantation. The crop calendar is provided in Figure 8.

The next important livelihood strategy of villagers is skidding timber. With development of highway, the area is more accessible and this leads to increase in illegal timber extraction. The brokers usually disburse the money in advance to timber cutters. Then, the cut timber is skidded by using buffalos. Thus, almost all the

buffalo owners are involved in this business. The skidding price is 60,000 K/ton. One buffalo can skid 0.1 ton per one trip, 1 ton for the whole month in average. Some skidding path that villagers previously used passes through the plantation. Thus, development of private forest plantation limits the timber skidding.

Next to farming and timber skidding, the rest of the villagers worked as farming labors and odd job labors before developing plantations. By that time, the farming and odd job labors faced with seasonal unemployment because they had to rely on the agriculture only. Although they got the job in the growing and harvesting seasons, they were seasonally unemployed for several months over the year. Some of them collected NTFPs during that period for their livelihood.

Since the private forest plantations were developed at large scale nearby the village, this could create alternative job opportunities for them. At the initial years, about 80-90 peoples from Taunghonlon worked as plantations labors in NRDC, “U Kyaw San” and “Nay Wun Myat”. Now, the number declined to 40-50 because most of plantation area nearby the village has already been planted and the new sites become farther and farther from the village. Thus, some villagers who could save money during their employment in private forest plantation bought buffalos and got involved in timber skidding activities. In Inwainggyi village, about 30-40 villagers are currently working in Yuzana Company. In addition, some are working in other companies such as “Toe Naing Man”, “Nay Wun Myat” and “Green Forest”.

Figure 9 provides the work calendar for the plantation workers. It was found that the companies generally used both permanent labors and daily-waged temporary labors for nursery operation. However, “taungya cutting”, “kyunkwe” operation (collecting and re-burning partially burnt materials during site preparation), staking, planting and weeding are usually carried out with lump sum payment per acreage. These operations are labor-intensive ones. Sometime, the companies use daily-waged labors for planting and weeding. On the other hand, burning and fire protection are usually carried out by using their permanent labors. Therefore, the companies do not need to employ many labors during these seasons.

Type of Crop	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Paddy	▭											
Black Gram (Matpe)						▭						
Sesames (Winter)			▭									
Sesames (Summer)								▭				

**Figure 8** Crop calendar for Taungthonlon and Inwaingyi villages

Plantation Operation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nursery	▬											▬
"Taungya" cutting	▬											▬
Burning			▬									
"Kyunkwe"				▬								
Staking					▬							
Planting						▬						
Weeding							▬		▬		▬	
Fire protection	▬											▬

**Figure 9** Work calendar of private plantation workers

Table 23 shows number and percentage of households which were involved in different livelihood strategies in 2008 and 2012. However, as livelihood strategies in the study area were found very complex and overlapping each other, household livelihood strategy could be regarded as either single one or any combination of them. The study revealed that percentage of households involved in agriculture declined from 45.3% to 39.3%. Similarly, those involved in livestock breeding, NTFPs

collection and farm laboring decreased from 64% to 56.7%, from 93.3% to 88%, from 46% to 38.7% respectively. On the other hand, percentages of household involved in other odd job laboring, timber skidding and sawing, small-scale trade and services increased as mentioned in the Table 4.22. In addition, it was observed that 5.3 % of households were migratory workers, but despite no figure available in 2008. Similarly, the percentage of households involved as private forest plantation workers represented 35.3% to the sample households in 2012 after launching private forest plantation programme.

**Table 23** Number of households involved in different livelihood strategies in 2008 and 2012

Year	Household	Agriculture	Livestock breeding	NTFP collection	Plantation workers	Farming labor	Other odd job labor	Timber skidding& sawing	Small-scale trade	Service	Migratory workers	Others
2008	No.	68	96	140	-	69	21	27	17	8	-	3
	%	45.3	64.0	93.3	-	46.0	14.0	18.0	11.3	5.3	-	2.0
2012	No.	59	85	132	53	58	27	39	22	13	8	1
	%	39.3	56.7	88.0	35.3	38.7	18.0	26.0	14.7	8.7	5.3	0.7

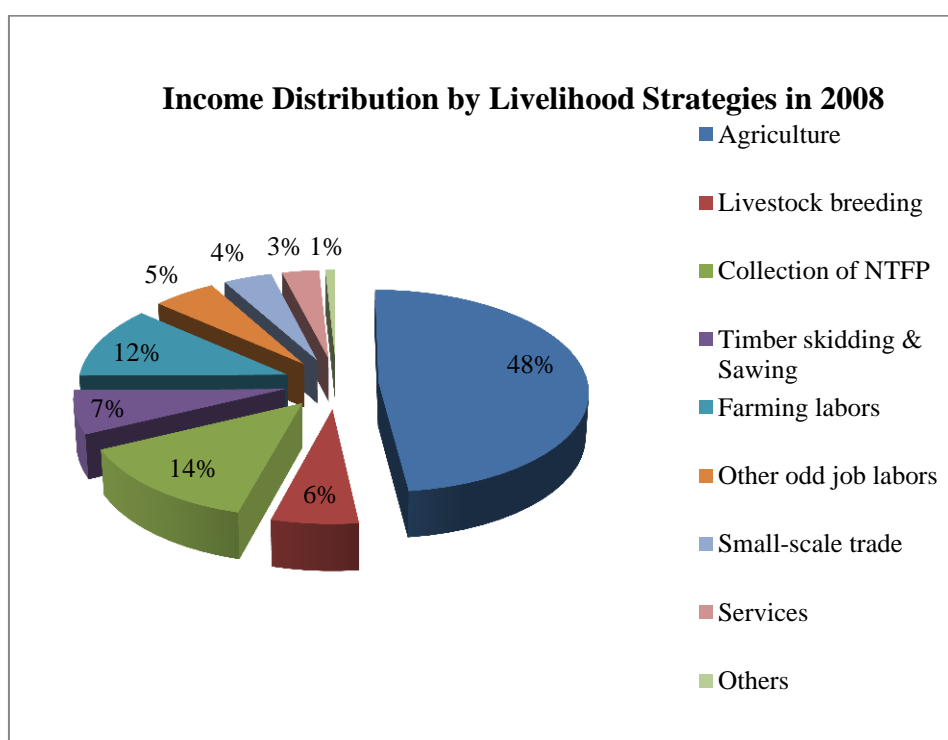
Note: Livelihood strategies of households are overlapping and it may be either single strategy or any combination of them.

Related to importance of livelihood strategies in terms of income, it was found that agriculture is the most important livelihood strategies in the study area, constituting 48.2% to the total household income in 2008. Then, it was followed by collection of NTFPs (13.7%), farming labor (11.5%), timber skidding and sawing(6.9%), livestock breeding (6.1%), other odd jobs (5.4%), small-scale trade (4.2%), services (3.2%) and others (0.8%) as shown in Figure 10.

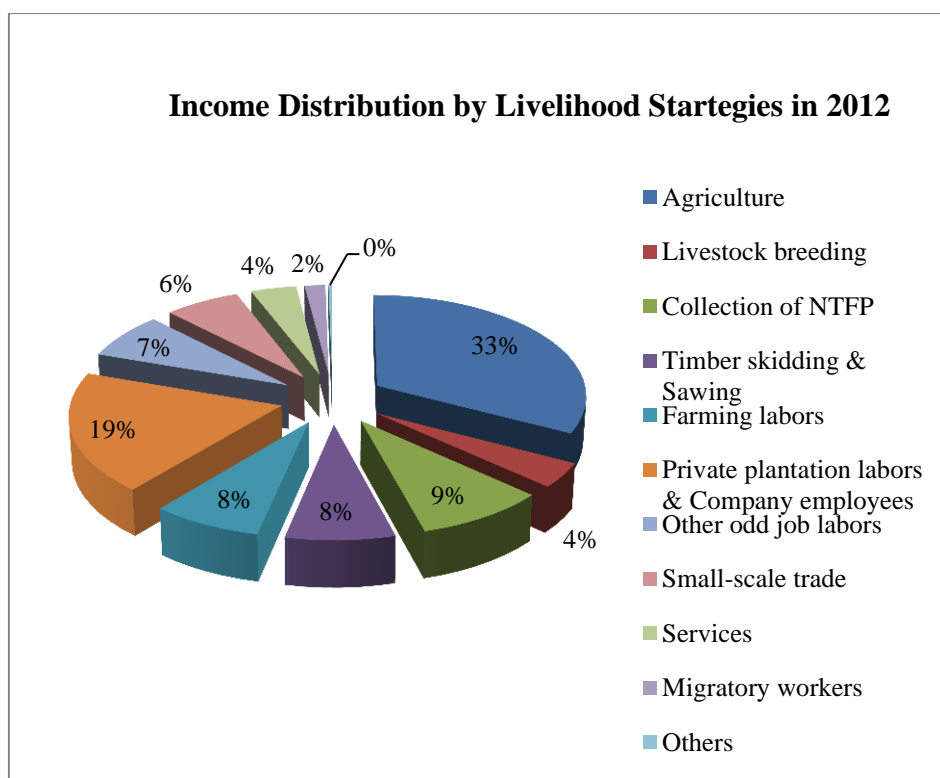
However, it has been found that role of livelihood strategies in contributing to the total household income has changed in 2012. Agriculture remained as top livelihood strategy in the study area, but its contribution reduced to 32.7%. Working

in private forest plantation took second most important livelihood strategy for the households, constituting 19.2% of the total household income as a whole. Then it was followed by collection of NTFPs (9.1%), farming labor (7.7%), timber skidding and sawing (7.6%), other odd jobs (7.4%), small-scale trade (6.4%), livestock breeding (4%), services (3.9%), migratory worker (1.8%) and other (0.3%) as described in Figure 11.

Thus, it was found that private plantations could make livelihood strategies of households more diversified and working in plantation itself stood as a strategy contributing second largest share to total household income.



**Figure 10** Income distribution by livelihood strategies in 2008



**Figure 11** Income distribution by livelihood strategies in 2012

### 9.3 Impacts on livelihood outcome

#### 9.3.1 Income of general households

The distribution of households by income groups is presented in Table 24. As overall household income, it was found that percentage of households belonged to Group 1 (up to 600,000 Kyat) went down from 38.7% in 2008 to 32.0% in 2012 while that in Group 3 (1,000,001 to 1,500,000 Kyat) and Group 4 (1,500,001 to 2,000,000 Kyat) increased from 14.0% to 15.3% and from 7.3% to 12% respectively. However, the percentage belonged to Group 5 (>2,000,000 Kyat) remained unchanged between 2008 and 2012, representing 10.7%. Therefore, it can be generally stated that the total household income has improved in 2012.

For household income distribution in Taungthonlon village, the percentage in Group 1 declined from 39.5% in 2008 to 23.7% in 2012. All the percentages in Group 2 to Group 5 have risen up from 32.9% to 35.5%, from 13.2% to 15.8%, from 5.3% to 11.8% and from 9.2% to 13.2% respectively. In contrast, in Inwainggyi village, the percentage belonged to Group 1 increased from 37.8% to 40.5%. But, that in Group 5 decreased from 12.2% to 8.1% while increasing 9.5% to 12.2% in Group 4. Thus, it has been generally observed that household income in Taungthonlon village improved

where as that in Inwainggyi village slightly declined in 2012 after private forest plantation companies came in.

**Table 24** Distribution of households by income groups

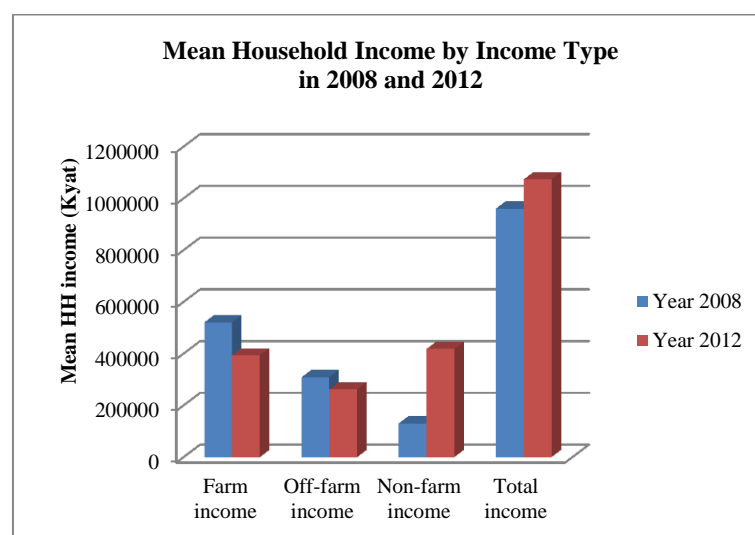
Year	Village	Household	Income Group					Total
			Group 1: (Up to 600,000 Kyat)	Group 2: (600,001 to 1,000,000 Kyat)	Group 3: (1,000,001 to 1,500,000 Kyat)	Group 4: (1,500,001 to 2,000,000 Kyat)	Group 5: (>2,000,000 Kyat)	
2008	Taungthonlon	No.	30	25	10	4	7	76
		%	39.5%	32.9%	13.2%	5.3%	9.2%	100.0%
	Inwainggyi	No.	28	19	11	7	9	74
		%	37.8%	25.7%	14.9%	9.5%	12.2%	100.0%
	<b>Total</b>	<b>No.</b>	<b>58</b>	<b>44</b>	<b>21</b>	<b>11</b>	<b>16</b>	<b>150</b>
		<b>%</b>	<b>38.7%</b>	<b>29.3%</b>	<b>14.0%</b>	<b>7.3%</b>	<b>10.7%</b>	<b>100.0%</b>
2012	Taungthonlon	No.	18	27	12	9	10	76
		%	23.7%	35.5%	15.8%	11.8%	13.2%	100.0%
	Inwainggyi	No.	30	18	11	9	6	74
		%	40.5%	24.3%	14.9%	12.2%	8.1%	100.0%
	<b>Total</b>	<b>No.</b>	<b>48</b>	<b>45</b>	<b>23</b>	<b>18</b>	<b>16</b>	<b>150</b>
		<b>%</b>	<b>32.0%</b>	<b>30.0%</b>	<b>15.3%</b>	<b>12.0%</b>	<b>10.7%</b>	<b>100.0%</b>

Table 25 shows overall income distribution by income types in 2008 and 2012. It was found that overall mean household income increased by 12%, from 960,892 Kyat in 2008 to 1,073,460 Kyat in 2012. So did mean household non-farm income by 220%, from 130,781 Kyat to 418,211 Kyat. The majority of non-farm income came from private forest plantation and it accounted for 49% to non-farm income and 19% to total household income. But, it was observed that mean household farm income and off-farm income declined by 25% and by 15% respectively. Therefore, increase in overall household income is mainly due to private forest plantation. Figure 12 illustrates mean household income as an overall by income types in 2008 and 2012.

**Table 25** Household income distribution by income types in 2008 and 2012 (Overall)

Sr.	Type of Income		2008		2012	
			Mean	Total (Kyat)	Mean	Total (Kyat)
1	<b>Farm Income</b>					
	1.1	Agricultural income	462,787	69,418,000	350,860	52,629,000
		1.1.1 In-cash	398,060	59,709,000	309,460	46,419,000
		1.1.2 In-kind	64,727	9,709,000	41,400	6,210,000
	1.2	Livestock income	58,177	8,726,520	42,447	6,367,020
		1.2.1 In-cash	41,207	6,181,000	27,237	4,085,500
		1.2.2 in-kind	16,970	2,545,520	15,210	2,281,520
	<b>Total farm income</b>		<b>520,963</b>	<b>78,144,520</b>	<b>393,307</b>	<b>58,996,020</b>
2	<b>Off-farm income</b>				-	
	2.1	Income and wages from farming labors	110,974	16,646,100	82,367	12,355,100
	2.2	Income from NTFP	131,613	19,742,000	98,101	14,715,150
		2.2.1 In-cash	32,517	4,877,500	11,863	1,779,400
		2.2.2 In-kind	99,097	14,864,500	86,238	12,935,750
	2.3	Income from timber skidding and sawing	66,560	9,984,000	81,473	12,221,000
	<b>Total off-farm income</b>		<b>309,147</b>	<b>46,372,100</b>	<b>261,942</b>	<b>39,291,250</b>
3	<b>Non-farm income</b>				-	
	3.1	Wages and salaries from private plantation	-	-	206,123	30,918,500
	3.2	Income from other odd jobs	52,065	7,809,700	79,261	11,889,200
	3.4	Small-scale trade	40,050	6,007,500	69,027	10,354,000
	3.5	Services	30,533	4,580,000	41,667	6,250,000
	3.6	Remittances	-	-	18,933	2,840,000
	3.7	Others	8,133	1,220,000	3,200	480,000
	<b>Total non-farm income</b>		<b>130,781</b>	<b>19,617,200</b>	<b>418,211</b>	<b>62,731,700</b>
	<b>GRAND TOTAL</b>		<b>960,892</b>	<b>144,133,820</b>	<b>1,073,460</b>	<b>161,018,970</b>

Note: Sample size is 150 households

**Figure 4.12** Mean household income by income types in 2008 and 2012

Related to status of household income in the study villages, Table 26 reveals household income distribution by income types in Taungthonlon village in 2008 and 2012 and Table 27 represents for Inwainggyi village.

According to the findings, mean total household income in Taungthonlon village increased about 33%, from 876,899 Kyat in 2008 to 1,169,899 Kyats in 2012. Similarly, it was also found that household income from non-farm sector in 2012 was about 210% higher than that in 2008. But, farm income and off-farm income decreased by 13% and 14% respectively. As for income from private forest plantations, it contributes about 20 % to total household income and about 40 % to non-farm household income. Therefore, increase in total household income is mainly due to private plantation.

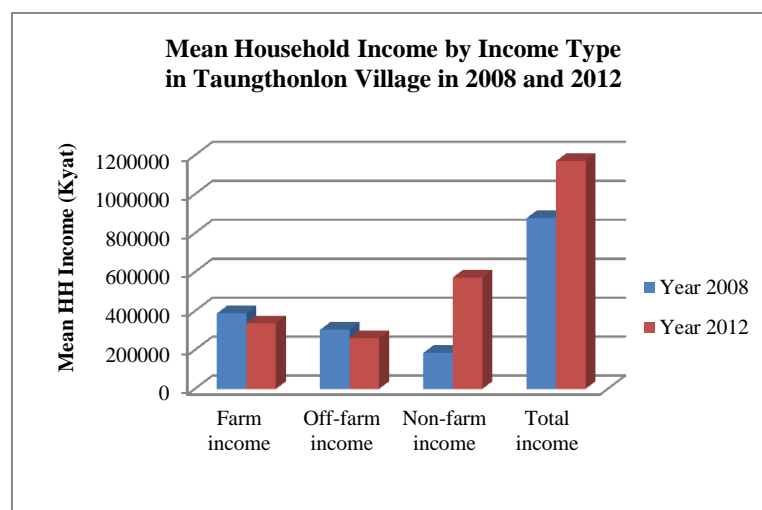
In contrast, it was found that mean total household income in Inwainggyi village went down by 7% between 2008 and 2012. Similarly, farm income and off-farm income decreased by 31% and 16% respectively. But, income from non-farm sector in 2012 increased by 245% compared to that in 2008. Pertaining to income share from private forest plantation, it contributes about 18% to the total household income and about 69% to household non-farm income. But, contribution from private forest plantation did not cover the amount decreased from farm income. Thus, the total household income in Inwainggyi went down.

Figure 13 depicts mean household income by income types in Taungthonlon village in 2008 and 2012 and so does Figure 14 for Inwainggyi village.

**Table 26** Household income distribution by income types in 2008 and 2012  
(Taungthonlon Village)

Sr.	Type of Income		2008		2012	
			Mean	Total (Kyat)	Mean	Total (Kyat)
1	<b>Farm Income</b>					
	1.1	Agricultural income	332,855	25,297,000	291,250	22,135,000
		1.1.1 In-cash	263,776	20,047,000	243,566	18,511,000
		1.1.2 In-kind	69,079	5,250,000	47,684	3,624,000
	1.2	Livestock income	55,158	4,192,000	45,579	3,464,000
		1.2.1 In-cash	42,164	3,204,500	32,336	2,457,500
		1.2.2 in-kind	12,993	987,500	13,243	1,006,500
	<b>Total farm income</b>		<b>388,013</b>	<b>29,489,000</b>	<b>336,829</b>	<b>25,599,000</b>
2	<b>Off-farm income</b>					
	2.1	Income and wages from farming labors	94,278	7,165,100	54,918	4,173,800
	2.2	Income from NTFP	112,997	8,587,750	81,612	6,202,500
		2.2.1 In-cash	18,092	1,375,000	5,296	402,500
		2.2.2 In-kind	94,905	7,212,750	76,316	5,800,000
	2.3	Income from timber skidding and sawing	96,842	7,360,000	124,316	9,448,000
	<b>Total off-farm income</b>		<b>304,116</b>	<b>23,112,850</b>	<b>260,846</b>	<b>19,824,300</b>
3	<b>Non-farm income</b>					
	3.1	Wages and salaries from private plantation	-	-	231,566	17,599,000
	3.2	Income from other odd jobs	83,257	6,327,500	142,434	10,825,000
	3.4	Small-scale trade	49,145	3,735,000	110,000	8,360,000
	3.5	Services	52,368	3,980,000	60,066	4,565,000
	3.6	Remittances	-	-	28,158	2,140,000
	3.7	Others	-	-	-	-
	<b>Total non-farm income</b>		<b>184,770</b>	<b>14,042,500</b>	<b>572,224</b>	<b>43,489,000</b>
	<b>GRAND TOTAL</b>		<b>876,899</b>	<b>66,644,350</b>	<b>1,169,899</b>	<b>88,912,300</b>

Note: Sample size is 76 households

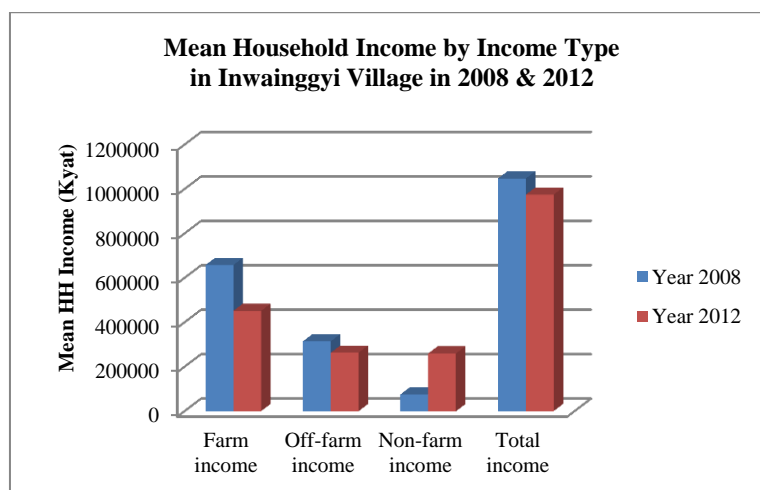


**Figure 13** Mean household income by income types in Taungthonlon village in 2008 and 2012

**Table 27** Household income distribution by income types in 2008 and 2012  
(Inwainggyi Village)

Sr.	Type of Income		2008		2012	
			Mean	Total (Kyat)	Mean	Total (Kyat)
<b>1</b>	<b>Farm Income</b>					
	1.1	Agricultural income	<u>596,230</u>	<u>44,121,000</u>	<u>412,081</u>	<u>30,494,000</u>
		1.1.1 In-cash	535,973	39,662,000	377,135	27,908,000
		1.1.2 In-kind	60,257	4,459,000	34,946	2,586,000
	1.2	Livestock income	<u>61,277</u>	<u>4,534,520</u>	<u>39,230</u>	<u>2,903,020</u>
		1.2.1 In-cash	40,223	2,976,500	22,000	1,628,000
		1.2.2 in-kind	21,054	1,558,020	17,230	1,275,020
	<b>Total farm income</b>		<b>657,507</b>	<b>48,655,520</b>	<b>451,311</b>	<b>33,397,020</b>
<b>2</b>	<b>Off-farm income</b>					
	2.1	Income and wages from farming labors	128,122	9,481,000	110,558	8,181,300
	2.2	Income from NTFP	<u>150,733</u>	<u>11,154,250</u>	<u>115,036</u>	<u>8,512,650</u>
		2.2.1 In-cash	47,331	3,502,500	18,607	1,376,900
		2.2.2 In-kind	103,402	7,651,750	96,429	7,135,750
	2.3	Income from timber skidding and sawing	35,459	2,624,000	37,473	2,773,000
	<b>Total off-farm income</b>		<b>314,314</b>	<b>23,259,250</b>	<b>263,067</b>	<b>19,466,950</b>
<b>3</b>	<b>Non-farm income</b>					
	3.1	Wages and salaries from private plantation	-	-	179,993	13,319,500
	3.2	Income from other odd jobs	20,030	1,482,200	14,381	1,064,200
	3.4	Small-scale trade	30,709	2,272,500	26,946	1,994,000
	3.5	Services	8,108	600,000	22,770	1,685,000
	3.6	Remittances	-	-	9,459	700,000
	3.7	Others	16,486	1,220,000	6,486	480,000
	<b>Total non-farm income</b>		<b>75,334</b>	<b>5,574,700</b>	<b>260,036</b>	<b>19,242,700</b>
	<b>GRAND TOTAL</b>		<b>1,047,155</b>	<b>77,489,470</b>	<b>974,414</b>	<b>72,106,670</b>

Note: Sample size is 74 households



**Figure 14** Mean household income by income types in Inwainggyi village in 2008 and 2012

Table 28 shows results of normality tests for income difference between in 2008 and 2012 for the different types of income.

**Table 28** Results of normality tests

Type of income	Shapiro-Wilk	
	d.f	Significance
Difference between farm income in 2008 and 2012	150	p= 0.000<0.05
Difference between off-farm income in 2008 and 2012	150	p= 0.000<0.05
Difference between non-farm income in 2008 and 2012	150	p= 0.000<0.05
Difference between total income in 2008 and 2012	150	p= 0.000<0.05

According to test results, distribution of income differences between 2008 and 2012 for farm income, off-farm income, non-farm income and total income are not normal ( $p<0.05$ ). Therefore, Wilcoxon Signed Rank Tests (1945) were performed to determine whether there are statistically significant differences in different types of income between 2008 and 2012. Table 29 reveals result of Wilcoxon Signed Rank Test (1945).

**Table 29** Results of Wilcoxon Signed Rank Test on different types of household incomes in 2008 and 2012

Type of income	Mean	SD	Median	“p” value (one-sided)
Farm income in 2008 Vs. Farm income in 2012	520,963 393,307	747,964 652,592	125,000 65,000	p = 0.000<0.001
Off-farm income in 2008 Vs. Off-farm income in 2012	309,147 261,942	239,528 235,658	252,500 200,000	p= 0.000<0.001
Non-farm income in 2008 Vs. Non-farm income in 2012	130,781 418,211	354,693 642,938	0 180,000	p= 0.000<0.001
Total income in 2008 Vs. Total income in 2012	960,892 1,073,460	765,422 820,656	687,500 807,875	p= 0.0275< 0.05

It was found that overall total household income in 2012 significantly increased ( $p<0.05$ ), with a median household total income of 687,500 Kyat in 2008

and 807,875 Kyat in 2012. Similarly, non-farm household income in the same year also significantly increased ( $p < 0.001$ ), with a median of 180,000 Kyat in 2012. However, household farm income significantly decreased ( $p < 0.001$ ), with a median of 125,000 Kyat in 2008 and 65,000 Kyat in 2012. In addition, it has been observed that compared to 2008, there is significant decrease in household off-farm income in 2012 ( $p < 0.001$ ), with a median of 252,500 Kyat in 2008 and 200,000 Kyat in 2012.

Therefore, establishment of private forest plantation contributes to increment of overall household income.

### 9.3.2 Income of plantation workers' households

It was observed that there were 53 households which were involved in private forest plantation activities either as permanent workers or daily-waged labors in 2012. Although 62.3% of these households fell under income group 1 (up to 600,000) in 2008, this percentage declined to 30.2% in 2012. At the same time, the number of households in better income classes of group 2 to 5 has significantly risen up in 2012. Table 30 reveals changes in household income of plantation workers.

**Table 30** Number of the plantation workers' households with respect to income groups in 2008 and 2012

Year	Household	Income group of plantation workers' household					Total
		Group 1: (Up to 600,000 Kyat)	Group 2: (600,001 to 1,000,000 Kyat)	Group 3: (1,000,001 to 1,500,000 Kyat)	Group 4: (1,500,001 to 2,000,000 Kyat)	Group 5: (>2,000,000 Kyat)	
2008	No.	33	11	5	2	2	53
	%	62.3%	20.7%	9.4%	3.8%	3.8%	100%
2012	No.	16	19	6	6	6	53
	%	30.2%	35.9%	11.3%	11.3%	11.3%	100%

In addition, Wilcoxon Singed Rank Test (1945) also showed that household income of plantation workers significantly increased ( $p = 0.000034 < 0.001$ ), with a median household income of 725,000 Kyat in 2012 where as 504,500 Kyat in 2008. Therefore, this finding also proved that development of private forest plantations enhanced the household incomes of plantation workers. In addition, the finding did firmly confirm that private forest plantation contributed to improvement of household income.

## 10. Discussions

### 10.1 Discussions related to livelihood assets

Forest land encroachment is a long standing issue in Myanmar. It can be found as a very common problem encountered in implementing development project. However, if one looks at the issue from legal aspect only, it will be very hard to reach agreement with local communities. Thus, it is essentially required to take into consideration for their secured livelihoods as well. Otherwise, conflicts over land use between local communities and project developers will be arisen without being avoidable. It can also be observed in Yuzana plantation as well.

Initially, the Company held a position that it had legal right to use forest land for establishing plantation. So, it did not try to get free, prior and informed consent (FPIC) with local communities, related to the plantation project. Instead, it just informed the Chairman of VPDC about its legal right. Then it took villagers' encroached land where they have been doing agriculture since considerably long time before.

One of the key informants in Inwainggyi Village said; *"I arrived here since 25 years ago. I reclaimed this area by taking porridge. I lost lives of my two own sons due to malaria. After reclaiming for 1 to 2 years, I had 3 to 4 acres of paddy field. I had to sell a fixed quota of rice to State as well. One year, as I could not sell it because wild boars ate my paddy, my wife had been arrested for three days while I went for burning charcoal in Pado. Thus, when Yuzana Company took my land, I really felt upset."*

Furthermore, the Company's re-rental of confiscated paddy fields under tenancy made relationship between villagers and company itself worsen. As a result, the conflict appeared to be more intense even though Yuzana paid 100,000 Kyat/ acre as cost of land clearing to farmers, which is particularly only for paddy field. Company personnel said; *"Our plantations are burnt at large scale every year"*. On the other hand, one of the key informants from the village said; *"Company always accuses villagers of setting fire teak plantation, of cutting trees despite doing nothing"*.

In fact, this conflict was originated from failure in getting FPIC with local communities and taking position too much by the Company.

On the other hand, NRDC used a softer approach in handling land use issue by persuading farmers to sell their land despite having legal right. The problems arisen were also solved through negotiation of Land Use Monitoring Committee formed with Officials from General Administration Department, Forest Department, Settlement and Land Record Department, Department of Agriculture (Previously called Myanmar Agricultural Service),

and Myanmar Police Force at Township level. The Company followed the decision of the Committee with respect to compensation to affected farmers. In addition, compared to Yuzana's site, NRDC project area comprised of less paddy fields. Thus, the conflict between the Company and near by villages appeared to be less intense compared to Yuzana plantation area.

As an overall, it can be said that development of private forest plantation had initially high adverse impact on access to land by the local communities, particularly in Yuzana site. However, it can be said that emergence of guidance from DPDC of Bago Division to return paddy fields to the farmers is a wise decision which much released the impact on land holding of the farmers despite loss of sesames growing plots where the Company had already planted teak trees.

Regarding impact on collection of NTFPs by local communities, the findings of this study has already showed that development of private forest plantation caused more difficulties in collection of NTFPs by the villagers, both in terms of quantity produced and distance to go for collecting. However, the quantity of some NTFPs like thatch and bamboo might reduce with improvement of housing while increasing household income. Nevertheless, the majority of households are still involved in collection of NTFPs mainly for their household consumption. In Myanmar Forest Policy (1995), it has been clearly stipulated that fulfilling basic needs of people is one of six policy imperatives. In the forest management plans, local supply and community forest working circles are deliberately formed for providing local communities with forest products for their personal use. However, this is usually neglected in reality, especially while implementing development projects.

A field inspection report related to development of private forest plantation in Aingdon Kun Reserved Forest, submitted by local Forest Department stated; *“The condition of existing forest appears to be degraded one due to over cutting firewood, poles and posts for fencing, housing and farming appliances by the villagers. It is very sure that value of the forest will be enriched and this will contribute to greening as well as benefits of the State if highly capable private entrepreneurs are allowed to develop private forest plantation in order to match with Yangon-Mandalay Highway and to enhance the value of forest.”* In addition, the report did not clearly state about forest land encroachment and provide any comment on it despite a large extent of paddy field inside reserved forest.

Thus, this revealed that there were weaknesses in due consideration for personal use of forest products for local communities as well as their livelihoods while granting land concession right to develop private forest plantation.

As for physical capital in village context, it can be generally said that neither positive nor negative impact by private forest plantation can be seen significantly, excepts renovation of village road having about 200 Yard in length in Taungthonlon village by private entrepreneur U Kyaw San. But, most of household assets and goods and type of housing became more improved in 2012 after establishing private forest plantation. However, this improvement relates to increased income due to more job opportunities as a combined result of development of private forest plantation programme and Yangon-Mandalay highway in the study area. Technology innovation that makes people affordable to purchase things can also be considered as a factor contributing to improvement of some household assets and goods. Thus, further studies would be needed for providing a clear explanation.

Compared to the time before plantation, social capital of the study villages has generally improved because they have contact with several plantation companies near by the villages. This improvement in social capital contributes to getting jobs at the companies and consequently to the betterment of their livelihood. This can also helps to get assistance from the plantation companies, like logistic support for going clinic or hospital, getting primary health care assistance, cash contribution to religious function and school etc. Such improvement in social capital is more evident in Taungthonlon village than Inwainggyi village. However, at the same time, associated negative impacts arisen from social relationship with Companies can also be recognized. Conflict between Yuzana and villagers from Inwainggyi village is an example revealed by this study.

Regarding the financial capital, an interest rate imposed by formal source like Agricultural Development Bank is found much lower than that from informal sources. After developing private forest plantation, high interest rate due to the lack of access to the formal loan is becoming a burden for the villagers from Inwainggyi village whose farms are inside reserve forest. Thus, this could be considered as negative impact of the private forest plantation. According to household survey, saving amount is relatively low even though household income was found increased. Lack of saving practice and uprising living cost can be considered as possible reasons.

As for human capital, NRDC's initiative for providing primary health care to plantation workers at work sites and to the villagers from nearby village upon request;

supports of Toe Naing Man Company for plantation workers with basic medical care and arrangement for their children to be able to access education by opening primary school at work sites could be considered as some small positive impacts of the private forest plantation. However, increase in labor force can be regarded as more significant positive impact of private forest plantation as the companies can provide local peoples with jobs. But, employment in private forest plantation varies with the time period and intensity of work.

During the initial period, plantation companies employed many local people depending on their work load. However, with passing time, large portion of project area has been planted and work load become lesser compared to initial years. Consequently, the trend of employment goes down in the late period. This is usual in most private plantation companies. On the other hand, the project sites become quite far from villages although they were previously located near by the villages. Thus, villagers have come to take into consideration of distance to project sites. This also contributes to declining employment trend.

In case of NRDC, land concession right was granted to the Company to develop 10,500 acres (4,249 hectares) of private forest plantation. However, suitable area to develop plantation was found about 7,500 acres (3,035 hectares) only. The company has already established a total 5,525 acres (2,236 hectares) of plantation during the 4-year period of 2009-10 to 2012-13, with an annual average of approximately 1,400 acres (560 hectare). However, it set annual target to 600 acres (243 hectares) from 2013-14 to 2015-16. Although the Company could employ about 300 local peoples from Zalokegyi, Ye-e, Khintha, Gyogon and Taungthonlon village as daily-waged labors during the initial years, the number decreases to about 100 in base camp and Ye-e camp now. Apart from daily waged-labors, there are 44 permanent employees in NRDC, of which 15 are locals.

At Yuzana Company, it was learnt that there were 18 permanent plantation workers including 3 from Inwaingyi, 10 from Tawkwein and 5 from other places. Also the Company has employed 25 daily-waged nursery labors from Inwainggyi, Sarpyin and Tawkwein. Apart from nursery work, other plantation operations are usually carried out under lump sum payment system, i.e. payment with fixed norm per acre for a particular operation. During the period of “taungya” cutting, the Company could provide jobs to about 100 local people from Inwainggyi, Sarpyin, Gyogon and Bogon.

Concerning seasonal employment in private forest plantation, planting and weeding season from June to August is peak season in employment because these operations are

labor intensive ones. “Taungya” cutting season from December to January is at the intermediate scale in labor use. The remaining months from February to May and September to November are least employment periods.

Thus, villagers from both villages pointed out that development of private forest plantation was generally good for job opportunities because this could still provide the villagers with jobs till then, but it was uncertain for long run. So, this point needs to be taken into account for sustainability in employment.

## **10.2 Discussions related to livelihood strategies**

Pertaining to livelihood strategies, it is very obvious that development of private forest plantation could make livelihood strategies of the local communities more diversified. This also caused changes in practice of certain types of livelihood strategies. For example, several plantation companies come to practice “taungya” system in establishing plantation whenever “taungya” cutters are available. Apart from two study villages, Sarpyin is a Kayin village from which most “taungya” cutters come to work in the private forest plantation companies, namely NRDC, Yuzana, Toe Naing Man and U Hla Min. The village has 127 households of which about 117 households are Kayin and the remaining 10 households are Shan. Previously, majority of villagers earned their living on shifting cultivation with a 5-year fallow cycle. Usually, one household cut the “taungya” about 5-10 acres annually before. When plantation companies came, those shifting cultivators were absorbed to establish taungya-based forest plantations.

Under this system, “taungya” cutters are allotted plots for growing “taungya” crops such as paddy and varieties of vegetable along with trees for one year. They are also paid charges by the companies for cutting “taungya” (i.e. clearing land), “kyunkwe” operation (i.e. collecting partially burnt material and re-burning during site preparation), planting trees and weeding operations. In fact, this system was originated in Myanmar since long time ago. It has also been recognized as forerunner of agroforestry. Thus, it is preferable because not only it can control shifting cultivation practice which is assumed as one of the main causes of deforestation and forest degradation but also it benefits both shifting cultivators and plantation developers in short term. However, they can grow “taungya” crops only for one year under current practice and they have to move on to new sites in next years. Finally, they would have nowhere to go after planting all proposed areas. Therefore, it should be taken into account for their livelihood in long run by the Companies as well as Forest Department.

### **10.3 Discussions related to livelihood outcome**

Concerning livelihood outcome, the study has demonstrated that total household income significantly increased after launching private forest plantation programme in the study area. However, whether private forest plantation is main reason of increasing total household income or not may be questionable. But, if we look at income distribution by income type, share of farm income represents 54.2% to total household income, followed by off-farm income 32.2% and non-farm income 13.6 % in 2008. In 2012, this share has changed in such a way that non-farm income contributes 39%, followed by farm income 36.6% and off-farm income 24.4%. Therefore, it is very clear that increase in household income between 2008 and 2012 is due to non-farm sector. Within the non-farm sector, income from private forest plantation accounts for 49.3% in terms of amount. Thus, private forest plantations are the main sources of increasing household income in 2012 in spite of some improvement in income from other odd jobs, small-scale trade and services along with development of Yangon-Mandalay highway. However, sustaining income share of private forest plantation will depend on how employment shift will occur in plantation companies as discussed earlier.

### **11. Conclusion**

This study could highlight both positive and negative impacts of private forest plantation on livelihoods of local communities, with an emphasis on livelihood assets, livelihood strategies and livelihood outcomes. Based the findings of the study, conclusions can be drawn as follows:

- 1) Development of private forest plantation can enhance overall household income and non-farm income through diversified livelihood strategies and employment opportunities. But, the trend of employment is going down.
- 2) Private forest plantation programme can limit the access to the land by farmers, consequently reduce in land holding size and decline farm income.
- 3) Unless prior and due consideration is taken, the programme makes local communities more difficult in collecting NTFPs.

## **12. Recommendations:**

Based on findings of this study, some recommendations are provided with a view to mitigating/avoiding negative impacts of private forest plantations on livelihood of local communities and keeping on positive ones in sustainable manner. In addition, further studies are also suggested as follows:

### **12.1 Recommendations for secured access to land**

Secured access to land is indispensable for sustainable livelihood of local communities. Conflicts over land usually come out from unclear or lack of land use policy and land use plan. Conflict with Yuzana was evident in this study. The land is under forest land, i.e. reserved forest, administered by Forest Department. However, real situation on ground is that large extent of land has been converted into agricultural land since considerably long time ago. Previously, farmers cultivating on those lands were able to access to formal agricultural loan and they also had to sell fixed quota of rice to the State. After the Company came in, the lands were taken for developing private forest plantation, and then the paddy fields were returned to farmers two years later. But, they had no longer access to formal agricultural loan. This made livelihood of local communities vulnerable as a result of unsecured access to land. Thus, the following recommendations were provided for taking into consideration in development of land use policy and in granting land concession right for establishing private forest plantations with a view to ensuring secured access to the land by local communities.

1) Ministry of Environmental Conservation and Forestry has been collecting data and consulting with line ministries to develop land use policy and formulate land use plan as priority task. Thus, it can be said development of land use policy is under way. In this regards, forest land which has been already converted into agricultural use at large scale should be cancelled and put under agricultural land in accordance with existing rules and regulations. As intensity of encroachment inside the forest land varies, criteria for exclusion from and inclusion in forest land need to be set.

2) Before emerging land use policy and plan, the forest land which has been already converted into agricultural use at large scale should be set aside from granting land concession for developing private forest plantation.

3) Field inspection related to issue of land concession right to private entrepreneurs should be carefully carried out. In addition to forest condition

and other biophysical information, the inspection report should cover status of existing land use, forest resources use by local communities, possible impacts of private forest plantations on livelihoods of local communities along with clear comments so that management level can make decision rationally.

### **12.2 Recommendations for sustainable use of forest resources**

As the study indicated that development of private forest plantations caused difficulties to local communities in collecting NTFPs, following recommendations were provided for sustainable use of forest resources.

1) If the proposed plantation area is closed to villages or local communities used to access that area to collect NTFPs for their household consumption, an appropriate area and extent should be set aside for village use. Whenever possible, community forestry should be practiced.

2) The study indicated that household income from timber skidding and sawing slightly increased in 2012 about 1.2 times compared to 2008. This implied increase in illegal logging for commercial purpose along with development of road infrastructure. Therefore, appropriate measures should be taken to control illegal logging.

### **12.3 Recommendations for sustainable employment and livelihood**

With a view to achieving sustainable employment and livelihood of local communities, following recommendations are provided.

1) As discussed earlier, the trend of employment in private forest plantation slightly goes down along with passing time. However, intermediate yield from plantation can be obtained from thinning operations starting from about seven year after developing plantation. Thus, in order to sustain local employment and to produce value-added products at low production cost, the companies should consider for establishing wood-based industries near by the plantations.

2) To ensure livelihood security for those involved in taungya-based plantation operations, more advanced agroforestry designs should be explored and exercised to allow them for growing not only paddy and seasonal crops but also perennial crops under certain conditions.

3) As findings showed that most household could not improve in saving even though the total household income generally increased, the companies should introduce saving practice to plantation workers in order to improve their

financial capital. This should be started with permanent plantation workers who get regular income.

#### **12.4 Recommendations for avoiding possible conflicts**

In order to avoid possible conflicts with local communities while developing private forest plantations, following recommendations are suggested.

1) Getting an agreement with local communities is prerequisite for introducing any kind of project. Conflict with local communities will make the investment vulnerable. Thus, it is highly recommended for taking process of local participation and empowering local communities before launching project. Too much taking position should be avoided during the process.

2) It was also found that villagers in Taungthonlon had recognition of NRDC's initiative like providing primary medical assistance and logistic supports to the villagers, and perceived more positive attitudes towards the Company. On the other hand, Yuzana had no such initiatives. Thus, all plantation companies should try to support needs of local communities as Corporate Social Responsibility (CSR) with full local participation to ensure development of local communities near by the plantations.

#### **12.5 Recommendations for future research**

1) This study was conducted in only two study villages closed to the two largest private plantations due to time constraint. As mentioned in the Chapter I, the study has therefore limitation to generalize the whole private plantation programme of Myanmar. Thus, it is recommended to conduct further researches which can generalize the impact of whole private plantation programme of Myanmar.

2) Shifting cultivation has been regarded as one of the important issues in sustainable forest management of Myanmar. Therefore, experimental researches related to agroforestry designs should be conducted in private plantations so that both shifting cultivators and plantation developers are beneficial.

**References:**

- Anon (1992). Forest Law, Union of Myanmar.
- Anon (1995). Myanmar Forest Policy.
- Anon (2000). National Forest Master Plan, 2001-02 to 2030-31, Ministry of Forestry, Myanmar.
- Ashley, C. & Carney, D. (1999). Sustainable Livelihoods: Lessons from Early Experience, Overseas Development Institute, p6.
- Baumann, P. (2002). Improving Access to Natural Resources for Rural Poor: A Critical Analysis of Central Concepts and Emerging Trends from a Sustainable Livelihoods Perspective, FAO, p2.
- Chambers, R. & G. Conway (1991). Sustainable Rural Livelihoods: Practical Concepts for the 21<sup>st</sup> Century, IDS Discussion Paper296, Institute of Development Studies, p6
- Cor.H. Hanssen (2007). Lao land concessions, development for the people?: Proceedings-International Conference on poverty reduction and forests, Bangkok, p1.
- Cromwell, E. (2002). DFID's Key sheet series: Pro-poor Infrastructure Provision, Land Tenure, p1.
- Dahal, G.R, Atkinson, J. & Bamton, J. (2011). Forest Tenure in Asia: Status and Trends, p 30.
- DFID (2001). Sustainable Livelihoods Guidance Sheets.
- Ellis, F. (2000). Rural Livelihoods and Diversity in Developing Countries, pp7,8,11
- FAO / INBAR (2006). Global Forest Resources Assessment 2005: Myanmar Country Report on Bamboo Resources, Working Paper, 126, Rome, p18, 21, 24, 27
- FAO, (2010). Global Forest Resources Assessment, 2010.
- Grootaert, C. & Van Bastelaer, T., (2001). Understanding and Measuring Social Capital: A Synthesis of Findings and Recommendations from the Social Capital Initiative, World Bank, p4.

- Hobley, M. (2007). Does Forestry Have a Role in Poverty Reduction? Proceedings: International Conference on Poverty Reduction and Forests, Bangkok, p2.
- Hoogenbosch, L. (2010). Forest Plantation and Livelihoods in Ghana's High Forest Zone.
- [http://en.wikibooks.org/wiki/Statistics/Data\\_Analysis/Data\\_Cleaning](http://en.wikibooks.org/wiki/Statistics/Data_Analysis/Data_Cleaning)
- IHLCA Project Report (2011). Integrated Household Living Conditions Survey in Myanmar (2009-2010); MNPED, UNICEF, Sida, UNDP; p16.
- Kaung, B. & Cho, K. M. (2003). Forest Plantation Management between Centralized and Participatory Planning — A Case Study of East Pegu Yoma Project (EPP), Myanmar, p2,3.
- P. K. Ramachandran Nair (1993). An Introduction to Agroforestry, Kluwer Academic Publishers in cooperation with International Centre for Research in Agroforestry, p75.
- Prachvuthy, M. (2011). Impacts of Economic Land Concessions on the Livelihoods of Indigenous Communities in Northeast Provinces of Cambodia, p36.
- Schirmer, J. (2006). Socio-Economic Impacts of Land Use Change to Plantation Forestry: A Review of Current Knowledge and Case Studies of Australian Experience. [[http://www.ces.ncsu.edu/nreos/forest/feop/Agenda2006/iufro\\_plantations/proceedings/G01\\_m-Schirmer.pdf](http://www.ces.ncsu.edu/nreos/forest/feop/Agenda2006/iufro_plantations/proceedings/G01_m-Schirmer.pdf)]
- Soussan, J. & Blaikie, P. (Not Known). Understanding Livelihood Process and Dynamics: Livelihood-Policy Relationships in South Asia, Working Paper 1, Annex 1. [<http://www.citeseerx.ist.psu.edu>]
- Thorpe, A. & Van Anrooy, R. (2009). Inland fisheries livelihoods in Central Asia – Policy interventions and opportunities, FAO, p27
- William F. Elmendorf and A. E. Luloff (2001). Using Qualitative Data Collection Methods When Planning for Community Forest, Journal of Arboriculture 27(3), p142.
- Wint, S. M. (Not Known). A Brief review of Forest Restoration Programmes in Myanmar. [[http://www.forru.org/PDF\\_Files/frfwcpdf/part2/p22%20Wint%20a%20brief%20review.pdf](http://www.forru.org/PDF_Files/frfwcpdf/part2/p22%20Wint%20a%20brief%20review.pdf)]

World Bank (2008), Forest Source Book: Practical Guidance for Sustaining Forests in Development Cooperation, pp15-17.

Yamane, T. (1967). Statistics, An introductory analysis, 2<sup>nd</sup> Ed., New York: Harper and Row, p886

**APPENDIX I**  
**PHOTO PLATES**



Yuzana Company Plantation



Agricultural encroachment falling under Yuzana concession area



NRDC Company Plantation



NRDC Clinic at Taungthonlon base camp



Key informant interview to Assistant General Manager of NRDC



Key informant interview to Plantation In-charge of Yuzana Company



Group interview to key informant from Taunthonlon village



Group interview to key informant from Inwainggyi village



Household survey at Taunthonlon village



Household survey at Inwainggyi village



Taungya cutters from Sarpyin village



Personal interview to Taungya cutters from Sarpyin village



Nursery workers at Yuzana Company



Nursery workers at U Kyaw San's Plantation



Plantation workers preparing site



Small-scale trade (Grocery)



Gravel mining



Odd job labors involved in gravel mining



Timber skidding / illegal logging



Collection of Non-timber forest products by local communities



**APPENDIX II**  
**KEY INFORMANT INTERVIEW GUIDES**

**Interview Guide for Assessing Livelihood Impact of Private Forest Plantation at Village Level for the period of 2008-2012 in Kyauktaga Township, Bago District, Bago Region, Myanmar**

**(Key Informants from village)**

**1. Background Information of Village Profile**

- History of the village settlement
- Major events in the village
- Number of household
- Population with respect to sex ratio, ethnicity, religion; birth rate
- Migration

**2. Livelihood Assets**

**2.1 Natural Capital**

- Land Resources: Land use, land tenure, ownership
- Source of Water for agricultural use and drinking: Irrigation, others water resources such as river and stream etc.; tube well, and nearness to them.
- Forest resources: Forest area used by village and type; production of forest products including bush meat; nearness to forest resources
- Positive and negative impact of private forest plantation on village's natural capital

**2.2 Physical Capital**

- Road network (high way, feeder road, nearness to road infrastructure)
- Electricity supply
- School inside the village and the ones outside village to which students from the village go.
- Clinics and health facility used by the villagers
- Number of house and types
- Monastery
- Market
- Mill (rice mill, oil mill etc.)
- Trade & services (shops, restaurants, KTV etc.)
- Contribution of private forest company to village infrastructure development

### 2.3 Human Capital

- Education status (school enrollment, drop-out situation, literacy, organizations involved in education)
- Health status (health care organization, common disease, estimated death rate and proportion by age)
- Contribution of private forest company to Education and Health

### 2.4 Financial Capital

- Access to loan and credit, and types
- Saving and credit organizations and their initiatives
- Cattle and livestock population
- Contribution of private forest company to social capital development

### 2.5 Social Capital

- Name of social networks, organizations, institutions and groups (formal/informal)
- Objectives and activities of social networks, organizations, institutions and groups
- Membership
- Direct or Indirect contribution of private forest company to social capital development and to the social events

## **3. Livelihood Strategies**

- Major livelihood strategies of village
- Cropping pattern and calendar
- Job creation by plantation company
- Positive and negative impact of private forest plantation on livelihood strategies

## **4. Livelihood Outcomes**

- Income

**Interview Guide for Assessing Livelihood Impact of Private Forest Plantation at  
Village Level for the period of 2008-2012 in Kyauktaga Township, Bago District,  
Bago Region, Myanmar**  
**(Key Informants from Private Forest Company)**

1. Private forest plantation development plan
  - Concession area and location
  - Project period
  - Annual target of plantation
  - Planted area
  - Investment
2. Free, Prior, Informed Consent process by companies with villagers
  - Meeting and discussion
  - Informing project objective and plan
  - Agreement with villager
3. Land taking process by companies
  - Area of farming plots fell under concession area
  - Compensation or sympathetic assistance
  - Coordination with relevant organization
4. Employment
  - No. of employee (local villagers and outsiders)
  - Seasonal variation in employment
  - Trend of employment
  - Salary, wages and rights of labors
  - Welfare for labors
5. Contribution to community development
  - Education
  - Health
  - Social
  - Infrastructure etc.

6. Conflicts between companies and villagers
  - Whether there is conflict between villagers and company
  - If so, type of conflict
  - Conflict resolution
7. Problem and constraint
  - Problem and constraint in developing private forest plantation
  - Suggestions for benefiting local communities and company

**APPENDIX III**  
**QUESTIONNAIRE FOR HOUSEHOLD INTERVIEW**

**Questionnaire for Assessing Livelihood Impact of Private Forest Plantation at Household Level for the period of 2008-2012 in Kyauktaga Township, Bago District, Bago Region, Myanmar**

Village : .....

Name of Respondent : ..... Sex: Male / Female

Year of settlement in village: .....

Date : .....

**A. Household Profile**

1. List names, gender, ages of all household members

Name	Gender (M / F)	Age	Ethnicity	Religion	Relationship to HH Head

**B. Livelihood Assets**

**Human Capital**

2. Please indicate education levels , health condition, productivity of labor for household members

Name	Highest Education level	Health Condition (Good, Fair, Poor)	Remarks

**Natural Capital**

3. Please provide land holding size of household with respective to location of plot and ownership and tenure status before and after private forest plantation companies come in ( i.e in 2008 and in 2012).

Location	Ownership	Tenure status	Area(Acre)		Reasons for discrepancy
			2008	2012	
Inside Reserve Forest					
- Plot 1					
- Plot 2					
- Plot 3					

Location	Ownership	Tenure status	Area(Acre)		Reasons for discrepancy
			2008	2012	
Outside Reserve Forest					
- Plot 1					
- Plot 2					
- Plot 3					
<b>Total</b>					

4. Before establishing private forest plantation, did your household previously collect timber and non-timber forest products (NTFPs)?

**Yes / No**

(If “Yes” go to Question No. 5; If “No” go to Question No. 7)

5. If “Yes”, please provide the estimated quantity that was annually collected, and the distance to go for collecting. Then please go to Question No. 19.

No.	NTFPs		Estimated quantity				Distance (mile)	
			2008		2012		2008	2012
			Consumption	Sale	Consumption	Sale		
1	Timber	Cu-ton						
2	Poles	No.						
3	Posts	No.						
4	Firewood	Cart-load						
5	Charcoal	Bag						
6	Bamboo	No.						
7	Thatch	No.						
8	Bush meat	Viss						
9	Bamboo shoots	Viss						
10	Root/ tuber	Viss						
11	vegetables	Value (K)						
12	Others (specify)							

6. Since the companies came in, is it more difficult for you and your household members to collect forest products? **Yes / No**

If “Yes” please explain what kind of difficulties are and how to solve them now?

.....  
 .....  
 .....  
 .....

7. If you didn't collect timber and NTFP before, how did your household get forest products?  
 .....  
 .....

**Financial Capital**

8. Please describe balance of your household economy between annual income and expenditure.

a) Surplus -----(Kyat) b) balanced c) deficit----- (Kyat)

9. Can your household save "cash" or "in-kind" from your income? **Yes / No**

a) If "Yes", please provide average annual saving in cash between 2008 and 2012.

-----Kyat

b) Average annual saving of "in-kind" (such as gold, jewellery etc.) between 2008 and 2012.

(Equivalent to cash) -----Kyat

c) After private forest plantation companies came in, saving of your household:

Increase                       Decrease                       Not change

If "Increase" and "Decrease", please provide explanation why:

.....  
 .....

10. Do you have to borrow cash for your household consumption or for doing business? **Yes / No**

a) If "Yes", please provide sources and amount of debt at present, interest rate and reasons for borrowing.

	Sources of loan and credit	Amount (Kyat)	Interest (%)	Reasons for borrowing

b) After private forest plantation companies came in, the amount of debt:

Increase                       Decrease                       Not change

If "Increase" and "Decrease" please explain why and how:

.....  
 .....  
 .....

11. Does your household raise cattle and livestock? **Yes / No**

- a) If “Yes”, mention the population of cattle and livestock before and after private plantation companies came in?

	Population		Reasons for change in population
	2008	2012	
Cattle			
Pig			
Goat /sheep			
Poultry (chicken/ duck)			

- b) Did you previously graze your cattle and livestock in the concession area to establish private forest plantation? **Yes/ No**
- c) If “Yes”, now where do you graze them? Please provide with explanation.

.....  
 .....

### **Social Capital**

12. Are there family members in your household who are members in any formal or informal association, organization and institution etc? **Yes / No**  
 If “Yes” please provide following information.

Name HH member	Name and type of organization	Role in organization

### **Physical Capital**

13. Type of house

Year of construction	Roof	Post	Wall	Floor	Remarks

14. Please provide number of producer goods and household goods belonged by your household. (To fill up number for 2008 in upper box and for 2012 in lower box)

(a) *Farming*

<input type="text"/>	Tractor	<input type="text"/>	Trawlergi	<input type="text"/>	Bullock cart	<input type="text"/>	Others
<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	(Please specify)

*(b) Travelling*

<input type="text"/>	Car	<input type="text"/>	Motorbike	<input type="text"/>	Bicycle	<input type="text"/>	Others
<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	(Please specify)

*(c) Milling*

<input type="text"/>	Rice mill	<input type="text"/>	Oil mill	<input type="text"/>	Others
<input type="text"/>		<input type="text"/>		<input type="text"/>	(Please specify)

*(d) Trade and services*

<input type="text"/>	Grocery	<input type="text"/>	Food shop	<input type="text"/>	KTV	<input type="text"/>	Others
<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	(Please specify)

*(e) Communication*

<input type="text"/>	Telephone	<input type="text"/>	Radio	<input type="text"/>	Others (Please specify)
<input type="text"/>		<input type="text"/>		<input type="text"/>	

*(f) Other household goods*

<input type="text"/>	TV	<input type="text"/>	Video set	<input type="text"/>	Sewing machine	<input type="text"/>	Generator
<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	(Please specify)

<input type="text"/>	Others
<input type="text"/>	(Please specify)

15. After plantation companies came in, if there is any increase or decrease in number of above-mentioned producer goods and household goods, please provide explanation on why and how increased or decreased by items:

.....  
 .....

**Livelihood Strategies**

16. What are the main livelihood strategies of your household?

a) Before private forest plantation (in 2008)

Livelihood strategies	Ranking	Who involve
Farming		
Plantation company workers		
Small-scale trading		
Service providers (transportation, entertainment etc.)		
Odd job or casual labor		
Collecting NTFP		
Timber cutting		
Government employee		
Others (please specify)		



- c) If there is any increase or decrease in farming income from crop before and after private forest plantation companies came in, please explain why:

.....  
 .....

19. Farming income from **Livestock**

- a) Before private forest plantations (in 2008)

Sr.	Livestock	Quantity	Consumption	Sale	Price	Production Cost	Total net income	
							In-cash	In-kind
	Total							

- b) After private forest plantations (in 2012)

Sr.	Livestock	Quantity	Consumption	Sale	Price	Production Cost	Total net income	
							In-cash	In-kind
	Total							

- c) If there is any increase or decrease in farming income from livestock before and after private forest plantation companies came in, please explain why:

.....  
 .....  
 .....

20. Income from collecting timber and NTFP

- a) How much does your household earn annually from collecting timber and NTFP?

	Before private forest plantation (in 2008)	After private forest plantation (2012)
In-Cash		
In-Kind		

(For calculation: Quantity of each items answered to question No.( 5)  
X Prevailing price of each item, then allocated for “Household Consumption”, i.e. In-kind, and “Sale”, i.e. In-Cash, by using respective percent)

- b) If there is any increase or decrease in income from collecting timber and NTFP before and after private forest plantation companies came in, please explain why:

.....  
.....

21. Incomes from other sources

- a) Please describe income from other sources apart from farming income and that from collecting timber and NTFP.

Sources	Before private forest plantation (in 2008)		After private forest plantation (in 2012)		Remark
	Monthly income	Yearly income	Monthly income	Yearly income	
Total					

- b) If there is any increase or decrease in income from other sources before and after private forest plantation companies came in, please explain why:

.....  
.....  
.....