MINISTRY OF FORESTRY FOREST DEPARTMENT TANINTHAYI NATURE RESERVE PROJECT

Socioeconomic Baseline Study Report

on

Local communities adjacent to Taninthayi Nature Reserve

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1. Introduction

The Taninthayi Nature Reserve (TNR) has been legally declared as a managed nature reserved to conserve tropical rain forests and their constituent biodiversity in the Taninthayi region of southern Myanmar. The Government of Myanmar, represented by the Forest Department (FD), and Mottama Gas Transportation Company (MGTC) Limited and Taninthayi Pipeline Company (TPC) Limited have agreed to implement a co-operative project for the establishment and operation of TNR. The main intent of the project is that the reserve be planned, established and managed using recognized international best practices, appropriately adapted to the Myanmar situations.

In this regard, most of the areas of the reserve will be designated as core zone with the management objective of maintaining pristine conditions for checking loss of habitats and biodiversity. The remainder will be designated as buffer zone in which proper landuse practices will be planned in compliance with the primary purpose of the reserve. Buffer zone will be managed for the protection of core zones, for rehabilitation of degraded areas, and for provision of material, cultural and/or spiritual benefits to local residents. Accordingly, management and landuse planning within the buffer zone of the reserve required pragmatic considerations for setting a balance between short-term gains for providing immediate needs of local communities and long-term goals for conserving biodiversity. In response to this, the project assigned the national consultant to assist in preparing a buffer zone management plan in particular and developing a comprehensive management plan for the reserve in general.

1.1. Objectives of the study

According to the terms of References (TOR), the main duty for the consultancy is to plan and organize a socioeconomic survey around TNR. With the ultimate goal to characterize landuse patterns within and adjacent areas of the reserve, the socioeconomic study was properly designed to embrace following immediate objectives:

- 1. to investigate socioeconomic conditions of the communities adjacent to the $\ensuremath{\text{TNR}}$
- 2. to analyses the current livelihood efforts being undertaken
- 3. to characterize the existing landuse patterns and conflicts
- 4. to assess the knowledge on the environment and attitude of the local communities towards TNR

1.2. Activities carried out in implementation of the socioeconomic study

The implementation of the socioeconomic study involved a number of activities that passed through different consecutive phases to achieve the objectives of the study. The phases included: conceptualization, problem identification of, preparation of field survey, organizing field survey, data processing and analysis and reporting results.

- (i.) **Conceptualization phase**: This phase mainly involved reviewing relevant literatures, collecting information from the available secondary sources (i.e., documents, reports ect.) and making discussion with personnel concerned from the project and related organizations.
- (ii.) Problem identification phase: The general overview of the problems relating to the protected areas could be gained during the previous phase. In that moment, the activity was to specify the objectives of the study clearly. A reconnaissance survey was conducted then to get better understanding of the situations.
- (iii.) **Preparation for the field survey**: After identifying the problems and clear objectives, the conceptualization and identification phase turned into the operational phase. Formation of a survey team compressing of proper persons, preferably with a balanced gender mix, was a key function in that phase. Appropriate data collection methods were reviewed and adopted for collecting both quantitative and qualitative data. Necessary survey instruments such as questionnaires for structured interviews were developed.
- (iv.) **Conducting field survey:** A pilot survey was organized to test the appropriateness of the adopted data collecting techniques and predefined survey instruments in support to gather required data in a correct format. Rejection of immaterial techniques and addition of other pertinent ones were made and the predefined questionnaire sets also modified through item analysis and reliability test. Then, the action moved to prepare sampling frame of target population and select sample (villages and respondents) of an appropriate size, depending on statistical principles with a view to make legitimate generalization. Afterward, field survey was realized in the ground.
- (v.) **Data processing and analysis**: After completion of field survey, collected data were coded into different individual variables and computed using general SPREADSHEET software. Both quantitative and qualitative analyses were employed for having better information on the socioeconomic aspects of the study area.
- (vi.) **Reporting results**: The final phase of the study was to document the findings in a proper format with a view to be supportive in preparing the management plan of TNR.

The work-plan for accomplishing these activities is attached as Appendix I.

2. Methodology

2.1. Conceptual and analytical frameworks

Socioeconomic environment refers to a wide range of interrelated aspects and variables relating to social and economic factors. In order to organize and conduct a socioeconomic study in a proper way, it should be systematic, and have minimum bias, and allow for consistent comparison and reasoned judgment. To guide the whole process of the study for achieving all these conditions, it is necessary to adopt a carefully designed conceptual framework. Likewise, it is equally essential to assume an analytical framework insofar as to make objective decisions relating to type and amount of required information, techniques and procedures for collecting data, means and ways for analyzing data, and outlines for interpreting results.

Accordingly, Sustainable Livelihood (SL) approach is adopted as a framework for conceptualization and analysis. The approach can be described as a way of thinking about objectives, scope and priorities for development in order to enhance progress in poverty elimination. In fact, it is an approach carrying a development objective. SL approach thus consists of two key components: a framework and core principles. The framework provides a way of understanding the factors that influence the ability of people to achieve SL in a particular circumstance while a set of core principles guides actions to address and overcome poverty.

The United Kingdom Department of International Development (DFID) has initiated a Sustainable Livelihood Framework which is further modified and improved by various organizations and individuals. However, the framework is neither a model that aims to incorporate all the elements of people livelihoods nor a universal solution. Rather, it is a means of stimulating thought and analysis. The framework offers better interpretations on livelihoods and poverty. It also provides an analytical structure, highlighting key components of livelihoods and making the complexity of livelihood more manageable (see figure 2.1).

A livelihood is basically the means that people use to sustain live (Johnson, 1997) and to achieve well-being (Messer and Townsley, 2003). Livelihoods comprise the capabilities (what people can do), assets (what people have) and activities (how people combine what they have) in making a living. A livelihood is said to be sustainable only when it can cope with and recover from stress and shocks, maintain or enhance it capabilities and assets, both now and in the future. Livelihoods are shaped by a magnitude of different forces and factors, which are themselves constantly changing. However, the framework presents the main factors affecting people's livelihoods and typical relationships. People are placed at the centre of the analysis. It is then assumed that people draw a range of resources (livelihood assets) to undertake a portfolio of activities (livelihood strategies) in pursuit of a variety of objectives (livelihood outcomes). The activities they adopt and the way in which they reinvest in assets is usually driven by their own preference and priorities. However, it is also strongly influenced by the external elements: context (vulnerable changes) and conditions (policies, institutions and processes). Therefore, it is rather logical to start the analysis with the simultaneous investigation of livelihoods assets, the livelihood outcomes they seek and the livelihood strategies they adopt to achieve these outcomes.



Figure 2.1 A simplified sustainable livelihood framework (modified based on DFID, 2000 and Messer and Townsleys, 2003)

Livelihood assets are what people used to gain a living. They are the basic building blocks in a living, thus core aspect of a livelihood. People will access assets in different ways and combine different assets in order to achieve positive livelihood outcomes. There is no single asset in this area that is sufficient on its own. People have to search for efficient combinations between these assets in order to survive. Both quality and quantity of assets matter, along with the options to convert assets into productive activities. Generally, assets are divided into five categories: Natural capital (natural resources and ecological processes), physical capital (basic infrastructures and producer goods), financial capital (money stock and flow), human capital (quantity and quality of people to labour) and social capital (social relations).

Livelihood strategies refer to how people do to achieve their objectives. They actually are combinations of activities (including productive actions, investment decisions and reproductive choices) that people choose in order to promote options, opportunities and diversity in their livelihoods. Such a particular combination of activities can be seen as a livelihood portfolio. Some such portfolios may be highly specialized with a concentration on one or a limited range of activities; other may be quite diverse. The degree of specialization or diversification may relate to the resource endowments available and the level of risk. Moreover, different patterns of combinations (this may be called livelihood pathways) are also evident over different timescale (over seasons, years or decades). It will depend on variation in options, the stages in the domestic cycle or on more fundamental changes in local and external conditions. The aim of these livelihood strategies is to meet people's needs, as efficiently and effectively as possible. These needs can be expressed as desired livelihood outcomes of a chosen livelihood strategy. When considering poor people, there are five basic outcomes that will usually be most important to them: increased food security for ensuring subsistence, more income for having the maximum flexibility in meeting their needs, increased well-being for enjoying physical, mental and spiritual health, reduced vulnerability for improving availability of assets, and more sustainable use of the natural resource base for sustaining production systems. At a more abstract level, outcomes consists in the qualitative or quantitative transformation of the assets, which means that by ways of the strategies, assets are being accumulated, consumed or converted. The outcomes thus contribute to the resource base and the composition of the capital endowment, eventually increasing sustainability or vulnerability.

Livelihoods of people have to be constructed within a specific context. The context is usually featured with risks (events with known probability of occurrence) and uncertainties (events without knowledge of probability of occurrence) resulted from changes in natural, economic and social circumstances most of which are beyond the people control. These risks and uncertainties would lead to stresses (a small, regular, predictable disturbance with accumulated effects) and shocks (large, occasional, unpredictable disturbances with immediate effects) that may exert negative influences on people's livelihoods. The SL framework captures these changes as trends, shocks and seasonality respectively. Accordingly, such continual changes as in population, environmental conditions, governance patterns, economic circumstances, and technological innovations are taken as trends. Trends may create more constraints or better opportunities on resource utilization, production processes and market accesses. Likewise, shocks represent some external changes that are sudden and unpredictable and relates to health, nature, economy or relations. They may rapidly reduce stocks of and access to key livelihood assets, making people livelihood far more problematic and vulnerable. Seasonality is also trends that have a seasonal dimension such as price fluctuation, resource abundance, crop production, employment prospect and so on. These forces may reduce or create opportunities or options of livelihoods at different times of the year. This aspect of livelihood is named the vulnerability context in the LF framework.

Institutions include organizations, set of conventions, policies and legislations which regularized social behaviors. They operate at all levels from the families to international arena and in all spheres from the most private to most public. From a managerial point of view, institutions are understood as both enabling (in providing ways for cooperation) and constraining (in providing the rules for actions). In this connection, they define both formal constraints (such as constitutions, laws, rules etc.) and informal constraints (such as norms, behaviors and so on). Specifically, institutions determine three elements in livelihood perspectives: access to capital, to livelihood strategies, and to decision-making bodies etc.; the terms of exchange between different sort of capital; and returns of investments.

2.2. Methods of data collection

The present assessment requires both quantitative and qualitative data of socioeconomic aspect. Some data were gathered from the secondary sources such as project document, reports, working plan and other relevant literatures. In the case of collecting primary data, a combination of formal (quantitative) and informal (qualitative) survey method was applied to improve the quality of data and the strength of analytical conclusions. Such an application of a combined method of course increased trustworthiness of the information (i.e., credibility, transferability, dependability and confirmability). Even though sequential and concurrent uses of instruments of both survey methods were also possible in a particular study with their comparative strengths, the study employed a combined tactic by merging tools and attitudes from one tradition to another.

Participatory Rural Appraisal (PRA) is a qualitative, participatory research methodology, most often used to gather and analyze information in rural communities. PRA is more than a collection of techniques. It is a general approach whose effectiveness depends heavily on the attitude of its practitioners: it will only work well if they list to and respect the views of the local people with whom they are working with. More important than the PRA tools is the process for which they are used- a two-way process of exploration, questioning, analysis and learning. Many traditional methods of research and development planning place the outsiders in a privileged position as question/asker, solution-providers and all round experts. Local people, or insiders, are assumed to need the advice and direction of outsiders. The information exchanges are one-way: either in terms of answers to set by the outsiders or in terms of directions given by. Establishing a basis for dialogue through which information is shared and in which there is an explicit recognition that outsiders need to learn as much as, if not more than, the insiders, is a fundamental step in PRA.

One of the strengths of PRA tools is that they facilitate learning by both insiders and outsiders. The tools are simple to use, relying mostly on oral and visual techniques, such as discussion groups and mapping and diagramming. Even in communities, where literacy rates are low, these tools can be used by everyone, including children. But being simple to use does not mean that little can be learned from them. On the contrary, these tools can be used to reveal a great deal of information and to support detailed analysis and planning process. While working with PRA tools, outsiders have the role of listeners and facilitators, rather than teachers and experts. They become catalysts and providers of occasions for local people to analyze their own problems. This requires a more respectful stance which generally lead to improved rapport with local people, making both insiders and outsiders better collaborators for development. Then, the knowledge of both insiders and outsiders can be brought together to fine the best solutions overall.

There are always limitations on and resources in conducting a research. Thus, the process need tom be action-oriented, and it might be worth considering the principles of PRA.

• **Optimal ignorance**: knowing what is worth knowing

- **Perfect imprecision:** choosing standards of accuracy that might not be acceptable to academic research, but that still allow responsible decision-making
- Iteration: advancing in cycles, as a continuous learning process
- **Exploration:** applying the serendipity principle of making fortunate and unexpected discoveries by chance
- **Eclecticism:** choosing and accepting freely from various sources
- **Triangulation:** looking at things from different (at least three) points of view. This principle is essential inc considering team composition, units of observation, sources of information and research methods.
- **Learning:** PRA is a learning process, and not simply information collection. It involves learning through interacting with people, and learning not only about people, but also with people.

2.3. Formation of the survey team

At the beginning of the consultancy period, TNR project, with the guidance of the experts from WCS, organized a basic training course on "Wildlife Conservation" at the project site. All technical staff of the project participated and Participatory Rural Appraisal (PRA) concepts were introduced and various PRA exercises were practiced in the course. After the course, two most efficient technical staff, U Kyaw Win Myint (Deputy Ranger) and U Chan Nyein Gyi (Forester), were assigned as permanent members of the survey team. Two other technical staff, one deputy ranger and one forester, from respective Local Operation Unit (LOU) were also supported when the team conducted activities in the area under their routine duty. Additionally, two lady-specialists on ornithology, who were also national consultants of the project, sometime joined the team to have a gender balance. A long the course of the survey, the team frequently received guidance and direct personal involvement of Robert Tizard, the international consultant, from WCS-Myanmar program.

2.4. Pilot survey

It is obvious that data collection phase is a relatively important one in the process of a socioeconomic study to be able to draw reliable conclusive results. Therefore, suitable survey techniques were selected and different survey instruments (such as information sheets, interview guides and questionnaire) were set in advance. Then, these techniques and instruments were needed to test for efficiency and conformity to local situations. To do so, a pilot survey was essentially conducted. Accordingly, eight villages were initially selected for the pilot survey, based on considerations for ethnic and geographic representation. These villages are:

(a) Yapu (b) Mayaungchaung (c) Migyaunglaung
(d) Zimba
(e) Yepone
(f) Heinze
(g) Hnankye
(i) Wunpo

In accordance with the adopted analytical framework and in order to grasp the ultimate goal and immediate objectives, the pilot survey was carried out in selected villages to gain basic data for developing different profiles concerning communities, household livelihood strategies, local institutions, and linkages between them. Following main activities were implemented in each and every village.

- (a) Formal discussion with village authorities
- (b) Community meeting
- (c) Focus group discussion
- (d) Geographical transect walk
- (e) Household interview
- (f) In-depth interview

The main intentions of the formal discussion with village authorities were to inform them about objectives and activities of the study, to ask for necessary supports in conducting survey, and to gather official data of the villages concerned. These official data for community level were recorded by using preset information sheet for community profile (Appendix II).





Then, a series of community meetings were organized in these pilot villages with the keen supports and dynamic collaborations from the village authorities concerned. In these meeting, the history, the socioeconomic status, natural resource conditions, landuse pattern, and perceived socioeconomic problems of the respective villages were recalled and identified through various PRA exercises. Members of almost all households from a particular

village were actively taken part in the respective meeting so that the survey team could motivate and encourage local communities to have active, but genuine participation in the socioeconomic assessment of the area.

Next, the survey team invited social leaders of the village concerned to the relevant focus group discussion to reveal their current and anticipated activities, constraints and opportunities for community development. Then. social cohesion of the community organizations scrutinized was and prospects for collaboration with outside institutions were discussed as well. Moreover, most serious socioeconomic problem of their community perceived and identified in the related community meeting was analyzed in the discussion



with active participation to reach desired solutions.



The survey team brought about the geographical transect walks with some knowledgeable persons in almost all villages in order to have self-evidences on local landuse, dominant livelihood activities and customary institutions. It also provided opportunities to crosscheck and validate information derived from community mapping exercises.

Another main activity accomplished in the course of data collection was household level interview. In the pilot stage, a cluster of five households were randomly selected in each pilot village, amounting to a total of 40 households. Semi-structured interview technique was accepted as a main technique in performing household level interviews. However, three parts of the interview process in each household was systematically framed to accomplish within a given time limit (i.e., one



hour). The first part of the interview was about basic data of the respondent household and the information sheet was used to record these data. Similarly, an interview guide was put in order to administer the second part of the interview that was dealing with household resource-use patterns. The environmental knowledge, relations to staffs of the reserve and attitude towards TNR project were measured in the third part of the interview using the preset questionnaire.

Some activities such as informant survey, informal discussion with villagers and self-ocular observation were also made as a complementary to these focal activities to increase sources of information for cross-reference. Wherever

necessary, various tools and instruments (namely mapping, diagramming, and gaming) were effectively employed in these activities.





As a last task in the pilot survey, different tests were tried to evaluate the efficiency and consistency of the techniques and instruments to the local situations and to appraise the reliability and validity of responses to the questions. Basically, according to the subjective intricacy faced along the course of the survey, techniques and its procedures were frequently picked up to enhance efficiency and consistency of the entire process of data collection and type, number, sequence, and wording of the questions were also repeatedly modified insofar as to increase understandability of the respondents and to assure fro having valid responses.

Particularly, objective tests were also, in line with statistical principles, undertaken for responses to questionnaire used in the third part of the household interview. Regarding the questions related to environmental knowledge, "difficulty index" and "reliability index" were worked out for each question. Similarly, a number of "distinctive tests" were also attempted for each question raised to measure the attitude toward TNR to evaluate whether the responses to the particular question were distinguishable in showing attitudes. Then, type, number, sequence and wording of the questions of the questionnaire were modified according to the results of the different tests. The modified questionnaire comprised of three sections: 1) 9 questions about knowledge regarding environmental issues and the reserve; 2) 6 questions about relations between local residents and Reserve employees; and 3) 21 statements for quantifying people's attitude towards the reserve. Later, the modified questionnaire was essentially utilized in the intensive household interview. Survey instrument used in the intensive survey is given as Appendix III.

2.5. Conducting intensive survey

The intensive household survey was carried out with all out efforts and a grater momentum using the modified instrument (information sheet, interview guide and questionnaire). A total of ten villages (eight plot villages plus other additional two villages- Kyaukshet and Tharyarmon) were included in the intensive survey. All activities (both focal and complementary) of the pilot survey were organized only in two added villages, but just household interview was repeated in the pilot villages. It was decided to take a cluster sample of equal size in all villages disregard of some level of different in household numbers in order

to simply represent a random mix in social differentiation such as ethnicity, religion, livelihoods in these villages. Thus a cluster sample of ten households was selected randomly in each and every village. In the case of villages where the pilot study was carried out, only additional households that were not included in the pilot survey was taken for replicating household level interview for final analysis of basic socioeconomic data. Whenever possible, all members of the households were invited to participate in the interview for cross-referencing information given mainly by the household heads. In particular, females members of the families interviewed were encouraged to response separately the questionnaire assessing attitudes, knowledge and relations for a proper covering of gender perspective in the process. All such valid responses separately given by the female members in addition to the head were also recognized in the analysis.

Moreover, a series of in-depth interviews were conducted with different livelihood professional groups of horticultural farmers, shifting cultivators, lowland farmers, bamboo and wood cutters, and odd-job workers with a view to discuss key linkages with other groups, fill in gaps in information, validate key findings and discuss changes and improvement. Another important topic of discussion was coping and adaptive strategies in face of changes of various forms.

2.6. Data analysis and interpretation

The study used both qualitative and quantitative methods to analyze data collected through a combined approach of formal survey techniques and informal exercises of participatory rural appraisal. Data collected by using PRA techniques were analyzed qualitatively with the help of communities. Triangulation was widely applied as a way to cross-check information for accuracy. It means looking at any problem from as many perspectives as possible, but at least three. Triangulation was achieved in the study by composing multi-disciplinary team, looking at different information sources, using different tools and techniques and listing to different people with different points of view about the same topics (see figure 2.2 for triangulation process in the study). Moreover, various matrix-based tools were used in analyzing landuse conflicts and stakeholders involved.

More quantitative aspect was given in analyzing some basic socioeconomic data and especially in measuring attitudes of local residents towards the reserve. Descriptive and inferential statistics were applied to describe and test for significant differences among grouped data. To quantify people's attitude towards the reserve, attitude statements with 3-points Likert-scale were score (1-3)(1 for "don't know", 2 for "no", 3 for "yes" response in the positive statement and 1 for "don't known", 2 for "yes" and 3 for "no" response in the negative statement). Accordingly, the highest possible score in the attitude assessment for a particular respondent was 51 points since there were 17 statements in the assessment. If a respondent obtained score equal or greater than 40 was considered to be having fair/positive attitudes towards the reserve.



Figure 2.2 Triangulation in cross-checking information for accuracy in qualitative analysis in PRA exercises

The same rule was also applied to the knowledge questions. Thus, a respondent would get the highest score of (3x9=27) if he/she could provide right answers to all questions in this section. The respondents who gained the score of equal or greater than 18 were considered to have a fair/good knowledge level about environmental issues and the reserve. In contrary, score (1) for "no" and (2) for "yes" response were assigned to questions regarding the resident-Staffs relations that have only two scales of response (yes or no). Since a particular respondent could get a highest point of 12 for all right answers, those people who had a fair/good relations with the staffs should at least have the score of 9.

3. Results and discussions

3.1. Geography

TNR lies between the Dewai river and Myanmar Thailand international borders within the latitudinal range of N 14°20′50″ to 14°57′55″ and the longitudinal range of E 98° 5′10″ to 98° 31′32″. It is located within the jurisdictional boundaries of Yebyu and Dewai townships, Dewai district of the Taninthayi Division, southern Myanmar. The location of TNR is given in figure 3.1. TNR with a total area of about 1700 square km was notified as the Nature Reserve in 2005. It stretches over some fractions of three Reserved Forests, namely, the Kaleinaung, the Heinze and the Luwaing Reserve. The Kaleinaung (constituted in 1885), Heinze (notified in 1902), and Luwaing (declared in 1932) were in fact very old Reserved Forests in Myanmar.

Most area around TNRP is undulating, ranging 15 m to 1400 m above sea level. The mountain range is running from north to south while the slope rises almost west to east climbing to the ridge top and is oriented to the western aspect. The Dawei river flows from the north to the south in more or less parallel with the western boundaries of TNR. Almost all eastern tributaries of the river originate in TNR. Ye-Dawei road, main access road in the area, runs in the narrow strip of plain along with the river. It can be used almost all weathers, with some difficulties in the rainy season. At the northern parts of the area, the road runs in the west side parallel with the river, but it passes through the river near Kaleinaung, and then runs on the east bank parallel again with the river in the south.

The area around TNR enjoys the seasonal and tropical monsoon climate with high rainfall. According to the meteorological records of Dawei District, average annual rainfall is 5,000 mm average temperature range is 25-28'C. There are about 145 rainy days from May to October in a year. The hottest month is March and the coldest January.

Once TNR and surrounding areas were covered with tropical rain forests. Typically, tropical rain forests were distributed in high elevations, but deciduous and bamboo forest were found in the lowlands. However, the areas mostly outside TNR have been seriously affected by human beings. Most forests were totally denuded and some degraded mainly due to shifting cultivation. Secondary forests dominated by bamboos are now prevailing in the areas proximity to human habitats. Residential areas become widen noticeably and agricultural farms appear extensively in place of dense tropical forests. Even though some human disturbances are obvious inside TNR, natural vegetation is still likely to be in good shape in most parts of the TNR.

Available information indicates that there is no enclave village inside TNR. However, information on far north and south of the reserve where human inferences are promising is still very scanty. Around twenty villages of different sizes are located west of TNR within the distance of (3-7) miles. The locations of villages under investigation are expressed in figure 3.2. The geographic locations of the villages could broadly be separated into three spatial zones: northern, middle and southern zone. The northern zone covers from Lawthaing to Mayaungchaung, whereas the

middle zone stretches over the neighborhood of Michaunglaung, Zimba and Kzaukshut. Others (Yepon, Heinze, Hnankye and Wunpo) are located in the southern zone.



Location Map of Tanintharyi Nature Reserve Project Area

Figure. 3.1 Map showing location of Taninthayi Nature Reserve



Figure 3.2 Sketch-map showing locations of sample villages

3.2. Demography

3.2.1. Settlement history

There is a long history of settlement and four ethnic groups are now found settled in the area. Kayin and Dawei tribes seem to be forerunners in the known history of settlement for more than 200 years. They occupied different tracts in the area. Generally, Kayin ethnics settled in all parts of the area, but at the present more concentrated in the middle range. Dawei tribes who extended from the centre of their origin (i.e., the Dawei district in the southern part of the country) occupied the southern peripherals of the area. In contrast, migration of Mon people into the area is very recent. They started to set up their settlements in the northern fringe since just last 50 years and extended gradually southward. The last settlers are noticeably Bahma individuals who came to find better livelihood and settled in the area mostly due to marriage ties with local dwellers. Bhama migrants particularly settled in villages of the northern and middle zones of the area. Accordingly, the spatial zones of the area can also be, based on tribal dominance, recognized as Dawei ethnic vicinity of the southern zone, Kayin dominated middle zone and Mon environs of the northern zone. Nowadays, Dawei are the most dominant ethnicity, representing about 40% of the people residing in the area. The present ethnical composition of the area is given in figure 3.3.



Figure 3.3 The ethnical composition of the area

Dawei people established Hnankye village last 200 years and Wunpo last 100 years ago. Yepon is supposed to be established by a few Kayin households last 100 year ago, but Dawei people also accumulated in the village later on and gradually became dominant. Compared to other villages of the southern zone, Heinze is however rather recent which became settled in last 50 years. All inhabitants of Heinze, Hnankye and Wunpo at this instant are Dawei. Many members of the Dawei vicinity were born and raised in the area, enjoying their second and third generation; even some are in their fourth generation.

The middle zone was dominated now by Kayin ethnics. Migyaunglaung village has been settled by Kayin families for two centuries. Kayin people also found their settlements in Zimba and Kyaukshut last 100 years ago. For the time being, Migyaunglaung still stand as pure Kayin village whereas other members of ethnic groups are living together with Kayin in Zimba and Kyaukshut. However, Kayin people of these villages were native settlers born and raised in their villages. Mon villages of Yapu, Tharyarmon and Mayanchaung are in the northern spatial zone of the area. Mon people have been staying for less than 50 years. Particularly, Tharyarmon is a new satellite village of 8 years, which was resettled under the arrangement of local authorities. Originally, most of the people residing in this zone were migrants from nearby Mon state and they came to the area for search of farmlands. They settled the villages inside reserved forests and gradually extended horticultural farms for their livelihood. Table 3.1 and associated graph provide the length of establishment and major ethnicity of the inhabitants of villages under investigation.

		Ypu	Tym	Мус	Mgl	Zba	Kst	Ypn	Hze	Hke	Wpo
Length of establishr (years)	nent	48	8	46	> 200	103	100	90	53	> 200	> 100
Major eth: group	nic	Mon 68%	Mon 86%	Mon 50%	Kayin 100%	Kayin 60%	Kayin 40%	Dawei 72%	Dawei 100%	Dawei 100%	Dawei 100%
		1	00% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%	5 10 ³ 10 ³	1200 Veg	ypr ne	the upo	□ Bha □ Mo □ Kay □ Dav	ıma n vei		
Remark:	Ypu=	= Yapu		Zba	= Zimba		Ypn=	= Yepon		Wpo=	Wunpo
	Myc=	– Tharya: = Mayano	rmon haung	Kst= Mal:	= Miqvau	iut inglaung	Hze= Hke=	Hze= Heinze Hke= Hnankve			

 Table 3.1
 The length of establishment and ethnical composition of the villages

3.2.2. Inhabitants

The largest number of inhabitants is observed in Yapu (1078) and the smallest in Heinze (326). Other villages have inhabitants within a range of 350 to 750. The average household size (members/household) of the area seems to be not very large, ranging from 3.7 (Heinze) to 6.4 (Yepon). Small household size indicates less mouth to feed, less people to support, implying low level of dependency, less threat to overpopulation and low tendency of vulnerability to abject poverty. The numbers of inhabitants, households and average household size of the study villages are given in table 3.2.

	Ypu	Tym	Мус	Mgl	Zba	Kst	Ypn	Hze	Hke	Wpo
Number of inhabitants	1078	451	471	452	669	755	682	126	432	351
Number of households	193	104	84	74	139	158	107	34	97	59
Average household size	5.6	4.3	5.6	6.1	4.8	4.8	6.4	3.7	4.4	6.0
Remarks: Ypu= Yapu Tym= Tharyarmon Myc= Mayanchaung			Mgl= Migyaunglaung Zba= Zimba Kst= Kyaukshut		Ypn= Yepon Hze= Heinze Hke= Hnankye		W	Wpo= Wunpo		

 Table 3.2
 Average household size of villages under investigation

3.2.3. Religious composition

People of the area are devoted to two main religions: Buddhism and Christianity. Buddhism tends to be more influential in the area since more than 80% of the people are Buddhists (see figure 3.4 (a)). Most villages (Yapu, Kaukshut, Heinze, Hnankya and Wunpo) are entirely composed of Buddhists alone. Both Buddhists and Christians are found in Tharyarmon, Mayanchaung, Zimba and Yepon. Among others, Migyaunglaung is said to be a pure christian village (see figure 3.4 (b)).



Figure 3.4 Religious composition of the whole area(a) and of villages (b) (in numbers of households)

Figure 3.5 reveals that there seems to have some degree of association between ethnicity and religious belief. Particularly, all Dawei tribal groups are devoted to Buddhism. Kayin ethnics more incline into the Christian faith while Mon families into the Buddhism. Therefore, a majority of Kayin (68%) are going to churches, but most Mon people (90%) to the monasteries. Some Bhama settlers also are followers of Christianity.



Figure 3.5 Ethnic and religious composition of the area

3.2.4. Biological characteristics

Population of a given area is always dynamics due to intrinsic and extrinsic factors. Biological characteristics are intrinsically determined dynamics of a particular population. The most significant intrinsic characteristics are the sex ratio (ratio of males to females), the age distribution (the number of people of each age in the population) and the total fertility rate (the number of children per woman per life time).

Across the entire area, there are slightly more females than males, with the ratio of 45:54 (males to females). In the southern zone (Dawei tribal vicinity), sex ratio is in balance whereas the middle zone (Kayin dominated area) and the northern zone (Mon environs) reveal greater number of females than males. Most villages in question (Tharyarmon, Mayanchaung, Migyaunglaung, Zimba, Yepon, Heinze and Hnankye) have a balanced ratio of sex, implying that numbers of males and females are more or less equal in these villages. Wunpo is a single village where males somewhat outnumber females. In contrast, Yapu have females who are significantly more in number and hence shows relatively negative sex ratio of (33:67). Numbers of males and females and respective sex ratios of villages are expressed in table 3.3. In general, overall sex ratio of 45: 54 indicates that reproductive potential of the area is fairly high.

	Ypu	Tym	Мус	Mgl	Zba	Kst	Ypn	Hze	Hke	Wpo	Total
Males	359	225	237	225	335	331	338	62	214	183	2509
Females	719	226	234	227	334	424	344	64	217	168	2957
Sex ratio	33:67	50:50	50:50	50:50	50:50	44:56	50:50	50:50	50:50	52:48	46:54
Remarks:	Ypu= Yapu Tym= Tharyarmon Myc= Mayanchaung		Mcl= Migyaunglaung Zba= Zimba Kst= Kyaukshut		Ypn= Yepon Hze= Heinze Hke= Hnankye		Wp	o= Wunj	ро		

 Table 3.3
 The sex ratios of the villages under investigation

The age distribution also has a great deal to do with the rate of population growth. If a population has many young people who are raising families or who will be raising families in the near future, the population will continue to increase even if the families limit themselves to two children. This might have another implication for local economy that young people put into a prevailing working force.

The age distribution over the area indicates that nearly 40% of the people of the villages are young, having an age range of 16 to 40(see figure associated in table 3.4). This range is believed to be raising actively reproductive families and who will be raising families in the near future. Segments of young people to the total population of the particular zones are fairly different: young people constitute 44% in the northern zone, 41% in the middle zone and 30% in the southern zone. This points out the fact that more young people are found in the Mon environs, especially in Yapu village where 42% of the population are between the age of 16-40. Compared to others, the southern zone (Dawei vicinity) includes a fairly small young population segment which represents merely one third of the population of the zone. Particularly, Yepon, one of the villages of the southern zone, has the least young people ratio, contributing only 20% of the total population of the village (see table 3.4)

	Village	0 - 5	6 -15	16-39	40-60	> 60	Total
	Yapu	120	262	453	184	59	1078
5% 12%	Tharyarmon	57	109	171	94	20	451
21%	Mayanchaung	71	49	251	61	39	471
23/6	Migyaunglaung	77	110	175	64	26	452
	Zimba	93	195	285	80	16	669
	Kyaukshut	75	185	302	149	44	755
39%	Yepon	93	82	133	347	27	682
	Heinze	12	25	55	27	7	126
	Hnan-kye	51	119	159	79	23	431
	Wunpo	22	94	135	85	15	351
		671	1230	2119	1170	276	5466

 Table 3.4
 Age distribution of the villages in question

Family age also determine the reproductive potential. In this respect, more than half of the families across the villages are found to be young. This is especially to say that they are within the active reproductive stage or that a majority of married women are under 45 years of age. Much more families (63%) are observed to be well within the active reproductive range in the middle spatial zone whereas lass than half (46% and 48%) of the households residing in the northern and the southern zones are still in active stage of reproduction. A larger segment of young people in the population and a larger number of young families in their communities would support reproductive potential to be high in the entire area. In particular, the middle zone (Kayin area) where the largest number of young families resides will enjoy a higher rate of reproduction and perhaps more people would be seen in the zone in immediate future. The total fertility rate is also one of the critical factors determining population growth. The total fertility rate of 3.4^{1} is observed over the entire area. The specific rates for the Mon environs, Kayin area and Dawei vicinity are 3.1, 3.5, and 3.7 respectively. These overall and spatial zone specific rates are well above the replacement fertility (i.e., a total fertility rate of 2.1) and these will thus exhibit the gradual increase in population. It is clear that the higher the fertility rate is, the higher the population growth rate will be. As a matter of fact, the southern zone which has a comparatively higher fertility rate than others would experience the faster rate of population growth.

3.2.5. Cultural characteristics

Not only the biological factors but also cultural factors indirectly affect the population dynamics. Religion and tradition influence some behavioural characteristics that have a direct concern with the family size. These behavioural characteristics include age of women getting first married, age of the mothers giving birth and time-lag between marriage and birth.

It was obvious that cases of early marriage were commonplace in the area. Survey data reveal that cases of women getting married under 15 year of age and (16-19) range of ages are found to be 5% and 31% of all cases of marriage (see figure 3.5(a)). Such cases of women getting married at age of under 15 constitute 7% all cases in Mon ethnics, 4% in Kayin tribe and 5% in Dawei families (see figure 3.6 (b))).In average, age of women getting the first married across the villages is found to be 22.6 year with the youngest of 14 year and the eldest of 40 years. Likewise, the ranges of age of women getting married across the ethnic groups show a certain extent of variations: (14 to 31) among Mon women, (14 to 40) among Kayin ladies and (14-39) among Dawei spouses with the average ages of 20.3, 23.0 and 23.3 respectively. In this regards, the overall average age across the area and the specific average age across the ethnic groups seem rather reasonable. However, the youngest age of women getting married that is common in all ethnic groups is supposed to be too young for getting married and having a healthy and happy family. Moreover, earlier marriage will make women exposed to the probability of pregnancy for more of their fertile year and lead to larger family sizes.

When looking at another cultural aspect of reproductive behaviour, data on the age of mother giving birth indicate that nearly 20% of cases in the area are given by women in the 16-19 year-old range. In this range of age, this is true of 22% in Mon ethnicity, around 20% in Kayin tribe and about 10% in Dawei people. Figure 3.7 provides relative frequencies of age of mother giving birth.

¹ This figure is estimated based on wives who are overdue the active reproductive age (i.e., over 45 years)



Figure 3.6 Frequencies of the age of women getting first married



Figure 3.7 Frequencies of the age of mother giving birth

The time-lag between marriage and birth is also investigated for getting overall indicator of reproductive potential for the entire area and specific indicators of particular ethnic groups. Out of all interviewed families, 30% of the couples responded that they had the first baby less than 1 year after marriage and another 30% said that the first baby became a family member within 2 year after marriage. Within the ethnic groups, majority of families from all major ethnic (56% of Mon households, 52% of Kayin couples and 75% of Dawei families recalled that they take the first baby less than 2 year after their marriage (see figure 3.8).



Figure 3.8 Time-lag between marriage and birth

3.2.6. Population dynamics

To gain insight into the population dynamics of the area, a relative population trend (figure 3.9) was developed based on the numbers of houses that was easy to recount by local elders in the community meeting. The trend indicates that the inhabitants of the areas was relatively dynamic, showing rises and falls in numbers during last seven decades. Generally, the relative trend indicates upward movement with varied rates except between 1970s to 1990s, where the trend goes a bit downward.



Figure 3.9 The relative trend of population dynamics in the study area

Specifically, the numbers of inhabitants of Mayanchaung, Migyaunglaung, Zimba, Yepon, Heinze and Wonpo seem to be relatively fluctuated in the past, but those of remaining villages increased in a steady rate. In Mayanchaung, Migyaunglaung, Zimba and Yepon villages, the number of residents decreased during 1970s and 1990s, pulling the trend downward. During 2000s, decreases in number of inhabitants are also found in Heinze and Wunpo. However, these specific decreased numbers cannot significantly reflect to the trend of the whole area. Figure 3.10 provides rises and falls in number of houses to get idea of relative population dynamics in particular villages.

As a rule, population dynamics of a particular area is always the results of interaction between biological, economic, cultural, social and political factors. In this context, biological factors observed in the area potentially support to have an ever increasing population growth. In contrary, the relative population trend of the area reveals somewhat downfall in some periods. This downward trend in population dynamics of the areas in the past might be resulted from profound fluctuation of residents in several villages like Migyaunglaung and Zimba. These downfalls are obviously not due to biological influences, but due more likely to socio-political interferences and interventions.

The most significant reality might be insurrectionary attempts for ethnic autonomy and restorative efforts for better security around the area. However, development interventions under national mandate would be a main ground for reduction of inhabitants in some villages. For instance, land reclamation and agricultural expansion for national economic development seem to cause reduction of residents in Heinze and Wunpo village during 2000s. Extensive land reclaimation around Wunpo for private commercial plantations made local people landless and hence to out-migrate for their livelihood. In contrast, expansion of private commercial plantation tells another storey relating to population dynamics of the Heinze village. The private company brought migrant workers from other places to establish huge farm, raising the number of residents in the village. When labour demand became low after being established the farm in 2000s and surplus labour families moved to better places, the number went down again in the small village. Accordingly, More significant socio-politico-economic events that might drove the population dynamics of the areas are expressed in box 1.



Figure 3.10 The numbers of houses of the villages in past seven decade

Box 3.1	Significant socio-politico-economic events
1029	Constructed Vo Dowoi road (googonal)
1936	Abandoned village (1 st time) (Michaunglaung)
1940	Constructed Venon iron suspension bridge
1960	Prosperous era of village headman II Posaw (7imba)
1962	Renovated Ye-Dawei road (Yanu)
1964	Upgraded Ye-Dawei road (Kyaukshut)
1966	Tarred Ye-Dawei road (Yepon)
1971	Built Mayaungchaung iron suspension bridge
1977	Troubled with exiled group (Wunpo)
1978	Resettled Heinze at the present site
1979	Influenced by rebellion of exiled patriotic part (Mayaungchaung)
1988	Influenced by Kayin insurgents
1989	Started railway construction activities (Yapu)
1991	Abandoned village (2 nd time) (Michaunglaung)
1991	Built up army battalions and occupied Nat-ein-taung (Kayin camp)
1993	Reclaimed residential area for railway (Kyaukshut)
1993	Exchanged fire between army and Kayin insurgents in the village (Hnankye)
1993	Started to received pipeline company assistance (Zimba)
1995	Started to received pipeline company assistance (Michaunglaung)
1996	Constructed railway (Mayaungchaung)
1996	Upgraded school building with the assistance of MGTC (Zimba))
1997	Started rural development activities of socioeconomic div. of MGTC
1997	Upgraded school building with the assistance of MGTC (Michaunglaung)
1998	Reclaimed farmlands for private commercial rubber plantation (>300 ac) (Wunpo)
1998	Renovated the road with the assistance of MGTC (Michaunglaung)
2001	Reclaimed farmlands for private commercial oil paim plantations (> 200 ac) (Wunpo)
2001	Received assistance from pipeline companies (Kyauksnut)
2001	Renovated the road with the assistance of MGTC (Limba)
2000	
Remark: N	AGTC= Mottama Gas Transport Company

3.3. Tracking livelihood asset status

People combine their capacities, skills and knowledge with different resources at their disposal to create livelihoods. Every thing that goes towards creating that livelihood can be thought of as a livelihood asset. Therefore, livelihood assets are nothing, but resources that people use to gain a living and they are thus core elements of a livelihood. Such livelihood resources may be, drawing on an economic metaphor, other ways seen as the capital base from which different productive streams are derived for constructing livelihoods. To get better insight, these capital assets are usually categorized into five types and can usually be represented as a pentagon. Then comprehensible implications for diversity, amount and balance of the assets can be made through spotting on size and shape of the pentagon (see figure 3.11).



Figure 3.11 The livelihood asset pentagon

Natural capital: Natural capital is made up of the natural resources used by people: land, soil, water, plant, animal and minerals. They provide goods and services, either without people's influence or with their active interventions. Natural capital is important for its general environmental benefits, and because it is the essential basis for many rural communities (in providing food, building materials, fodder etc.).

Physical capital: Physical capital is derived from the resources created by people. It is essentially made up of consumer goods and services (such as buildings and roads) and producer goods (such as tools and equipments). Physical capital is therefore important since it directly meets the needs of people through provision of access to other capitals via transport or infrastructure.

Financial capital: Financial capital is also a specific and important part of created resources. It encompasses money stock (e.g., wages and incomes) and money flow (e.g., saving and credits). By definition, it is poor people's most limiting asset. It can be used to purchase other types of capital and can have influence, good and bad, over other people.

Human capital: Human capital is human resources that are typified by quantity and quality of labour available. The quantity aspect is dealt with available working force while the quality dimension is concerned with skills, knowledge and health of the people. Human capital is the most important not only for its intrinsic value but also because other capital assets cannot be used without it.

Social capital: Social capital is the part of human resources determined by the relationships that people have with other. It basically refers to such resources as information, idea, support that individuals are able to procure by virtue of their relationship with other people. Unlike physical resources (e.g., tools, technology) or human assets (e.g., education, skills) which are essentially the properties of individuals, social capital is only accessible through relationship in the society between family members, friends, workers, communities, organizations etc.). It is not a single entity, but is rather multi-dimensional in nature. This multi-dimensionality is usually captured in respect to structure, cognition, ways of operating and outcomes. It is import because of its intrinsic values. Within the religious, cultural and political norms, social capital serves to generate the framework of society, increase well-beings and facilitate flow of other capitals.

It is obvious that each and every capital has intrinsic and significant values to livelihood efforts. However, people must combine the capital endowment that they have access to and control over in order to construct the best possible livelihood. Consequently, the diversity and amount of these different assets that people have at their disposal and the balance between them will seriously affect what sort of livelihood they are able to create for themselves at any particular moment. Moreover, the diversity, amount and balance of capital endowment are also essential for developing coping strategies (temporary shift in the face of unpredictable perturbation- shocks) and adaptive strategies (permanent changes in response to regular perturbations- stresses).

Accordingly, the livelihood assets status of the communities around the TNR is tracked to gain insight for livelihood strategies of the area. Relevant indicators are developed to spell out each type of capital. These indicators are scored 1 to 5 where 1 represents the worst case and 5 the best one. For natural capital, two aspects- natural resource bases and environmental services- are considered by representing with nine indicators whereas a total of twenty-seven indicators are developed for specifying three basic dimensions of physical capital. Likewise, eight indicators for financial capital, thirteen indicators for human capital and twenty-two indicators for social capital are included in the assessment scale for covering respective multi-dimensionality of these capitals. Respective scoring guides are given in table (3.5, 3.6, 3.7, 3.8 and 3.9) and summeries of assessment results for different villages are provided in table 3.10. Detailed scoring results are attached as Appendix IV.

Table 3.5Natural capi	tal assessment scales
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		P	Assessment scale	S	
	5	4	3	2	1
<u>Resource base</u>					
Per capital land area	> 100 acres	75 acres	50 acres	25 acres	None
Per capital farm land	> 1 acre	0.75 acre	0.5 acre	0.25 acre	None
Timber resources	within village	l miles	3 miles	5 miles	7 miles
Bamboo resource	within village	l miles	3 miles	5 miles	7 miles
Water resource	within village	l miles	3 miles	5 miles	7 miles
Bush meat	All seasons	Seasonal	Sometime	Rare	None
Pasture	Specified	Communal	Farmlands	Homesteads	None
Environment					
<u>services</u>					
Bush fires	None	Rare	Sometime	Frequent	Very freqt.
Catastrophic flood	None	Rare	Sometime	Frequent	Very freqt.

		Assessment scales							
	5	4	3	2	1				
<u>Basic infrastructure</u>									
Post office	within village	l mile	3 miles	5 miles	7 miles				
School (primary)	within village	l mile	3 miles	5 miles	7 miles				
School (Middle)	within village	l mile	3 miles	5 miles	7 miles				
School (High)	within village	l mile	3 miles	5 miles	7 miles				
library	within village	l mile	3 miles	5 miles	7 miles				
Hospital	within village	l mile	3 miles	5 miles	7 miles				
Clinic	within village	l mile	3 miles	5 miles	7 miles				
Electricity	many home	some home	nearby villag	nearby town	no nearby				
Bridge across river	permanent	semi-permnt.	temporary	seasonal	no				
Groceries	within village	l mile	3 miles	5 miles	7 miles				
Market	within village	l mile	3 miles	5 miles	7 miles				
Railway station	within village	l mile	3 miles	5 miles	7 miles				
Road network	Zero mile	l mile	3 miles	5 miles	7 miles				
<u>Consumer goods</u>									
Bamboo house (%)	< 10%	15%	20%	30%	> 40%				
Drought cattle	> 2/hh	1.5/hh	l/hh	0.5/hh	no				
Diary cow	>1 /hh	0.75.hh	0.5/hh	0.25/hh	no				
Swine	>1/hh	0.75/hh	0.5/hh	0.25/hh	no				
Poultry	> 20/hh	15/hh	10/hh	5/hh	no				
Domestic water	all seasons	10 mn/yr	8 mn/year	7 mn/yr	6 mn/yr				
<u>Producer goods</u>									
Trawlergi	l per 20 hh	l per 30 hh	l per 40 hh	l per 50 hh	l per 60 hh				
Motorbike	l per l hh	l per 5 hh	l per 10 hh	l per15 hh	l per20 hh				
Bullock cart	l per l hh	l per 5 hh	l per 10 hh	l per 15 hh	l per 20 hh				
Motorboat	l per 20 hh	l per 30 hh	l per 40 hh	l per 50 hh	l per 60 hh				
Boat	l per 10 hh	l per 20 hh	l per 30 hh	l per 40 hh	l per 50 hh				
Farm implements	Machinery	Tractor	Machine	Simple	Very simple				
Fishing gears	Large traps	Boat + net	Cast-net	Small traps	Fish hooks				
Grinding machine	within village	l mile	3 miles	5 miles	7 miles				
Remark: hh= household	; mn= month; yr	= year							

Table 3.6 Physical capital assessment scales

		A	ssessment scale	es	
	5	4	3	2	1
<u>Stock of cash</u>					
Formal employment	100% of WF	75%	50%	25%	None
Average household income	> 15 Lakh	13 Lakh	10 Lakh	7 Lakh	< 5 Lakh
Local saving	Very high	High	Moderate	Low	None
Debt	<25% of HH	40%	50%	60%	70%
<u>Flow of cash</u>					
Soft loan access	Very easy	Easy	Passable	Difficult	None
Credit repayment	Very secure	Secure	Steadfast	Insecure	Problematic
Remittance	Very regula	Regular	Often	Sometime	None
Basic products price	Very cheap	Cheap	Reasonable	expensive	Very expen
Remark: WF= Working Force	9				

Table 3.7 Financial capital assessment scales

Table 3.8 Human capital assessment scales

		Assessment scales								
	5	4	3	2	1					
<u>Quantity</u>										
Working force	>75% of Pop.	60%	50%	40%	< 25%					
Quality of education										
Illiteracy rate (%)	< 10 of Pop.	20 %	30%	40%	50%					
Existence of school	> 50 year	40 year	30 year	20 year	< 10 year					
Students per class	< 25	40	50	60	>70					
Students per teacher	< 25	40	50	60	>70					
Drop-out rate (%)	Nil	10	25	40	> 50					
<u>Quality of health</u>										
Access to doctor	At village	l mile	3 miles	5 miles	> 7 miles					
Access to nurse	At village	l mile	3 miles	5 miles	> 7 miles					
Access to midwife	At village	l mile	3 miles	5 miles	> 7 miles					
Water quality	Pipe network	Tube-well	Privt. well	Comm. well	stream					
<u>Knowledge and skill</u>										
Local knowledge	>75% of WF	60%	50%	40%	25%					
Shared knowledge	>75% of WF	60%	50%	40%	25%					
Specialized knowledge	>75% of WF	60%	50%	40%	25%					
Remark: Pop.= Population;	WF= Working For	ce; Privt= Priva	te; Comm= C	ommon						

	Assessment scales						
	5	4	3	2	1		
<u>Structural</u>							
Organizations	Very diverse	Diverse	Moderate	Limited	None		
Membership	Most people	Many	Few	Little	None		
Participation mode	Initiated	Facilitated	Co-opted	Induced	Forced		
Leadership	A accorded	Elected	Selected	Appointed	Forced		
<u>Cognitive</u>							
Trust	Very high	High	Moderate	Low	No		
Perception	Highly positive	Positive	Neutral	Negative	very negative		
Collective actions							
Water supply problem	Very high	High	Moderate	Low	No		
Welfare	Very high	High	Moderate	Low	No		
Natural disasters	Very high	High	Moderate	Low	No		
Labour contribution	Very high	High	Moderate	Low	No		
Cash contribution	Very high	High	Moderate	Low	No		
Assess to information							
Radio	Every hh	l per 3 hh	l per 5 hh	l per 7 hh	l per 10 hh		
Television	Every hh	l per 5 hh	l per 10 hh	l per 15 hh	l per 20 hh		
Telephone	At village	l mile	2 miles	3 miles	> 5 miles		
Social cohesion							
Landlessness	< 5 % of hh	10% of hh	15% of hh	20% of hh	> 25% of hh		
Poorness	< 5 % of hh	10% of hh	15% of hh	20% of hh	> 25% of hh		
Religious composition	100:100	50:50	40:60	30:70	20:80		
Recent immigration	< 5 % of hh	10% of hh	15% of hh	20% of hh	> 25% of hh		
Empowerment							
Sense of happiness	Very happy	Нарру	Impartial	Unhappy	Very unhappy		
Influence to local events	Very high	High	Moderate	Low	Very low		
Influence to general event	Very high	High	Moderate	Low	Very low		
Remark: hh.= Household							

Table 3.9Social capital assessment scales

	Natural	Physical	Financial	Human	Social
Yapu	3.4	2.9	2.5	3.1	3.4
Tharyarmon	3.2	2.3	1.8	3.0	2.7
Mayanchaung	3.8	2.2	2.0	3.0	2.8
Northern zone average	3.5	2.5	2.1	3.0	3.0
Migyaungchaung	3.4	2.8	2.9	3.6	2.9
Zimba	3.6	3.0	2.5	3.5	2.6
Kyaukshut	3.6	3.2	3.0	3.9	3.0
Mmiddle zone average	3.5	3.0	2.8	3.7	2.8
Yepon	3.6	2.3	2.4	2.9	2.8
Heinze	3.8	2.3	2.6	2.9	3.1
Hnankye	3.1	2.2	2.1	3.1	3.0
Wunpo	3.1	2.8	2.1	3.4	2.7
Southern zone average	3.4	2.4	2.3	3.1	2.9
	3.5	2.6	2.4	3.2	2.9

Table 3.10	Summarized results of livelihood assets status tracking of different
	villages

When looking at the livelihood assets pentagon of the whole area in figure 3.12, the size looks not large enough and the shape is appeared asymmetrical. The pentagon reveals that people of the area have low amount of and uneven balance in capital endowment and that their choices on livelihood options would thus be somewhat limited. More specifically, the capital endowment of the area is characterized by high natural capital and low financial assets with others more or less in moderate sums. Apparently, low financial capital is defining feature of the poors. Therefore, the poor people of the area have to heavily rely on the natural resources in creating their livelihoods. In this context, their livelihoods would be very vulnerable to the shocks and stresses that will have negative impacts on physical access to and stocks of the natural resource base of the areas.



Figure 3.12 The livelihood assets pentagon of the entire area

Livelihood assets pentagon of the northern zone, the middle zone and the southern zone are given in figure 3.13. These pentagons roughly say that the status of capital resources of particular zones are supposed to be somewhat low in amount and biased in balance. Among them, the size and shape of the pentagon of the northern zone is the most similar to that of the overall average of the entire

area, characterizing high natural capital and low financial resources. This points out the fact that communities residing in the northern zone dominated by Mon ethnics have to create natural resource based livelihoods. Consequently, their livelihoods would be secure only when policies encourage stable landuse practices and natural disasters such as wild fires, catastrophic floods, and severe droughts are not able to seriously disturb the stock and flow of the natural resources of the zone.

In contrasts, capital endowment of the southern zone appears to be lowest in the area. The livelihood assets pentagon of the zone, which is characterized by low physical and financial capital and moderate natural, human and social assets indicates that the people of the zone, mostly are Dawei, are living in the situations which holds low resilient power to changes and perturbations. Any changes whether it may be gradual, seasonal or abrupt ones will collapse their livelihoods very easily.



Figure 3.13 Livelihood assets pentagons of particular zones of the area

The middle zone embraces a better opportunity in choosing livelihood options than other zones of the area due to its capital status. Not only natural capital but also human assets are high in the zone while others rest in moderate. In this condition, even though people of the zone have to rely on natural capital in their livelihood efforts, they can effectively and efficiently use other capitals in their efforts due to high human capital. Therefore, their livelihoods are less vulnerable than that of the people of the other zones.

3.4. Vulnerability context

Obviously, the livelihood strategies adopted by people are so constrained by trends (continual changes), shocks (sudden changes) and seasonality (seasonal changes) that they are forced to maximize short-term returns and risk further vulnerability. Therefore, vulnerability and sustainability can be seen as the ends of the livelihood continuum, with economic, ecological, and social dimensions. Besides economic factors of stress, the analysis of the vulnerability context hence takes into account also ecological and social determinants in their relation to livelihood outcomes.

In fact, the vulnerability context draws attention to the complex influences that are out of local control yet directly or indirectly responsible for many of hardships faced by local communities. These forces are mutually reinforcing and usually form a vicious cycle particularly in relation to natural resource management. However, the vulnerability context in the SL framework, while giving due importance to external forces, provides a means for deconstructing this vicious circle. Moreover, if complex factors in the vulnerability context are looked separately, it is found that all issues are not totally outside of local control, but some are slightly predictable.

3.4.1. Trends

One of the prominent trends that would exert impacts on the livelihoods of the communities around TNR is population dynamics. The relative trend of the population of the area reveals rise and fall. The fall part of the trend is proved to be a reflection of socio-political processes of the area. However, in the future, there is a high tendency of population growth in the area due not only to biological potentials but also social reactions. The high tendency of the future population growth will largely be related to biological potential of reproduction in the existing population. High total fertility rate (3.7 child per women per life time), many young families in the communities (over 50% of the married coupes are at the active reproductive range of 16-40), and many young people in the population (40% of the total population are between the age of 16-40) will lead to a rapid population growth.

Moreover, in the communities, it is found that early marriage is every common; the age of mother giving birth is too young; and the gestation periods for receiving child is found to be rather short. These traditional conducts in getting married and giving birth will also encourage population growth. It is agreeable that the population growth is a contributing factor in nearly all environmental problems. Rapid growth in the population will hence ensue several things: famine if food grain production cannot pave with increasing numbers of people; soil degradation if agricultural practices are poor; habitat destruction and biodiversity loss if natural ecosystems are converted into agricultural ecosystems; forest denudation and degradation if forest products are overexploited; even political unrest if there are great disparities in availability of resources (such as jobs, goods, foods etc.).

Environmental degradation is another outstanding trend across the communities. Among others, soil degradation due to shifting cultivation appears to be immense in the area. Another casual factor to soil degradation is wildfire. Ground cover vegetation of all sorts are consumed by frequent and severe wildfires, making easily erodable soils on the steep slopes exposed directly to torrential rains and finally leading to widespread landslides and erosions. The consequence is siltation in stream system and catastrophic floods over most of the area.

Denudation and degradation of forests are also one of the environmental issues of the area. Apart from shifting cultivation, agricultural encroachment is another facet of forest denudation especially in the northern zone. Migrants from the near
by Mon state who have come and settled inside the dense forests of the zone for last 50 years gradually converted natural forests into horticultural farms. For the time being, areas around 3-4 miles radius from the villages of the zone have been already occupied by these farms. As a result, forest cover of the zone is badly reduced. Indiscriminate felling also seems to be a causal feature of forest degradation. At present, construction timbers are, due to over cutting, rarely found within 7 miles radius from the villages. This distance is nearly double compared to last ten years. In contrast, bamboo is still abundant since it can be available just outside the villages for personal uses. Nonetheless, good bamboo resources for the commercial level cutting can only be acquired some distance from the villages. Such a level of denudation and degradation of forest poses a direct effect on availability of forest products for the people and quality of habitats for wildlife.

Forest denudation and habitat destruction directly contribute in reduction of numbers of such flagship species as tigers, elephants, rhinoceros and tapirs. Decrease in populations of the species due to habitat destruction is scrupulously compounded by commercial poaching. These species are therefore gravely in danger to disappear from the area. Fortunately, some bush meat species such as barking deer, samba deer, and wild boar seem abundant in the area. Nevertheless, success of hunting for these species becomes constrained and availability of bush meat both in the communities and markets more restricted year after year. At large, disappearing flagship species from the area will strikes the prestige of country among international communities.

Dawei river and its main tributaries were once famous for their fish resources of different kinds. Fishing could easily be accomplished in all places and it only took a time of an evening to get a pot of fishes. However, stocks of fish resources became largely dwindle over the last few years due to haphazard fishing methods, for example, using electric shocks, mines and poisons. For the time being, tremendous efforts are necessary for worthwhile fishing since a good catch can only be possible at far upstream areas. Fishes are usually considered to be a free source of protein for most rural families so that difficult fishing implies that people have to use more labour or money for protein intake.

The area was said to be thriving with illegal border trades with Thailand in the past. There were numerous foot paths in the area via Nat-ein-taung camp at the Thia-Myanmar border. Zimba village was one of the renowned entries to the trade. Minerals, marine products and cattle were main export items from Myanmar while consumer goods were imported back as major commodities from Thailand in the trade at that time. A majority of local people took part in the trading activities as traders or porters and could enjoy a large margin of profits. Agricultural activities were hence recognized as a nasty livelihood and they hardly ever made enough investments in them. Unfortunately, the trend has changed after the Nat-ein-taung camp has been taken up to the legal hold: the paths were totally in command and the viable trade fully in collapse. Then, people could not find reliable income sources locally and faced big hardships. Consequently, many people migrated out to Thailand, but some started to establish cash crop farms in the area. That is why, most horticultural farms are observed too young to provide rewarding incomes for the time being. In this situation, remittance from the migrated family members is only source for living.

Recently, local people found job opportunities in establishment of cash crop plantations at an extensive scale by private companies. However, the quality and quantity of the job are not likely to be pretty for the poors to have positive livelihoods. Such a situation of economic stagnation in the area, emigration of a large part of population can be expected as an immediate solution. A last resort would be that local communities have to tap the natural resources in all possible ways for their subsistence: shifting cultivation for food grains production; poaching wildlife for protein supplement; and illegal cutting of bamboos and timbers for income. Coping and adaptive strategies of local people for such as economic stagnation were mentioned in participatory problem analysis in Yepon village (Box 3.2).

Box 3.2 Problem Analysis: no regular job (Yepon village)

<u>No regular job</u>

Causes:

- Imposing more intensive restriction on extraction of forest products
- Lack of enterprises
- Limited job opportunities for the existing population
- Lack of general knowledge and correct reasoning ability
- Introducing mechanical power in farming

Opportunities:

• To encourage young generation to have better education

Current solutions:

- Doing odd-jobs
- Illicit cutting and selling timber and bamboo disregarding regulations
- Illegal migration to Thailand
- Lending money with relatively high interest rate

Desired solutions:

- To establish large enterprises creating attractive job opportunities
- To establish permanent farms
- To have better access to a soft loan system for farming

3.4.2. Shocks

Flood, one of the striking natural shocks is now found to be frequent in the area. The 2006 flood raised the water level up to the historic height of 10 feet in most areas along the river network. The main causes of the catastrophic floods are obviously massive landslides on the steep slopes in the headwater area and widespread soil erosion elsewhere. These floods devastated a huge amount of public and private properties, damaged extensive areas of crops grown and claimed even human lives. The frequent occurrences would even further lead to displacement, famine and epidemic diseases both to human beings and domesticated animals.

Wild fires are also problems mainly caused by human factors. Main causes of wildfires are many: careless disposing of cigarette butts; intentional setting by

hunters for clearing under stories; indiscriminate use of fires. If wild fires out break, it is very difficult to suppress and they could spread over a large areas and consume all vegetations and properties, destroying both natural and man-made assets. Frequent occurrence would result in barren lands that are subject to serious landslides and gully erosions. Uncontrollable wildfires could immediately devastate established farms that provide cash incomes. Participatory problem analysis in Migyaunglaung village presented current and desired solution for wild fire control (Box 3.3)

Box 3.3 Problem Analysis: wild fire control (Migyaunglaung village) Wild fire control

Causes:

- Human factors
- Careless disposing of butts of cigarette and cheroots by pedestrians
- Fire intentionally set by hunters for clearance of under stories
- Setting taungya fire without proper preventive measures
- Indiscriminate use of fire

Opportunities:

- Report to administrative and departmental authorities
- Check the improper activities of ordinary villagers

Current solutions:

- Establish fire breaks individually around the farms
- Suppress the fire coming close to the village by collecting villagers

Desired solutions:

- To inform the headman of entering to the forest
- To inform the headman of setting fire for shifting cultivation sites
- To set up proper preventive and suppressive measures for wild fire control

On the other hand, outbreaks of malaria intimidate local livelihoods. Almost all families are said to be suffering from malaria. Malaria infests people of all ages and generally steals human ability to work and particularly consumes a large amount of expenditure. Therefore, it forces poor families who only have labour to create their livelihood into a great debt. It is also not uncommon that people died of malaria. If this happens to family head, the remaining members of the family will totally be in destitution.

Livestock breeding is also threatened by poultry diseases. Poultry is traditionally raised in every household as a main protein source since most of the people abstain from eating beefs and pork due to religious and spiritual reasons. Annually, the diseases are likely to outbreak at the onset of the monsoon and wide out nearly all individuals of poultry. As a result, the poultry breeding in the villages is now nominal and restrained only to some households. Several families can no longer get proteins at low cost from the source at home and have to use cash money for acquiring protein supplement. However, it would not be affordable for households with a low cash income to purchase poultry for supplementing their meals. Consequently, malnutrition would be commonplace among communities unless supplementary proteins are available at free of charge from other sources such as fishing or hunting. The people of the area have been dependent on the lands for their livelihoods. The history of the conflicts over lands started when landless people from nearby Mon state migrated into the area last fifty years. The conflicts are found to be very complex: there are multiple claims on lands (for security, legitimacy, legacy, livelihoods and so on) and numerous conditioning factors (such as conservation, commercialization, subsidization) trigger accumulation of grievances. The conflicts are now at the stage of trouble and intensity is relatively high. Since most of the local communities are directly involved, the dimension of the conflict is also considerable. Such a high intensity and large dimension of the conflicts indicate rentability and urgency for seeking resolutions.

3.5. Policies, institutions and process

In addition to the factors that determine the vulnerable context, there is a range of policies, institutions and processes (PIPs) designed to regularize and influence practices and behaviours of people in the society. If design is well, these influences on society should be positive. However, depending on their original purpose, some people may be affected negatively. PIPs, within the livelihood framework, include a broad range of institutions, originations, policies and legislations that shape livelihoods. Basically, they mediate access to livelihood resources and in turn affect the composition of portfolio of livelihood strategies. Therefore, understanding of PIPs allows identification of restrictions (barriers) and opportunities (gate way) to sustainable livelihoods and hence is a key to designing interventions. Moreover, PIPs are not only the products of social and political processes but also the sites where productions, authorities and obligations are contested and negotiated, underlying livelihood sustainability. Thus, an insight into these processes is also a key to finding entry point of interventions.

3.5.1. Community organizations

Numerous local organizations were observed in all communities. The nature of these organizations is also diverse: some are Government-induced (like Village Peace and Development Council-VPDC), but some are self-mobilized social groups (like Young Men groups). In every village, VPDC is a hub of the local social network. Because VPDC is an established decision making body in the village with respect to all matters affecting people. Political, religious, sociocultural concerns are settled in VPDC. Likewise, the Union of Solidarity and Development Association (USDA) is a group of volunteer doing social welfare activities like community greening and cleaning. Young Men and Young Women groups are self initiated assembly of youths of different religions and status. In most cases, these two groups together provide assistance in social welfare activities like funerals and charities. Religious oriented groups are also prevalent in almost all villages. Two separate groups for religious affairs are found in villages where Buddhist and Christians are living together. Specifically, these groups take care independently for the respective religious matters of monasteries and churches, but they take part together in social wellbeing of community.

Noticeably, Welfare group where almost all families of village concerned are members are informally formed in all villages. Their deeds are very practical in humanitarian aspects that every member provides cash and/or rice in case of loathsomeness. There are more organizational transactions with other groups. They include the Auxiliary Fire brigade, the Red Cross Society, People Militia, the Women Affairs Association, the Maternal and Child Association. These community involvements are indicators of group cohesion, cooperation and reciprocity or other social capital that are fundamental to community development initiatives. Figure 3.14 particularly outlines organizational relationships of Yepone village and generally provides clues on that of other villages.





3.5.2. Traditional land tenure

Land rights are a vital element when rural households balance their capabilities and assets determining their resultant strategies to cope with their daily production and food security. Landuse practices in the area were regulated by a traditional land tenure system. The rules of the system were informal, and lack of official recognition and protection. However, landuse rights, in practice, were quite formal and respected by all members of communities, and thus secure in their own context. Person who was the first to use a parcel of land for shifting or sedentary agriculture was recognized as an owner of the land even though State was a sole legal owner of all lands of the country. Such a land owner enjoys all rights (to use, control and transfer) of lands (at first come first principle). The boundaries between communities were also defined by local agreements or administrative identifications. Land resources were relatively abundant to local population and common to all members of the community so that every local inhabitant could easily find suitable lands for cultivation. Hence, there have, till recently, been very few land disputes and all disputes could be settled down personally or locally through mediated by community elders.

3.5.3. Taninthayi Nature Reserve for conservation

Recent establishment of TNR in the area is a policy level process that strongly influences livelihoods of local people in several ways. TNR, a protected area, is the product of other institutions, namely National Forest Policy, Ministry of Forestry, Forest Department, Conservation of Wildlife and Natural Area Law. Creation of TNR strongly prohibits people's access to natural assets within the area for embracing long term conservation goals. Therefore, households went hunting wildlife and cutting bamboos would no longer be able to do so. Similarly, people who previously used the lands for shifting cultivation as a traditional way of life, will have their access to there stopped altogether. Such an exclusionary approach for effective conservation and prohibiting local inhabitants from access to the resources inside TNR will generate social ramifications. On the other hand, existence of TNR would have also positive effects: improved environmental conditions will in the long term reduce vulnerability. It may reduce local people vulnerability to natural disasters, like prevailing floods, by protecting watershed and local microclimate. Local residents highlighted their concerns on exclusionary efforts to TNR in the group discussion section of Zimba village (see Box 3.4).

Box 3.4 Problem Analysis: denying access to nearby forest (Zimba village)							
Denying access to nearby forests							
 <u>Causes:</u> Establishment of Taninthayi Nature Reserve (TNR) 							
Opportunities: •							
Current solutions:							
Practice shifting cultivation in far-off areas							
 Cut timbers and bamboos inside TNR without regard of rules of law 							
Poach wildlife							
Desired solutions:							
 To designate a particular area for village use 							
 To allow shifting cultivation and subsistence hunting inside TNR for local 							

- communityTo permit mining concession for villagers

3.5.4. Agricultural commercialization

Another policy level institution is agricultural commercialization process in the area. Agro-climatic conditions of the Thanintharyi Division are favourable for

rubber and oil-palm that are in high demand in national and international markets. Hence, a national program has been constituted for growing these cash crops at commercial scales in the Division so that private involvements are being encouraged to take part in the programme. Consequently, long term exclusive land property rights were granted for extensive area of lands even inside reserved forests around TNR to individuals and private companies. Official land right holders reclaimed lands for commercial plantations that were mostly covered with established horticultural farms of local residents. Many local residents lost their lands previously held under the traditional acceptance and several land disputes emerged. Participatory analysis in Kyaukshut villages (Box 3.5) exemplified the problem and solutions.

Box 3.5 Participatory Problem Analysis (Kyaukshut village):

No more land in close proximity for shifting cultivation

Causes:

- Establishment of Taninthayi Nature Reserve (TNR)
- Expansion of private horticultural farms in a commercial scale
- Out break of frequent wild forest fire
- Annexation of military complex

Opportunities:

•

Current solutions:

- Provide more input and intensive care on farm land to be more productive
- Buy rice

Desired solutions:

- To allow shifting cultivation inside TNR for local community
- To resettle military complex in other area where population is sparse

3.5.5. Community reserve sites and wildlife

Community reserve areas for conservation purposes were found in Tharyarmon, Phayar-thonesu (near Yapu) and Hnankye villages. Groves of forests around natural springs have been locally designated as community reserve areas in these villages. No extractive use is allowed in the case of Hnankye whereas bamboo cutting for personal use is permitted with restrictions for community members in Tharyarmon village. They try to obtain legal supports for these areas for effective protection from outsiders. Likewise, some wildlife species is also recognized as sacred one. Local people recognize tapir as a virtuous animal since tapirs eat only grasses and make no harm at all to human beings. Therefore, people stay away from killing them and eating their fleshes. Moreover, there are also some ethical rules among local subsistence hunters: hunters must be dedicated to other hunters. Thus, local habitants avoid hunting tigers that are also hunters of the jungles. But this ethical rule are unlikely to be applicable to commercial poachers, because for them tigers are a huge profit.

3.6. Household livelihood strategies

Taking account of the livelihood assets at their disposal, the vulnerability context in which they operate, and the policies, institutions and processes around them, people tend to develop the most appropriate livelihood strategies possible. It is increasingly accepted that, given a set of opportunities and constraints, rural households combine a range of activities (livelihood portfolio) to obtain more positive outcomes. A portfolio may be highly specialized, concentrating on one or a few activities or it may quite diverse, mixing a complex array of activities. Therefore, unravelling the factors behinds a strategy combination is important aspect in the analysis. Moreover, households pursue various pathways (i.e., different patterns of combination) over different time scales as well. Again, it is very essential to properly look at this dynamics element evident in the composition and recomposition of livelihood strategies, especially in the context of assessing sustainability of different options.

With limited resources at their disposal, possible risks and uncertainties, people of the area have to pursue different strategies in order to make a living Principally, these strategies include working odd-jobs, farming in temporary or permanent basis. Community survey indicates that most families (44%) inhabiting in the villages are making their living as horticultural farmers while (20%) of households are practicing shifting cultivation as a main livelihood strategy. Another (4%) are farmers who grow rain-fed paddy rice on the lowlands. The remaining households are odd-job workers (23%) and a collective group of other professionals such as Government staff, company workers etc. (9%). (see table 3.11)

Village	Shift-culti	horticul	Lowland	Odd-job	Other	Total	<u>9% 4% 44%</u>
Yapu	20	112	1	25	35	193	
Tharyarmon	41	34	4	25	-	104	20%
Mayaungchaung	29	30	5	19	1	84	
Michaunglaung	37	20	-	10	7	74	
Zimba	50	30	10	34	15	139	23%
Kyaukshut	15	86	-	46	11	158	🗖 Horticulture 🔲 Odd-job 🛛 🗖 shifting-cul
Yepon	14	66	-	20	7	107	□ Other ■ Low land
Heinze	5	20	-	8	1	34	
Hnan-kye	-	45	5	47	-	97	
Wunpo	3	17	12	10	17	59	
	214	460	37	244	94	1049	

Table 3.11	Livelihood	composition	of study	<i>v</i> villages	(by	v households	١
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These principal strategies pursued by the households generate different productive results, contributing to different levels. With constraints on labour inputs and land availability, rice grains production from shifting cultivation and lowland cultivation contributes only to home consumption and in other words uses up all in subsistence level. However, families engaged in odd-jobs intend to receive cash incomes for purchasing food staff for home consumption and exchanging necessary goods and services at the community level. In contrast, another principal activity- horticultural farming- is carried out to be productive for contributing all three levels: consumption, substitution. and commercialization. Figure 3.15 illustrates principal livelihood strategies of the households of the villages and their contribution to different productive levels. It is obvious in the area that a particular strategy can hardly generate desirable livelihood outcomes. Therefore, most households do not concentrate on a specialized activity, but diversify their livelihoods by combining a mix of various activities for more preferable results.



Figure 3.15 Principal livelihood strategies of local people around TNR

3.6.1. Horticultural farmers

Horticultural farming is the most dominant livelihood in the area. The area in fact was renowned for producing of betel nuts. Community level survey indicated that 44% of households habituating in villages under study are constructing their livelihoods as horticultural farmers. Household interview covered a total of 53 households across the villages, whose principle strategy is said to be horticultural farming. Major characteristics of these households are mentioned in table 3.12.

Average family size of these farmers is found to be (5.0 individual), showing a wide variation within a range of minimum 2 to maximum 11. A few families have no working force at all. The reason is simple: grown-up children have married and left home for forming new families so that only parent and school children remain at home. Their married-children sometime help contribute labour in working for farms. In general, every person who can work in these farmers has to

feed another person. Average landholding size per household is found to be (7.7. acres), but land distribution among these farmers reveals a considerable variation. A minimum landholding of 2 acres and a maximum of 5 acres are observed. Household interviews on these horti-farmers indicated that 55% of them are holding of the farms of less than 5 acres that is said to be minimum viable landholding for a household. Only 14% of these farmers have the farmlands larger than 10 acres.

Table 3.12 Major characteristics of horticultural farmers househol
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Characteristics	Mean	Standard deviation	Minimum	Maximum
Family size	5.0	2.0	2.0	11.0
Total work force	2.6	1.5	0.0	6.0
Dependency ratio	1.1	0.9	0.0	4.0
Farm size (acre)	7.7	6.5	2.0	35.0
Betel: per tree yield (nut)				
Cashew: per acre yield (viss)				
Rubber: per acre yield (lb)				

<u>Remarks:</u>

• Sample size= 53 representing 12% of all horticultural farming households across the sample villages

• Working force represents people within a range of age (16-60)

• Dependency ratio was computed as the ratio of nonworking members (preschool children,

school children and older persons) to working family members

The common crops grown are betel nuts and cashew nut. Generally, two crops are grown together on a same parcel of land. Betel nuts require more water and are thus sensitive to soils. As a result, betel nuts are arbitrarily grown in low laying areas while cashew on remaining space of the lands in rows with equal spacing. Betel nuts that are less subjective to disease and pest infestation could produce a regular fruiting at 8-10 years after planting, having an average yield of nearly 100 nuts per palm up to the age of more than 50 years. Hence, a betel palm can make 1000 kyats a year at the present farm gate price. In contrast, cashew takes 5-6 years to be mature and could produce an average per acre yield of 200-300 visses from the farms containing 200 trees per acre. However, cashew is very sensitive to frost and subject to a large fluctuation in yield. With the prevailing farm gate price of 1800 kyats per viss, there can have a huge amount of earnings in good seed years. For cashew, the farmers asserted that frost damages at the time of flowering can lead to a total crop failure and such a wonderful year is rather hard to encounter.

Mature rubber plantations can only be seen in the northern zone (Mon environs) of the area. The settlers of the zone have come to establish rubber plantations for several decades. Local varieties of rubber were generally grown with a spacing to contain 200 trees per acres. Resin can be tapped from rubber trees 8-9 years after planting and in average 20 trees can produce around 1 lb. of resin. Since resin secretion is not promising in very dry and very wet periods, there can only have a total working days of around 270 days in a year. In these connections, about 10 lb. of resin can be collected from a rubber tree per annum. However, 40-50% of resin outputs must be paid to tapers as wages in kind. Though it can be expected high returns from rubber plantations, it demands high initial costs and

skill labours in establishment. Therefore, rubbers were rarely grown by the local communities of the middle and the southern zone in the past. Very recently, due to policy supports in extending rubber plantations under an agricultural commercialization scheme, more local people tried to make investment in rubber plantations across the area.

It is also found that all families who recognized themselves as horticultural farmers in the household level interviews still did not have mature farms providing regular income for the mean time. Only 62% of farmers of this group have mature horti-farms and a small portion of them (less than 6%) holds official titles for their farmlands. Both intensification and extencification of farming activities are evident as well. Under the pressures of land scarcity and commercialization, most of these farmers input more investments of capital and labours on their farms for improving productivity. Some (33%) extend (especially growing rubber) on fallow lands of their own for boasting productions and earnings. As these processes require huge labour inputs, family labours are not adequate, creating jobs opportunities for odd-jobs workers (see figure 3.16 for seasonal calendar horticultural farming activities.



Figure 3.16 Seasonal calendar of horticultural farming intensifying agricultural activities

Horticultural farming households also pursue secondary activities for more desirable livelihood outputs. The farmers (11%) who have well established farms of considerable sizes and extra money try to involve in trading these crops. They collect the products from smallholder farmers and send to the markets. By doing this, they can gain from the differences between farm gate and the market prices. If they collect the crops at the very beginning of the production season and store to the end of the season, margin of profits become much larger. Likewise, some farmers bought motor-cycles not only for their personal convenience in travelling, but also for taxi services. If the cycles can be used just for taxi

services, a monthly net income of around (100000 kyats) is not difficult to receive. This service also appears to be promising for additional incomes in the families where the cycles are partly busy with personal uses. In contrast, some farmers who have more labours other than cash money grow seasonal crops, generally vegetables and sell within communities. The respondents said that income level from growing of vegetables is not great, but this can be used for purchases of foods for the families. A portfolio of activities usually taken by horitultural farming households is given in figure 3.17.





3.6.2. Shifting cultivators

As a rule, shifting cultivation is practised with a prime intention of producing staple food- rice grains. The practice is taking place in all sorts of landholding categories. The survey results indicated that many cases (41%) are happening in reserved forests whereas around 30% inside TNR. This form of cultivation is also found on common lands (more than 20%) and even on private farms (less than 10%) (see figure 3.18).





Major characteristics of shifting cultivator households are given in table 3.13. The average family size (5.2) of the shifting cultivator households is said to be neither to small nor too large, which is composed of (2.7) working members with dependency ratio of (1.0). Average annual plot size is found to be (1.7)

acres). With this limited labour input, it is not possible to open up a wider plot. Average per acre yield of paddy (27 baskets) also seems to be rather low due perhaps to a shot fallow period (5.9 years in average). Hence, rice grains production from shifting cultivation in this situation could rarely rise above the level of self-sufficiency.

Characteristics	Mean Standard deviation		Minimum	Maximum	
Family size Total work force Dependency ratio Current plot size (acre) Per acre paddy yield (basket) Fallow period (yrs)	5.2 2.7 1.0 1.7 27.0 5.9	2.1 1.2 0.7 0.8 11.0 2.1	2.0 1.0 0.0 1.0 20.0 3.0	9.0 5.0 2.5 3.5 45.0 10.0	
Current plot distance (mile)	3.6	1.6	1.0	6.5	

Table 3.13	Major characteristics	of shifting	cultivator households
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Remarks:

• Sample size= 33 representing 15% of all shifting cultivator households across the sample villages

• Working force represents people within a range of age (16-60)

• Dependency ratio was computed as the ratio of nonworking members (preschool children, school children and older persons) to working family members

Noticeably, subsistence ratio with respect to rice grains production in shifting cultivation is routinely hundred percent (i.e., zero market sale). Shifting cultivator families have, in practice, to comprise a complex mix of activities that take place on farms of their own and/or on resources of common. It is difficult for shifting cultivators to intensify the primary production activity that are physically onerous tasks requiring able-bodied labours for boasting production. In this connection, diversification becomes essential to maintain livelihood by providing flexibility among sources of incomes. It will also satisfy the needs to acquire some cash incomes to enable purchases for basic goods and services and to pay school fees, medical cost etc. Livelihood diversification model of shifting cultivator households of the area is presented in figure 3.19.



Figure 3.19 Livelihood diversification model of shifting cultivators

Only a small portion of the shifting cultivators appear to be farmless households, since around 60% of the families have horticultural farms of different sizes (1-5 acre). These horticultural farms were established by a simple way: perennial cash crops, usually betel nut and cashew nut, were planted amid paddy rice at the cropping phase of shifting cultivation plots. After harvesting of paddy rice, the field stay on as a horticultural farm. Resource poor shifting cultivators usually could not apply improved inputs, the production levels are said to be rather low.

It is also obvious that a majority of shifting cultivators (60%) engages as waged labours on other farms. Equally, more than 25% of shifting cultivators admitted that hunting and fishing are important activities for their families for home consumption and income generation while several households (20%) are cutting bamboo for commercial purposes.

Even though the model exemplifies a portfolio of activities, it does not simply mean that all of the households chase the same combination. There is no family of shifting cultivators who undertakes a full set of activities mention in the model of livelihood diversification process. Data indicates that only 15% of the households embark on a portfolio of three activities and 40% are on a mix of two activities. Many families can however take just one additional activity beside the primary livelihood. Not surprisingly, one family is found to be bounded in the shifting cultivation practice because of old age and lack of working force.

Seasonal calendar (figure 3.20) illustrate that work schedules of shifting cultivation appear to be rather tight in their primary operations though they pursue livelihood diversification motivated by both push factors and pull factors. They engage in full time basis for more than nine months a year to implement basic operations on sites. Since some operation like, site clearing, is arduous needing strong physical labours, female members of the families are difficult to take part in such operations. Therefore, male members of the families have serious time constraints, but the female members have more changes for taking additional productive activities for diversifying incomes. Again, while looking at the daily schedule of a typical shifting cultivator household (figure 3.21), waives have, most of the times of the day, to involve in reproductive activities such as preparing foods, doing house works, and carrying water at home.

Undoubtedly, rural people have practiced shifting cultivation as a traditional life style for producing rice grains within physiographic limitations and capital restraints. As seen in the discussion, the production level seldom reaches for commercial sales. All available family's labours must therefore be timely invested in the field operations for enjoying potential production levels. Male members of the families have to deal with all major operations in the fields and female members engage not only in many operations in primary productive activities but also in reproductive activities at home. For most of the times of the year and the day, they are dealing with principal productive activity in field plots and reproductive activities at home.

Respondents confirmed that the families with a low working force will be difficult to undertake additional productive activities for effective cash incomes. They usually are bounded in the primary livelihood, working in a poverty trap. Moreover, many of their additional activities- bamboo cutting, hunting- are taking place on lands under reserved forests or TNR that are considered as illegal. Strong exclusionary efforts for biodiversity conservation and agricultural commercialization will also exert heavy pressures on their efforts to better livelihood security. Thus, livelihood diversification of shifting cultivators is a sing of survival strategies and migration may be their way out for better livelihoods.

	Tagu	Kason	Nayon	Waso	Wakhaung	Tawthalin	Thithinkyut	Tasungmon	Nataw	Pyartho	Tapotwe	Tapaung
Site preparation Growing paddy Weeding Harvesting								4				

Gerderized labour division of a typical shifting cultivator household

Male	Operations	Female
~	Site selection	-
v	Site clearing	-
✓	Collecting debris	✓
✓	Growing paddy	✓
✓	Weeding	✓
✓	Harvesting	>

Figure 3.20 Seasonal calendar of shifting cultivator households

Daily schedule of a typical shifting cultivator household								
Husband	Time	Wife						
	04:00	Weak up						
	04:30	Droparo broaltfast						
Weak up	06:00							
Heavy breakfast	06:15	Breakfast						
Go to worksite (2 mile from village)	06:30	Prepare for lunch,						
Start working	07:00	Carry water,						
Stop working, go back home	10:30	Wash the cloths,						
Get back home	11:00	Clean house						
Lunch at home	11:30	Lunch with family						
Go back to worksite	13:30							
Stop working	16:30							
Get back home	17:00	Prepare for dinner, carry water						
Cutting firewood, carrying water,								
taking birth								
Dinner with family	19:00	Dinner with family						
Rest, walk to video show		Take a rest, warship						
Go to bed	21:00	Go to bed						

Figure 3.21 Daily schedules of a typical shifting cultivator household.

3.6.3. Lowland rice cultivation

Lowland rain-fed rice cultivation can be observed only in some villages, namely, Yapu, Tharyarmon, Mayaungchaung, Zimba, Hnankye and Wunpo. Physiographic conditions and water availability constrain the further extension of rice fields in the area. Therefore, these rice fields are found stretched out along the Dawei river. It is also observed that a tiny proportion (4%) of the total households of the villages under study is being involved in lowland rain-fed rice cultivation as a principal livelihood strategy.

In the course of survey, nine households of lowland rice cultivators from different villages were interviewed, representing 24% of all those farmers across the villages. Average family size of the respondent paddy farmers is said to be (6.5) with a minimum of (5.0) and maximum of (10.0). They have an average total working force of 3.3 with worker-consumer ratio of 1.2: one working member has to feed 1.2 dependents in a family in average. These farmers hold an average size of (8.0 acres) of rain-fed rice fields that can produce paddy yields of (35-55 baskets) per acre. Application of improved inputs like chemical fertilizers and herbicides is very limited. All respondents however indicated that organic farmyard manures were added annually on their rice fields to enhance yields (see table 3.14 for major characteristics of lowland rice growing families).

Characteristics	Mean	Standard deviation	Minimum	Maximum
Family size Total work force Dependency ratio Rice field (acre) Per acre paddy yield (basket) Drought cattle	6.5 3.3 1.2 8.0 45.0 3.5	1.3 1.3 0.7 1.4 9.1 3.1	5.0 2.0 0.2 7.0 35.0 0.0	8.0 5.0 1.7 10.0 55.0 7.0
	l	1	1	1

Table 3 14	Maior	characteristics	of lowland	rice	cultivator	housel	hold	c
1 a D I E 0.14	IVIAJOI	characteristics	of iowialiu	TICE	Cultivator	nousei	1010:	5

<u>Remarks:</u>

• Sample size= 9 representing 24% of all lowland rice cultivator households in the villages

• Working force represents people within a range of age (16-60).

• Dependency ratio was computed as the ratio of nonworking members (preschool children, school children and older persons) to working family members.

With the present family labour force, landholding size and yield capacity, rice grains production from lowland cultivation among these farmers seldom reach for sales. The families lacking enough family labours and drought cattle of their own have to heir landhands and a pair of drought cattle in the growing season by paying paddy as charges. Moreover, intensification is constrained by financial assets. Therefore, subsistence level of rice grains production in lowland cultivation appears very high, contributing no or little to cash economy of the households. Present rice field holders continue lowland cultivation as a traditional practice since they receive the fields as inheritance from their parents. Nonetheless, they have to undertake other activities for diversifying their income sources to meet other needs (see figure 3.22).

One of the prominent secondary livelihoods for these lowland rice farmers is establishing horticultural farms of cash crops, especially betel nut and cashew nut. The interview results showed that almost all of rice growing farmers have established horticultural farms of varying sizes. The average size of these farms is found to be around (5 acres), generating good enough cash incomes.



Figure 3.22 Livelihood diversification model of lowland rice cultivators

Since drought cattle are essential in field preparations and transportation for lowland rice cultivation, all except one household of rice growing farmers interviewed raise drought cattle. The average ownership of drought cattle per households is found to be 3.5 heads. These households possessing drought cattle provide services for rural transports as well. This servicing function is said to be occasional in nature, but create considerable share for household incomes. Likewise, the households with surplus labour forces sometime find jobs on farms of others. Seasonal calendar (figure 3.23) suggests that lowland rice cultivation allows a five-month off-season a year. During off-season, rice growing farmers can draw more attentions on other productive activities. They receive more or less sufficient rice grains for home consumption from their farms and ample cash money from other activities. Therefore, most of them confirmed that they have no irritant debts.

	Tagu	Kason	Nayon	Waso	Wakhaung	Tawthalin	Thithinkyut	Tasungmon	Nataw	Pyartho	Tapotwe	Tapaung
Manure Ploughing/rolling Broadcasting Patching Weeding Harvest Winnowing			•									

Figure 3.23 Seasonal calendar of lowland rice cultivation

3.6.4. Odd-jobs

Odd-job working is another principal livelihood strategy constructed by many of households in the area. Community level data shows that 19% of households across the sample villages are connecting to the odd-jobs. The household level survey covers 33 respondents that represent 13% of all odd-job workers from the villages under investigation. Most of them (around 75%) are found to be landless whereas others have small parcel of arable lands ranging from 1 to 3 acres. No crop has yet been grown on these lands. Family size of the sample workers exhibits a considerable variation ranging between 3 and 9 with an average of 5.1 persons. The average labour force per household is 2.6 persons, indicating a worker-consumer ratio of 130%. The dependency ratio, the number of nonworking per working members in the family, is 1.3. On an average, every working member supports about 1.3 nonworking ones. This reveals burdens of these households in making their livings (see table 3.15 for major characteristics of sample odd-job workers).

Characteristics	Mean	Standard deviation	Minimum	Maximum
Family size	5.1	1.7	3.0	9.0
Total work force	2.6	1.3	1.0	5.0
Dependency ratio	1.3	0.9	0.0	3.0

 Table 3.15
 Major characteristics of sample odd-job workers

Remarks:

• Sample size= 33 representing 13% of all odd-job worker households across the sample villages

• Working force represents people within a range of age (16-60)

• Dependency ratio was computed as the ratio of nonworking members (preschool children, school children and older persons) to working family members

It is found that these workers take various forms of odd-jobs: some job relates to agriculture, such as sharecropping and farm waged labours, but others are non-agricultural activities. Figure 3.24 demonstrates various activities pursued in different combination by odd-job workers.



Figure 3.24 Livelihood diversification model of odd-job workers

Out of 33 odd-job workers interviewed, all said that they have no land of any kind for farming and that most of them (80%) are therefore working as waged labours on others farms. Since horticultural farms are generally carried out by family labours, the labour requirements on these farms are not so large. However, they can find jobs on commercial cash crop plantations which were recently extended in a large scale. The job is rather seasonal and an average working-day per annum is found to be 195 days. Moreover, disparities in daily wages among communities and between genders are also found. Male labours could get 3000-5000 kyats while female only 2500-3500 kyats per day.

In addition to this, some respondents (20%) grow rice on private commercial plantations under share-cropping agreement. According to the agreement, they can intercrop paddy rice with the perennial cash crops, especially para rubber and enjoy all rice grains harvested while receiving wages for operations undertaken by them basically for the benefits of their own accounts that also benefit the commercial crop. Therefore, they can produce rice grains for self-sufficiency and at the same time earn cash money for procuring other commodities and services. However, the potential of the practice is limited because the intercropping can only be applied in the very first year of the establishment of perennial plantations. Land availability is a limiting factor for them.

20% of sample odd-job workers acknowledged that they have been engaging in hunting and fishing for consumptive uses. Hunting is not a regular function, but occasional one carried out when they have time. Generally they go hunting as a group, usually with local made guns and dogs. Targeted species are barking deer, sambar deer, and wild boars that are still relatively abundant in nearby forests. Often monkeys are shot. All efforts of hunting are not always successful, sometime they have to return home with bare hands. The main purpose of hunting is for consumption, but these preys are fairly large to consume all. Therefore, they consume some at home and sell some within community at the price of (3000-5000 kyats per viss) or sometime send to local restaurants for better prices. In this sense, an adult sambar dear or wild boar can produce bush meats of around 30 viss, amounting to more than 100,000 kyat. This is considerable amount of money for the locals and hunting thus seems to be a commercial activity for few of them. Most of them know that hunting is strictly prohibited in the protected areas and an illegal action that can face serious legal sentences. Even so, some families earnestly feel that hunting is a part and parcel of traditional way of life in forest dependent communities and it is not a quilty sensible to face legal punishments.

Fishing is also carried out for home consumption. But some families catch fishes for money-making sales. They go fishing in a group to far upstream for a good catch, spending about a week in the forests. Most of the members of the groups are male, but inclusion of female members is not uncommon. Simple nets, scones and portable bamboo traps are used for catching different species of fishes of various sizes. Fishes captured are seldom bring back afresh to the village, but preserved as salty ones that can be easily send to the local markets at the price of 1800 kyats per viss. By and large, each person of the group can have a share of fishes enough to make around 20 visses of salty fishes in a single trip. Fishing support not only for home consumption but also for profitable sales so that it is considered as a viable activities for landless poors. However, fishing for commercial scale cannot be accomplished during raining season when streams are full of water. Moreover, most respondents properly notice that natural stocks of fishes in river system become dwindle year after year and access to the most of superior fishing grounds in side TNR is strictly denied. Nowadays, fishing is said to be a difficult function for them.

Several landless odd-job workers (30%) are also found to be involved in cutting bamboos and woods for commercial sales. Bamboos are often available on private farms at the cost of around 10% of selling price of about 100 kyats/clum at the villages. Therefore, they usually try to find profuse, but free bamboo resources to make profits more sensible. Hence, gainful harvests are only possible in reserved forests and TNR. Bamboo cutters responded that they usually cut the bamboos near to the streams where bamboo rafts can float down to the nearest villages. Normally, they go bamboo cutting in a group of 3-5 persons. Women are rarely involved in bamboo cutting because the works are burdensome in nature for them. A person needs to stay over night nearly for a week in the forests to obtain around 500 culms of bamboos. After cutting, they normally pull bamboos manually to the streams and from rafts to float down to the villages. Sometime bamboos cut are dragged by drought cattle to the streams or transported by bullock carts directly to the villages. Cost of dragging and transporting varies according to the distance: they need to spend (15-30%) of the selling prices.

Though bamboo resources are available for cutting all the year round, cutting is usually not carried out in the raining season (usually Nayon to Tawthalin) when water level is so high and current is so hasty that rafting the bamboo down the streams is rather difficult. There are another reason for not cutting bamboo in the raining season. Bamboo demand during raining season is quite low and hence the price is uninviting. Therefore, bamboo cutting season is said to be Thithinkyut to Kason, lasting eight months. During the season, they can in average organize two trips for bamboo cutting a month (see figure 3.25 for the season calendar of bamboo cutting). Bamboos are sold in the villages to the traders in most cases. Sometime, bamboo cutters raft the bamboos down to Dawei for getting additional profits which can have another 50% of that they can make by selling to traders at the villages.

Odd-job workers are also involved in woods cutting inside reserved forests and TNR. Since high water level is required to float the woods down the streams with the aid of bamboos, the cutting season is limited to raining season, usually Waso to Tasungmon (see also figure 3.25). Trees are felled using ordinary saws and moved out by manually labours to the streams. Trees of not larger than 3 feet in girth mostly near the streams are therefore felled for ease of working. Only branches of felled trees are trimmed and round logs are moved out to the streams where they are attached to bamboo rafts. Trees felled are usually soft-wooded species that are easy to find within a workable range from the streams. In general, these round logs are sold in the villages at the prices of 40000-50000 kyats per cubic ton to local traders. Journey for cutting woods is difficult and timeconsuming so that a group work is necessary. The group of 3-5 persons can hardly get 10 cubic tons of round logs for sales during a season. Cutting bamboos and woods inside reserved forests requires prior permission form the Forest Department, but strictly prohibited inside TNR. Thus, the cutting is considered illicit.



Figure 3.25 Seasonal calendar of bamboos and woods cutting

Another activity taken by odd-job workers is selling seasonal crops, generally vegetables. Only women are involved in selling. Some households under this group grow vegetable seasonally on small pieces of lands where water is easily available and sell themselves within communities. In contrast, some buy the vegetable from the farms and resell them. However, the activity is found to be seasonal and the margin of profits in very slim. Obviously, for landless people who have to rely their livelihoods on odd-jobs, opportunities in the areas is limited and unappealing: farm- jobs are seasonal in nature; sharecropping is hard in land availability; hunting and fishing are illegal; cutting bamboos and woods is illicit. Consequently, young members of many landless households (60%) migrate out of the villages for better job opportunities. Mobility of the entire family is very rare. Most emigrants are male and female youngsters, but some are heads of the households. The migration is found to be long distance.

3.6.5. Company workers

In the area around TNR, opportunities for getting formal employments are rather limited. Therefore, only a few local people are found working such resident professionals as school teachers and nurses. Fortunately, pipeline companies provide such an opportunity to villages within pipeline corridor. Community survey results showed that 23 villagers from Migyaunglaung and 4 from Zimba were getting jobs in the companies. However, no person from Kyaukshut which was also designated as one of the pipeline corridor villages was obtained the opportunity. Household interview covered only three households. The respondents said that level of monthly payments is attractive, but they can enjoy the jobs only for alternate months due to their level of education and nature of the works. It implies that they have the pretty job for six months and are jobless for another six months in a year. Therefore, they engage in some activities such as tiny trade of cash crops, cycle taxi services and going fishing in unwaged months.

3.7. landuse patterns and landuse conflict analusis

3.7.1. current landuse patterns

Lands around TNR can be classified into two types for management purposes: lands under reserved forests and lands at the disposal of the Government. Lands under reserved forests are managed by the Forest Department according to the Forest Law of (1992). In contrast, the Department of Settlement and Land Records takes the responsibility for managing lands at the disposal of the Government.

The northern parts of the area starting from Kaleinaung lie within the Kaleinaung reserved forest which has been constituted since 1885 (at the time of British occupation). At that time, there seemed to have no large villages inside the reserved. However, Former working plan of the Heinze-Kaleinaung reserved forest (1926-27 to 1935-36) described rights and privileges for Yapu and Migyaunglaung village. The area stretching over 10570 acres around Migyaunglaung and 7306 acres around Yapu village were designated as the Karen areas. The villagers of these villages were permitted as rights to practise shifting cultivation and collect forest produces for home consumption in the respective area. However, none of the reserved trees, namely Pyinkado, Thinganmagale, Thitka, Thitkado, Anan, Knozo, Karawe and Padauk were allowed to cut, mutilated or destroyed. Cutting bamboos and timber of unreserved kinds of less than 3 feet in girth and firewood for use en route within 100 feet on each side of the roads that were granted for rights of ways were also permitted as privileges for these villages.

Several decades ago, migration streams from nearby Mon State were flowed into the reserved forest in the northern part and subsequently villages appeared one by one. At that time, law enforcement could not be properly implemented in the area due to security reasons and the reserved were likely to become openaccess lands. Landless migrants firstly practised shifting cultivation taking advantages in weakness of rules and orders in the area and later established horticultural farms. Gradually, a customary land tenure system was developed and traditional land ownerships were recognized among community members on these open-access lands. With traditional agreements, horticultural farms have been extended cantering from the settled villages to all directions further since then. However, the Forest Management Plan (1996-97 to 2005-06) of Dawei District that covers the area did not ratify any rights and privileges inside the reserved. Moreover, no detail description concerning residential settlements and horticultural farms encroached inside the reserved was found in the plan. Sensibly, landscape outside TNR in the northern part today are dominated by sea of horticultural farms and separated fallow lands. Geographical transect between Migyaunglaung village and the boundary of TNR (figure 3.26) laid down with some local knowledgeable persons represents a typical landscape outside TNR in the northern part.

Geographical transect (Migyaunglaung)											
							K				
Distance	0-mile	l-mile		2-mile		3-mile			4-	mile	
Landuse		Farm	ัล	Farm		Remnant forest					
Vegetation	Residence area	Bamboo Yemain Thit-khauk Pyinkado Zin-byun Phet-wun-gyi	rent year taungy	Bamboo Yemain Thit-khauk Pyinkado Zin-byun Phet-wun-gyi		Bamboo, Yemane Zin-byun Thit- khauk	ast year fallow	Fallow	The-chaung	Fallow	TNR
Crop		Cashew Betel Palm	Curr	Cashew Betel Palm			Ľ				

Figure 3.26 Geographic transect between Migyaunglaung village and TNR boundary

Villages of the southern part are surrounded by TNR in the east and the Bawa reserved forest in the west. In this part, TNR previously was some compartments of the Luwing reserved forest which was originally constituted in 1932. Since these villages seemed to be large enough with a reasonable population at the time of forest reservation, they are excluded from the reserved and provided some buffer areas against the reserved forests for domestic uses. As a rule, lands outside reserved forests are known to be public lands managed by the Department of Settlement and Land Records. Most of the villages in this part of the area have long time been in existence and shared abundant lands around them in accordance with traditional rules. Local residents generally adopted shifting cultivation practice and assume horticultural farming. Later, in response to increased population coupled with migration from the south both shifting and sedentary cultivations were extended.

Traditional practice of the "first come first" rule has been applied as a customary land tenure system for landholdings. In fact, the Lower Burma Land Act allows formal land titling for legal use of lands at the disposal of the Government. However, formalizing land title is a long process that needs permission from higher authorities. In practice, almost all lands outside TNR have been allocated among community members and horticultural farms were established on these lands in accordance with local acceptance. Only a few farms established hold legal titles. Thus, landscape outside TNR in the southern part is not so much different from the north and can be seen as a mosaic of established horticultural farms spotted by uncultivated fallow lands. Common landuse patterns of the southern part of the area can be displayed with geographical transect set up between Yepon village and TNR boundary (Figure 3.27).

Very recently, the landscape around TNR became more diverse. With the favour of agro-ecological conditions of the area, agricultural commercialization was subsidized by the Government. Legal landuse rights were granted to private companies or individuals to establish extensive plantations of rubber and oil palm especially along the Ye-Dawei road. Consequently, a wide continuous band of rubber and oil palm plantations appear in each side along the road. Likewise, a number of large plots of rubber and oil palm plantations become dominant amidst small holding horticultural farms.

Geographical transect (Yepone) Omega phical transect (Yepone)

Distance		v-mine			1-11116	D-IIIIC			J-IIIIC	1-1111C			
Landuse	ad		Farms		Horti- farm				Farms		Horti- farm	Fallow land	
Vegetation	Ye-Dawei roć	Residenc e area	Bamboo	Creek		Creek		Railway	Bamboo Thit-khauk Yemane	Creek		Bamboo, Thit-khauk, Taung-pain Yemane Pyinkado	TNR
Crops			Betel Chewe Palm		Chewe				Betel Chewe Palm		chewe		

Figure 3.27 Geographic transect between Yepone village and TNR boundary

There are also evidences of encroachment inside TNR. One basic reason is for shifting cultivation. Fallow period that determines fertility of soil and hence productivity of the land is very essential in shifting cultivation practices. In order to adopt a longer fallow period for better productivity, numerous pieces of land parcels are required for a family to cover the desirable rotation. As mature fallows become difficult to be available near the villages and outside TNR, the option for landless poors and small landholders is making inroads to TNR. In addition, forested lands are considered to be the best for shifting cultivation so that local people frequently find lands inside TNR for maximizing returns on their scarce labour investment. Therefore, both people with no lands and people with sufficient lands outside TNR usually encroach into TNR for getting open-access lands for and enjoying more returns from shifting cultivation.

In this connection, local people normally exploit the lands elsewhere inside TNR even far upstream areas. More preferably, gentle sloping grounds, usually near the streams, within a short distance from villages are selected for convenience of transporting products from the working sites back to the villages. Sometime palm and edible fruits trees are planted and cashew nuts are directly sowed on the shifting cultivation sites to set up horticultural farms as by-products. However, additional inputs and cares are usually not provided later on the lands after leaving the sites for the next, the resultant farms are not very ostensible, but much more similar to desolate tracts. Thus, a number of small patches of fallows and desolate tracts are scattered inside TNR, particularly within a range of accessible distance from villages.

Another motive of intrusion into TNR is for gathering forest products and hunting wildlife. Bamboo and wood cutting inside TNR are also prevalent. Since horticultural farms are extended on lands around villages, bamboo and wood resources become sparse and commercial cutting for these products are only possible inside TNR. Bamboos and woods are being cut in areas generally along the floatable streams as most of local families have to rely on their own manual labours for cutting and bring these products to local markets. Equally, poor people need to supplement their diets with free source proteins. Since fishing grounds are destroyed and fish stocks are reduced in easily accessible areas outside TNR due to over-fishing and indiscriminate fishing methods. Similarly, almost all forested lands at the surrounding areas of the villages have been converted into less diverse agricultural farms; TNR therefore becomes a safer refuge for wildlife of all sorts. Hence, local people go frequently inside TNR for fishing and hunting with a primary intention of subsistence use. Targeted species are likely to be deer and wild boars, but evidences indicate that all kinds of wildlife, even monkey and porcupines, are killed. Places of fishing and hunting are perhaps elsewhere inside TNR, yet near to Thailand frontiers.

Obviously, local people inevitability intrudes into TNR for the following motives: fertile lands for shifting cultivation; bamboos and woods for commercial harvest; fishes for supplementary diets and wildlife for subsistence use and moneymaking. These activities seem to be happening across TNR, but logically are much more concentrated on areas within a walking distance from the villages. Concerns on the local use of lands inside TNR for the mentioned purposes were discussed in some detail through a series of community meetings, group discussions, in-depth interviews, household interview and informal discussion and all study villages. Personal field observations were also conducted in some villages.

Villagers of Wunpo stressed that the areas inside TNR easily accessible from the village was not essentially useful for them: the terrines were rather high, rough and step; vegetation cover was sparse, some areas were barren lands covered with grasses. Thus no profitable activity can be constructed in these areas for supporting their livelihoods. However, it does not necessarily means that all inhabitants of the village can stand without reliance on TNR. Few landless people need to enter somewhere inside TNR for cutting bamboos and woods for commercial sales. Similarly, a small village of Heinze where horticultural farms have been well established and arable lands are still available at the vicinity shows little interest on regular use of lands inside TNR. In contrary, Hnankye, Yepone, Kyaukshut, Zimba and Migyaunglaung village confirmed that they relied heavily on TNR. Most of the local residents of these villages frequently go into TNR for pursuing the activities for subsistence and commercial purposes. Accordingly, human frequently influence zones inside TNR were identified for Miqyaunglaung, Zimba, Kyaukshut (figure 3.28), Yepone and Hnankye village (see figure 3.29).







Figure 3.29 Map showing village influence zones of Yepon, Heinze and Hnankye village

3.7.2. Landuse conflict analysis

It is quite normal for some people to have different thought (idea), emotion (feeling and perception) and action (behaviour) from other regarding the use of a particular resource. Quite often, there differences are incompatible and clash each other. When people pursue goals that clash or are incompatible, conflicts occur. Thus, conflicts are a fact of life: they happen whether people want them or not. In this sense, a conflict can be referred to as a clash of interests, values, actions, views or directions. Accordingly, conflicts are outcomes of intricacy, interactions and disagreements of people. Hence, they can be better thought of as dynamic social processes featuring with various structural dimensions. According to its superficial connotation, the processes are likely to be associated only with negative effects, they can also generate positive consequences to the society. If the structure and dynamics of the processes were well understood through a systematic analysis and the conflicting situations were properly settled with good management interventions, it could provoke positive changes in the society.

Land is a vital resource for people of local communities. The notion of land here does not restricts itself, but also includes such other natural resources on and below it as water, soils, forests and minerals which are essential for people's livelihoods. The people of the area are usually poor in livelihood assets. Therefore, lands around them are only available assets to draw in their efforts to viable livelihoods. Obviously, their livelihood activities have been undertaken through concentrating on the use of lands. In most communities, the use of lands was usually settled with the traditional rules informally accepted by the members. In those days, the population was rather low and the ultimate aim of land base-production seemed to be self-sufficient. As a result, demands for land were not so great and consequent grievances not many that conflicts over land could be settled effectively with traditional rules and agreements. Over times, both endogenous pressures and exogenous factors put the communities to change livelihood objectives and then activities, exerting huge pressures on nearby lands and resulting in a series of land disputes.

To have better understanding and deeper insight into the structure and dynamics of conflicts over lands in the area, a preliminary analysis was conducted based on accounts and concerns of potential stakeholders. It is, in fact, an office-based analysis and carried out internally by drawing attentions on information gathered with minimum intrusion into the conflict situations. However, the analysis was intentionally devised to be a strategic instrument in designing subsequent process of negotiation and mediation without raising false expectations and exacerbating tensions. Accordingly, a number of simple, practical and adaptive tools were used in the analysis.

Conflict time line: As a first and fundamental step of the analysis, the conflict time line (table 3.16) was prepared based on information derived from community meetings, group discussions, in-depth interviews with various livelihood professional groups, and formal discussions with authorities concerned. The purpose was to assist in examining the history of landuse conflicts in the area and to improve the understanding of the sequence of events that led to the conflict. The conflict time line was found to be a useful tool for clarifying the dynamics of the conflict and spelling out its key issues. In particular, it helped to

structure the narratives of the conflicts and facilitated for proceeding of root cause analysis and stakeholder analysis.

Table 3.16	Landuse	conflict	time line
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Date	Events
1950s	Migration streams started to come in especially in the northern zone
1060s	Upgraded Ye-Dawei road
1980s	Migration continued in momentum due to illegal, but gainful border trade
1990s	Restorative efforts to gain full command of regional security; started establishment of small horticultural farms
1993	Started railway construction activities
1994	Started pipeline constriction activities
1995	Encouraged private involvement in oil-palm plantations
2000	Extensification/ commercialization of small-holder farmers
2002	Establishment of TNR
2006	Encourage private involvement in massive rubber plantation programme

The conflict time line suggests that conflicts over lands in the areas has a long history and gradually pressure on lands more and more significant over time. The most significant events that have escalated and broaden the conflict seem to be private involvement in commercial crop production and establishment of TNR. Because these activities covered a large area of lands on which livelihoods of most local people greatly depend. With their legal rights, private plantations did not respect the traditional agreement on landuse, leading to hostilities in some communities. TNR, with is official responsibility to conserve significant lands and flora and fauna found on them, has tried to check the offences where local people involved for their subsistence and commercial needs. TNR also has made concerted efforts for mobilizing communities participation in conservation, but the scope and extend of the efforts are not sufficient to get positive results. These situations fabricate confrontation between communities and TNR.

Root cause analysis : Conflicts arise from a sequence of events. The sources of grievances among people and groups that underlie disputes tend to result from achieving or retaining control over lands. In turn, achieving and retaining control over land is influenced by changes in the perceived and actual security of tenure (including population, commercialization, diversification, restrictions and so on). Clearly, many of such sources grievances are common to many societies and yet they do not necessarily shift into a conflictive situation or into hostilities. In fact, most land tenure system ten to be resilient to change and can absorb turbulence, but only to a limited extent. Beyond certain threshold, they can begin to break down. Serious land conflicts tend to be generated by an accumulation of different sources of tension which result in the erosion or abandonment of previously accepted and socially recognized rules of access to and use of land and other natural resources. The accumulation of sources to conflict.

Moreover, there is another layer of "conditioning factors" that trigger the shift from grievances into a conflict. When a situation prevailing with several sources of grievances is compounded by one or more factors, a balanced state may flip into a conflict. The flip may be impetuous when one social group seeks to force its agenda on others for exploitative aims. Such conditioning factors would come from both outside and inside and catalyse the situation that may have been held in balance for years into a conflict. Exogenous stresses could take different forms such as climatic fluctuation, migration, development pressures and structural discrepancies and contradictions. Likewise, impetus of the shift would also be based on the thought (idea), emotion (feelings and perceptions) and actions (behaviours) that are basic elements of conflicts and endogenous to the situation. It comes down to the fact that the way people perceive threat, danger, safety and security will have effect on the shift of stages or dynamics of the disputes.

Firstly, root cause analysis was carried out with a view to examine the origin and underlying causes of prevailing conflicts over landuse. The result is the conflict tree diagram (figure 3.30), illuminating linkages among the different factors and causes that have triggered the conflict. The diagram also helps builds simple cause-effect chains, which show the underlying dynamics of the conflict. Specifically, the conflict tree illustrates multiple claims to land resources and broader straggles over security, legitimacy, legacy and livelihoods. Most grievances and tensions are found to originate in competing claims to access rights, tenure insecurity and unequal land distribution.

It is noticeable in this case that one of the prominent immediate causes is establishment of TNR, claiming a large area of lands and restricting all kinds of access to lands inside officially defined boundaries with strict legal prohibitions. In deeds, all these lands and most of the adjacent areas were legally specified as reserved forests long time ago, but also had been used by local peoples for their livelihoods. Shifting cultivation, bamboo cutting, timber cutting and hunting are among other being some regular activities, but prohibited by law in reserved forests that communities would have to construct for their subsistence.

In the recently years, private involvement was strongly encouraged cultivation of commercial crops with national and international demands. Fortunately, the area lies well within agroclimatic zone for rubber and oil-palm. Therefore, extensive areas around TNR especially along Ye-Dawei road including a few parts of reserved forests are granted with exclusive land rights to individuals and private companies for cultivating rubber and oil-palm. With their legal land property rights, some area with horticultural farms established by local communities with traditional agreement were reclaimed for private commercial plantations with no or nominal compensation, leading to high hostilities. These cases demonstrate legal pluralism (customary and statutory systems of land rights existing side-by-side) and competing competencies for issuing rights are usually able to create or foster conditions that are conducive to conflict, even physical violence.



Figure 3.30 Conflict tree diagram of landuse dispute

Generally, individual land holding in the area was found to be rather small and were held under different formalization of rights: a small part is under formal property right, but a large part under informal and extra-legal rights. In response to strong market demands and in attempt to better livelihood outcomes, profit maximization become a main strategy among small-holder farmers and thus most of them now try to expand their holdings. Such agricultural extenfication appears on all sorts of available lands: open access, communal, private or state. Consequently, land disputes are widespread and profound in the area. Besides, an opportunistic way in that some local elites seek to obtain official rights for lands that were previously held under traditionally respected rights make the situations worse.

In the area, numerous land disputes were prevalent when a long track of lands was retrieved for construction gas transportation pipelines to Thailand. These disputes could be settled down due to a proper and effective compensation scheme and public relations. However, access to pipelines corridor, for which legal specification of physical boundaries is still lacking, is exclusive to pipeline companies for safety and security reason. Access to the long corridor especially inside TNR is strongly restricted and demands a prior permission even for TNR authorities. Lack of physical boundaries and restricted access to the corridor and service track pose intricacies to TNR authorities in implementing routine activities for management and in taking urgent actions for preventing forest and wildlife offences.

Additional immediate cause of the conflict is immigration of landless people from the nearby State. These immigrants have settled in the areas and constructed different agricultural activities on available lands of all sorts for their livelihoods. Firstly, they could find suitable lands that have not yet been held by any local habitants. Later, lands became scare and they failed to respect traditional ways of land holding and took even communal marginal lands, raising grievances among local residents.

There are many more underlying causes to the conflict in the area as shown in the diagram. These causes usually embedded in the wider part of social, economic, cultural and political life and cover a wide range of concerns from policy decisions (such as conservation, privatization, economic development), regional affairs (such as security, rice insufficiency) to local issues (such as livelihood and job opportunities). As a result, the task of sorting out the origins of the landuse conflict of the area is really challenging.

Issue analysis : The issue analysis was also performed as a added layer to the root cause analysis by providing a second level of analysis. The purpose of the analysis is to examine core issues (that contribute to the landuse conflict of the area) and specific issues (that give rise to a particular conflict) and then specify the most effective means of addressing them. The analysis thus help to identify and enumerate the core issues and provide a check list for fitting these issue into five specific categories (namely conflicting interest, information gap, relationship, structural issue and conflicting values). Result of the analysis is the issue analysis table (table 3.17) that can be best used as internal mental model to obtain clear picture of the conflict.

Types of issues	Descriptions of issues	Analysis of issues
Conflicting interests Information issues	 TNR: to contain poaching, illegal cutting of bamboos and timbers Poors: bamboos & timbers for personal and commercial uses Poors: staple food (rice) production Small-holder farmers: more income Pipelines: profit maximization, security, safety Private: cash crop production Military: regional security Institutions: limited information on biological, ecological and legal aspects of TNR Regulations: Inadequate dissemination of information (particularly forest, wildlife and landuse) Innovations: Limited knowledge on contemporary concepts and appropriate technologies (e.g., Community Forestry, Agroforestry, organic farming, SALT-Sloping Agricultural Land Technology etc.) Demarcations: Indecisive physical boundaries of the pipeline corridor (especially inside TNR) and private plantations Appropriation: questionable land property rights of private plantations 	 differences in interests (local livelihoods, economic efficiency, commercialization, conservation, security) threats (restricting access to forest and security zones, exclusive use of pipeline corridor and private plantations) Limited publication relations and extension services Lack of adequate public notifications about private plantations Lack of a legal specification of the pipeline corridor
Difficult relationships	 Rival relation: TNR (inclusive of Forest Department)(policemen) and communities (offenders) Bitter relations: communities and private plantations Argumentative relations: permanent and shifting cultivators Patron-client relation: TNR and pipeline companies 	 Exclusion efforts supported by acute law enforcement Disregard of traditional land tenure rights Indiscriminate use of fires
Structural issues Conflicting values	 Regulatory resource management Overlapping statutory and customary land property rights Prescription of mandatory crops (rubber, oil palm) Agricultural commercialization 	 Bureaucratic modes of administration Top-down agricultural planning

Table 3.17 Issues analysis table for landuse conflict

The table shows that the conflicts over landuse in the areas are for most part interest-based. Most issues are found to be concerned with actual and perceived differences in interests. These interests are as diverse as local livelihoods, economic efficiency, profit maximization, commercialization, safety, security and so on. There are also actual and perceived threats on landuse affairs. Restricting access to forests and security zones, exclusive use of the pipeline corridor and private plantations are what communities perceive and realize threats to the use of lands.

Information gaps on institutions, regulations, innovations, demarcation, and appropriation are likely to be noteworthy issues contributing to prevailing conflicts over lands. Dissemination of biological, ecological and legal information of TNR is still limited. Moreover, local people are difficult to receive knowledge of laws and regulations in respect to forest, wildlife and land management. The contemporary concepts and tools of forestry and agriculture, like community forestry, agroforestry, organic farming, are not well known to communities. Suspicion come out from questionable physical boundaries of pipeline corridor and land property right of private plantations. Obviously, these problems are results of lack of public relations and extension services of agencies concerned. Inadequate public notification about issuing of private land property rights is another facet of the problems.

Several forms of relationships among social actors of land conflicts are found to exist. Rival relationships are prevalent between TNR (including Forest Department) and communities due to use of law enforcement as a main instrument for checking forest and wildlife offences. Extensive land reclamation for private property right generates bitter relations between communities and private plantations. Moreover, permanent farmers usually blame shifting cultivators for indiscriminate use of fires fabricating argumentative relations. Definitely, prevailing of such relationships within the society would be full of tensions and grievances.

Structural issues also present especially in natural resource management. Forest and wildlife management is largely dependent upon rules and regulations and the role of people participation is overlooked so that local people are seen as problems rather than solutions. Similarly, statutory (legal) rights for lands (e.g., for agriculture) are simply granted in a way that does not take into account existing customary rights, rising a particular complex situation. This clash of de jure rights (existing because of the formal law) and de facto rights (existing in reality) often exists in the area. Therefore, bureaucratic modes of administrations are rigidly underway in management of natural resources. Likewise, decision making process in agricultural production is also characterized by a top-down structure. For instance, choices of crops (farm level decisions) are made far afield so that farmers have to adopt these decisions as a mandate.

This is fortunate enough that no conflicting value contributing to landuse disputes is observed. Differences among cultural, social, or personal beliefs or different world view and tradition are frequently the most difficult to change. That will require long term strategy that builds respect and supports the sharing and understanding of values among social actors of dispute.
3.7.3. Stakeholder analysis

Disputes usually take place between people as a fact of life. However, the matters that who are the people involved (actors) and why they are involved (reasons) in a particular dispute is an important element to understand and thus resolve it. The actors could either be individuals or organizations that they have something to win or to lose (stake) in the dispute and are more specifically known as stakeholders. Likewise, the reasons could be a mixture of disagreement on interests, values and actions of these stakeholders and the nature of the disagreements can be figured out by the relationships between the stakeholders. In this respect, stakeholder analysis is perceived to be a way of gaining understanding a conflict situation by identifying its key stakeholders and assessing them on the basis of their attributes, interrelations and interests. Consequently, stakeholder analysis was also implemented insofar as to gain a better understanding of conflicting situations over lands in the area. A flexible set of steps were taken in the analysis using appropriate tools (matrices and diagrams) to identify principal stakeholders, investigate stakeholder interests, characteristics, and circumstances, and spell out pattern and context of interactions between stakeholders.

Stakeholder identification : The analysis began with a logical question: who are stakeholders in the conflict over lands? In the context of land tenure regime, the stakeholders generally include those persons and/or groups who have an interest in the lands and the natural resources found on the lands. They will be landholders, land-users, state entities or local authorities (i.e., natural resource users or managers). They depend and have interest one way or another to use the lands but degree of dependency and level of interest may not be the same. This make difficult to decide the appropriate balance among stakeholders in managing land conflict. A distinction needs to be made between stakeholders using some criteria to assist the decision. Accordingly, key actors of the conflict over lands in the area were identified using gualitative criteria (level of interest and mode of involvement) and then categorized into two groups: primary and secondary stakeholders. In this sense, the primary stakeholders include those who are most affected by or dependent on the lands and associated resources or on the resolution or escalation of the conflict while secondary stakeholders are people who are kinked to the conflict but less direct effect on it. Stakeholders of the landuse conflicts in the area are presented in table 3.18.

Primary stakeholder	Secondary stakeholders
TNR authority	Land Record and Settlement Department
Forest Department	General Administration Department
Bamboo cutters	Village chairmen
Wood cutter	
Hunters	
Shifting cultivators	
Horticultural farmers	
Private commercial plantations	
Landless people	
Pipeline companies	

 Table 3.18
 Stakeholders of prevailing landuse conflict in the area

Power relation: Distinguishing the relative power that each group has to influence the directions or resolution of a conflict is central to stakeholder analysis. Power can be defined the capacity to achieve outcome. This includes the ability to make or prevent change. Power can be derived from a different source such as personal, physical, political or economic strengths. Reviewing different sources of influences may indicate new ways of strengthening a limited but already existing power base. Obviously, power relations influence every stage of a conflict and its resolution. A land conflict may be the result of the powerlessness of a person or a group in protecting their land rights. The powerful are very often able to influence the conflict resolution process to their own benefits. The powerless may resort to violence against the powerful and/or the authorities when they perceive they do not have a fair and just hearing of their cases in front of the authorities and consequently feel they have no other resources. Powerful stakeholders are reluctant to enter into conflict management process; they often more to gain or nothing to lose, but not negotiation. Moreover, the more powerful parties may have a greater capacity to define the problem from their own perspective and to determine which stakeholders are involved. Likewise, once an agreement is reached, it may be difficult to ensure that the powerful comply with it if they are capable of and willing to disregard it. Hence, collaborative conflict management will be less possible to bring about when power relations are significant unequal.

In this context, sources of power and their current level of power were assessed to get insight into how differences in power among stakeholders affect conflict management outcomes and to examine ways of strengthening the influence of marginalized stakeholders. In view of that, for each stakeholder, main source of power was identified and then the score was assigned to its current level of power on a scale of 0 to 5 (5 indicating a very strong influence on the landuse conflict). Next, the interests of the stakeholder groups in working with the others were also assessed on the same scale (5 indicating a very strong interest in collaboration to resolve the conflict). Afterward, a table (table 3.19) was completed.

Stakeholder diagram (figure 3.31) was also constructed to get a visual for depicting dependency and power of different stakeholders in the land conflicts. The diagram reveals power relation (i.e., how powerful they are and what relation there are among them). In the diagram, each circle represents a particular stakeholder group and its size and proximity to the issue indicate the extent to which that group is considered to be affected by the outcome of the conflict. A large circle that is very close to the issue specifies that that stakeholder group is greatly affected by the relative influence of each stakeholder group is represented by a triangle, the size of the triangle indicates the relative power that the group has on the process. The proximity of stakeholder to one another shows the relationships and alliances among the group.

The resultant diagram confirms that different public departments have, as a rule, more powers to influence landuse decisions by virtue of authorities for managing lands. However, power differential is so great among land users. TNR, pipeline companies and private plantations are found to be more powerful than communities' users because of their legitimate property rights on lands. Land disputes of the area could not be resolved unless actions are to be taken to narrow down power differentials between stakeholder groups.

Stakeholder groups	Sources of power	Level of power	Interest in collaboration with others
TNR	Legal authority for management of TNR	4	4 (used in parallel law enforcement and community consultation)
Forest Dept.	Legal authority for management of forest estates	5	3 (used mainly policing strategies)
General Admin. Dept.	Administrative authority for supervising land management	5	4 (coordination)
Settlement & Land Records Dept.	Legal authority for management of lands at the disposal of the Government	5	3 (enforced statutory land tenure)
Village tract chairmen	Administrative authority for village level land management	3	2 (personal decision)
Private plantations	Legal land property rights	5	l (personal interest)
Pipeline companies	Legal land property right; influential with national Government; support fund for establishment of TNR	5	3 (profit maximization coupled with contribution to community development
Horticultural farmers	Customary land tenure	2	2 (seeking legal rights)
Shifting cultivators	Traditional agreement	2	2 (seeking sharecropping opportunity with private plantations)
Wood cutters	None	0	l (seeking legal permission)
Bamboo cutters	None	0	l (seeking legal permission)
Landless people	None	0	l (seeking sharecropping on other farms)
Hunters	None	0	0 (illegal)

 Table 3.19
 Source and level of power of stakeholders of landuse conflict



Figure 3.31 Stakeholders diagram showing power relations.

Stakeholders and relationships (4Rs analysis): Stakeholders have a number of different relationships that need to be considered in understanding landuse conflicts. These include relationships to the lands (rights, responsibilities, and returns) and relationships with each others (individually, in partnerships or as part of larger alliances). Rights of access and control, and the benefits gained from lands often define stakeholders' roles and power in relation to management. Similarly, alliances with other groups, networks and collective action can be important bargaining tools and means of reaching new and necessary institutional arrangement.

Then 4Rs analysis was also carried out to chart rights, responsibility, returns of all involved stakeholders in relation to landuse as part of improving the understanding the conflict. The purposes of the 4Rs analysis are: to examine right, responsibility and returns of the different stakeholders in relation to the use of lands; and to observe the relationships among (or within) different stakeholder groups. Here, rights refer to assess and control over lands as formally or informally while responsibility connotes roles and power in relation to the use of lands. Returns cover benefits and costs that a stakeholder derives from the use of land based on rights and responsibilities. Knowing the differences in stakeholder rights, responsibilities and benefits related to the use of lands is often critical to understand the conflict. Inequities among stakeholders related to these four variables often underlie power imbalance and shape the relationship among groups. Therefore, 4Rs analysis can be accepted as an aid for levelling play ground among different stakeholders in later negotiation process. Rights, responsibilities and returns of each group were scored on a scale of 0 to 5 (with 0 meaning none and 5 maximum). In regard to responsibilities, scores were given based on the responsibilities that they actually display rather than what the stakeholder are legally responsible for. The scoring results are given as 4Rs matrix (table 3.20). Then stakeholders were ranked according to the score of each attribute of rights, responsibilities and benefits. Table 3.21 provides the ranking exercise, presenting that the General Administration Department (GAD) is found to have the greatest rights over lands, which is followed by Settlement and Land Record Department(SLRD) and next the Forest Department (FD). It is also true that most responsible one for landuse is also the GAD and the second most the FD. Then SLRD and TNR project stand as the third most responsible parties in relation to lands. In contrast, the pipelines companies, private plantations and TNR project are stakeholders they in order of merit enjoy most benefits over lands.

Table 3.20 Stakeholder Right, Responsibility and Return matrix

Stakeholder	Rights	Score	Responsibilities	Score	Score Returns	
TNR project	Establishment and management of TNR	3	 Improve infrastructure Demarcate boundaries Check forest offences 	3	 Better physical access Restrict encroachment, poaching, felling Support biodiversity conservation 	3
Forest Department	Administration and management of forest estate	5	 Check forest offences Collect revenue 	4	 Deforestation & degradation Decrease revenue 	2
Bamboo cutters	Traditional reorganization	1	• None	0	Restraints on access to forest	1
Wood cutters	Traditional reorganization	1	• None	0	Restraints on access to forest	1
Shifting cultivators	Traditional way of production rice	1	• None	0	Restraints on access to forest	1
Horticultural farms	Traditional reorganization	2	• None	0	• Restraints on further extension of farms	1
immigrants	None	0	• None	0	Restraints on access to forest	1
Pipeline companies	Legal right for control over pipeline corridor	5	Maintain natural environment of pipeline corridor	2	• Gas sale and profit	5
General administration Department	Supervise local landuse	5	 Community development Landuse dispute management 	5	 Improved infrastructure Reduced disputes 	3
Settlement & Land record Department	Management of lands at the disposal of the government	5	• Provide different land rights	3	Overlapped with customary rights	2
Private plantations	Official rights for mandatory crops	3	 Cultivate rubber or oil palm 	2	Crop sale and profits	4
Regiments	None	0	• None	0	Restraints on access	

Table 3.21	Ranking of stakehold	ers according to res	nective 3Rs weight
1able 0.21	Natiking of Stakenold	lets according to res	pective ons wergin

Rank	Greatest rights	Most responsible	Most benefits
	General Administration Dept.	General Administration Dept.	Pipeline companies
	Settlement and Land Records Dept.	Forest Dept.	Private plantations
	Forest Dept.	Settlement and Land Records Dept.; TNR project	TNR project

These characteristic attributes noticeably shed shadow relationships among stakeholders. Positive or cooperative relationships are found among few groups involved, but some disclose negative or aggressive relationships to others depending upon rights, responsibilities and benefits in relation to landuse. Positive interactions indicate opportunities for building support and alliances that are useful in conflict management. Prevailing relationships were mapped in order to provide visual representation on the degree to which they are positive or problematic.



Figure 3.32 stakeholders relationship map

The map reveals for example that TNR forms alliances with FD and informal and intermittent links with private plantations. On the other hand, the project takes positive relationship with line agencies GAD, SLRD, MAS while negative relationships with others including shifting cultivators, wood cutters, bamboo cutters, horticultural farmers and landless people.

3.8. Attitude of local residents towards TNR

Protected areas in developing countries often are a source of foods and resources to meet basic needs of local residents. Restrictions on access to natural resources in protected areas have frequently resulted in a negative attitude towards conservation by residents, thereby further exacerbating management problems. To provoke people's support for protected areas and the conservation of natural resources which they contain, a proper understanding is needed of the relationship of protected areas to people living adjacent to them. There are a growing consensus on the views and feelings that natural resource conservation requires greatly increased involvement of local people as local participation is an essential prerequisite for reducing the conflicts between local people and the management of protected areas. Moreover, co-management with local communities and provisions of tangible benefits to rural inhabitants are among the mechanisms advocated to reduce conflicts. Garnered by whatever means, the acceptance and support of local people are especially important for the longterm effectiveness in conservation of protected areas. An understanding of factors leading to local support is consequently a first step in the process of developing policies to achieve this end.

Accordingly, attitudes of local communities around TNR were assessed in support to formulate the management interventions of the reserve. The total attitude scores for respondents averaged 40.3 points (S.D. 4.1) of the 51 possible, indicating a moderate level of support for the reserve. No significant difference (F= 0.9281, P=0.3985) was found between the total attitude scores for local people residing in the northern (x=39.9), the middle (x=39.8) and the south zones (x=40.9) around TNR.

Perception on natural resource conservation and the reserve: Respondents had not divided opinions about the reserve and conservation of natural resources. A great number of people living around TNR (86%) supported the statement "it is good that this land is protected" and 78% did not agree that "it would be better not to have the reserve here". Likewise, most local people (86%) again agreed with the statement "the reserve was mainly created for local communities". Interestingly, almost all respondents (95%) are in agreement with the protection of forests for the children.

Perception on the reserve impacts on personal level: Only a few local residents (20% in the south and 6% in the middle zone and 10% in the north zone) agree with the statement "It was easier to make a living before the reserve creation". In contrary, more than half of the respondents composed more or less equal numbers from three different zones mentioned that "The reserve created problems in my life". These people further stated that they had relied on TNR for satisfying basic needs such as foods, building materials and for shifting cultivation. Present restrictions on access to the reserve have forced some inhabitants to give up a source of foods and incomes.

Attitude statement	All spatial zones					
—	WAS	n=110	don't know			
	yes	110	don (know			
Perception of TNR and natural resource conservation		_	•			
It is good this land is protected	86	7	6			
It would be better not to have the reserve here	12	78	9			
The reserve was mainly created for local communities	85	4	12			
It is important to protect the forests for our children	96	1	4			
Perception on the effects of the reserve on a personal level						
It was easier to make a living before the reserve creation	13	82	5			
The reserve has created problems in my life	55	42	3			
Perception on the benefits of the reserve to the community						
The reserve employees help community	33	39	28			
TNR project helps the community	14	59	27			
TNR project provides jobs to people	4	68	28			
Perception on natural resource use						
People should be able to hunt in the reserve	31	62	7			
People should be able to cut bamboos in the reserve for personal use	84	14	2			
People should be able to cut timber in the reserve for personal use	80	19	1			
People should be able to establish horti-farms in the reserve	36	53	2			
People should be able to cut bamboos and timbers for commercial use	25	69	6			
Percention on areas protected and restrictions of its use						
The reserve is too big	21	24	55			
The restrictions in the reserve is too many and severe	44	35	21			
The restrictions in the reserve is too many and severe	21	67	12			

Table 3.22 Percentages of responses to attitude statements (all spatial zones)

Table 3.23 Percentages of responses to attitude statements (by the spatial zones)

	The southern zone		The middle zone			The northern zone			
	n=45		n=35			n=30			
Attitude statement	yes	no	don't know	yes	no	don't know	yes	no	don't know
Perception of TNR and natural resource conservation									
It is good this land is protected	89	9	2	86	11	3	83	0	17
It would be better not to have the reserve here	16	82	2	14	77	9	7	73	20
The reserve was mainly created for local communities	91	0	9	86	6	9	73	7	20
It is important to protect the forests for our children	96	2	2	100	0	0	90	0	10
Perception on the effects of the reserve on a personal level									
It was easier to make a living before the reserve creation	20	73	7	6	94	0	10	80	10
The reserve has created problems in my life	51	42	7	63	37	0	50	47	3
Perception on the benefits of the reserve to the community									
The reserve employees help community	51	33	16	23	37	40	17	50	33
TNR project helps the community	20	62	18	14	49	37	3	67	30
TNR project provides jobs to people	2	80	18	9	54	37	0	67	33
Perception on natural resource use									
People should be able to hunt in the reserve	29	64	7	43	49	9	20	73	7
People should be able to cut bamboos in the reserve for personal use	82	16	2	91	6	3	80	20	0
People should be able to cut timber in the reserve for personal use	80	20	0	80	17	3	80	20	0
People should be able to establish horti-farms in the reserve	51	51	0	40	54	6	43	53	3
People should be able to cut bamboos and timbers for commercial use	20	78	2	34	57	9	20	70	10
Perception on areas protected and restrictions of its use									
The reserve is too big	29	20	51	17	20	63	13	33	53
The restrictions in the reserve is too many and severe	38	36	27	57	29	14	37	40	23
There are more wild animals now than ten years ago	42	44	13	11	74	14	0	93	7

Perception on the benefits of the reserve to the community: Most residents across the villages considered that the reserve was not beneficial for them at the present. The statement "Reserve staffs help community" was not supported by 39% of the respondents while only 14% hold up the thought "TNR project helps the community". Moreover, a majority (68%) of local people interviewed said "no" for the question "TNR project provides jobs to local people". In this respect, residents in the southern zone seem to have more positive attitudes towards the staffs of TNR project because more than half of the respondents from the south agreed that the staffs help community.

Perception of natural resource use: Use of the natural resources inside the reserve was still necessary for people living adjacent to the TNR. But, more than 60% of the all respondents suggested that hunting should not be allowed inside TNR even for the subsistence use. Nonetheless, a majority of people believed that cutting of bamboos (84%) and of timber (80%) inside TNR should be allowed for personal sues, not for commercial sales. Respondents reported that commercial logging would lead to deforestation. Without such restrictions on commercial cutting of timbers, they felt that little forests would be left in the area. Regarding establishment of horticultural farms inside TNR, contrasting views was observed since about half of the respondents said "no" while others "yes". Opponents of the statement mentioned that arable lands were no longer available near villages and landless families needed to be relied on TNR for establishing permanent farms.

Perception of the area protected and restrictions on its use: More than half of the respondents (comprising 51% from the southern, 63% from the middle, and 53% from the northern zone) said that they did not know the actual extent of the reserve even though most of them generally knew existence of TNR around their villages. Nearly 50% of the total respondents perceived that the restrictions in the reserve is too many and severe. In overall average, 67% of local people residing near TNR properly recognized that wild animal population were decreasing. Surprisingly, even 93% of residents from the northern zone accepted the concern.

Factors influencing attitudes towards TNR: Some logical factors influencing attitudes were tested. Cross-tabulation tables using Chi-square tests were performed for selected variables to determine the degree of dependence between independent variables and attitudes towards the reserve. Independent variables included: knowledge questions, residents-reserve staffs relation questions, other socio-demographic questions, spatial zones and principal livelihoods. Such factors as knowledge level, residents-staffs relation, education status, age were found statistically significant at ($\infty = 0.05$) while gender, ethnicity livelihoods, and length of settlements and spatial zone were not. These are itemized in table 3.24.

The knowledge level of residents of the area regarding environment and TNR seem to be high, showing an average score of 21.7 (S.D. 3.63) of the possible highest score of 27. However, no significant difference in knowledge scores (F=0.9859, p=0.3765) were found among communities residing in the northern (x=21.1), the middle (x=22.3) and the southern zones (x=21.1). Eighty-seven per cent of the residents, whether living the southern, the middle, or the northern zone, scored fairly-highly in knowledge about conservation issues and the conservation goals of the reserve. Respondents with fair/good knowledge of

conservation issues viewed the reserve more positively than those with less such knowledge.

Table 3.24	Factors i	nfluencing	resident	attitudes

Factors	Negative attitude	Neutral/ positive attitude	\mathbf{X}^2	df	X ² _{0.05}
Knowledge level					
Good/fair knowledge	29	67	9.0717	1	3.841
Poor knowledge	10	4			
Residents-staffs relation					
Good/fair relation	18	61	19.6633	1	3.841
Poor relation	21	10			
•					
<u>Education</u>					
• Illiterate	11	6	30.6137	2	5.991
• Primary	24	19			
• >Middle	4	46			
<u>Age</u>					
• < 40 year	25	18	15.9177	2	5.991
• 40-60 year	11	40			
• > 60 year	3	13			
<u>Gender</u>					
• Male	17	32	0.0223	1	3.841
• Female	22	39			
•					
<u>Ethnicity</u>					
• Bhama	0	6	4.0014	3	7.815
• Dawei	17	33			
• Kayin	11	16			
• Mon	11	16			
<u>Length of settlement</u> (year)					
• < 5	3	7	1.4678	2	5.991
• 5-20	9	10			
• > 20	27	54			
20		• •			
Livelihoods					
	12	32	5 9965	4	9 488
Lowland rice	3	2	0.0000	Ŧ	0.400
	12	19			
Other	4	5			
Shifting cultivation	ž R	13			
	0	10			
Spatial zones					
	14	21	0 7062	9	5 001
 North 	14	10	0.1004	4	0.991
South	14	31			

The average test score (9.50 ± 1.81) out of 12 possible on relation indicates that there seems to have fairly good relation between local residents and the staffs from the reserve. However, no significant difference in knowledge scores (F=0.9859, p=0.3765) and in the relation with the staff between residents (F=2.2770, p=0.1075) were found among communities residing in the northern, the middle and the southern zones. It was found that only twenty-eight per cent of the respondents (representing 25% from the middle, 23% from the north and 33% from the southern zones) showed poor relations with the staffs. Respondents reporting poor relations with TNR project staffs had more negative attitudes towards the reserve than those with fair or good relations. One of the important points in poor relations between local people and the staffs is limited visits of the staffs to communities and families.

Age significantly affected attitudes. Seventy-eight percent of middle-aged people (40-60 years) and eighty-one percent of older person (>60 years) perceived positive stance on the reserve, but fifty-eight percent of younger group saw the reserve negatively. Therefore, residents of aged people were likely to feel positively whereas younger generations hold the negative views towards the reserve. Education level also affected attitudes. Respondents with no education and with only primary level education held more negative attitudes towards the reserve than those respondents with better education.

Accordingly, local residents generally held a fairly good knowledge on environmental issues and the reserve and relations with the staffs, showing some degree of positive attitudes towards the reserve. It is likely to be one of the indications on effectiveness of community talks conducted by the project. TNR project has organized a series of such talks on villages for school children and community members. Another point could be long term existence of restrictions of access to the forests. Before creation of TNR, the area was part of reserved forests where the access to the forest products was also somewhat restricted by laws. Therefore, exclusion of local communities is not originally due to formation of TNR. It is true that the wildlife law that principally support TNR is much more severe than the forest law. Again, TNR project generally is in its initial phase of motivating local participation emphasizing on extension and educational activities in order to enhance their awareness and avoid confrontation with local people. Law enforcement is used just as a complementary tool for preventing serious forest and wildlife crimes. So far, no serious legal action has been taken against local residents. Thus, TNR still appear to be an open access land where hunting, fishing, gathering and cultivation activities are being accomplished in some degree by local residents as traditional ways of life. Accordingly, if serious actions are going to take against illegal activities inside TNR with strong law enforcement, it may possibly spoil existing relation with local people.

4. Conclusions and recommendations

4.1. Key findings

A lengthy discussion can be summarised into following key findings.

- There are a high tendency of population growth in the area due to high biological potentials (high fertility rate) and traditional conducts (early marriage).
- Landuse conflicts are relatively intensive due to widespread application of shifting cultivation and sizeable expansion of private cash crop plantations (rubber, oil palm).
- Local people heavily rely on natural resource based livelihood strategies.
- Livelihood assets endowment of local communities is low and unbalanced with the most characterizing feature of low financial capital.
- Lands for growing paddy rice, staple food of communities are rather limited.
- Severe degradation of lands and forest resources are noticeable in the area due to shifting cultivation and indiscriminate cutting
- Occurrence of catastrophic floods and disastrous wildfires are frequent.
- -Seasonal changes in abundance and price of bamboo, one of the main income sources
- The threats of poaching wildlife (big games for commercial purpose and ungulates for subsistence use) are still high.
- -Outbreak of malaria is common.
- External assistance for community development is inadequate.

4.2. Recommendations

Following management and development interventions coupled with different specific activities are recommended for local communities adjacent to TNR to be able to construct sustainable livelihoods and hence to actively participate in long-term conservation of TNR.

Education for women

-to encourage formal and informal education for women to generally assist in constructing preferable livelihoods for better outcomes and to particularly support in constituting a proper family planning programme for effective population control

-to develop a scholarship programme especially for women to support completion of basic education and to reduce school drop-out rate

-to raise an awareness programme and conducting a series of public talks and training courses regarding family planning and income generation for women

Landuse conflict management

-to define external buffer zones over lands outside TNR stretching from the legal boundaries to the road in the north and to the river in the south in order to influence the landuse decisions with effective supervision

- -to define internal buffer zones over lands inside TNR where local people disturbances are noticeable in order to provide a social buffer for local people and a physical buffer for wildlife
- -to develop a proper mechanism for collaborative conflict management of land disputes through active participation of all key stakeholders
- -to initialize traditional landuse agreement to guarantee long-term access to resources to bona fide traditional users
- -to demarcate and publicize the physical boundaries of the external and internal buffer zones using posts, pillars, sing-boards, blazes etc.
- -to form "landuse supervision committee" comprising representatives from all key stakeholders
- -to hold regular and special meetings of the committee to accommodate and regularize land disputes around TNR
- -to regularize gathering of forest products and fishing and hunting of nonprotected fish and wildlife species according to the agreement developed
- -to organize workshops/training courses on conflict management for project staff to improve communication and facilitation skill

Livelihood assets endowment

- -to improve livelihood assets endowment through community development process in the basis of active community participation and fair distribution of benefits resulting therefrom
- -to create a soft-loan system for improving access to credits
- -to create income-generating opportunities by encouraging production of valueadded products with a attractable market using local resources such as bamboo, cane, betel nut shells and so on.
- -to conduct a series of training courses on value-added production using locally available resources (e.g, basketry, furniture, food preservation and processing etc.)
- -to support for improving portable water supply (e.g., tube wells, pipeline networks, etc.)
- -to support in bringing out lands for growing low land rice
- -to upgrade local operating units (LOU) as community resource centers for providing assistance and information concerning utilization, conservation and management of natural resources
- -to encourage local communities to form organizations (e.g., forest user groups) and more preferably institutions (e.g., co-operatives) to have better bargaining power in trade of local products and in social relations for local and external events.

-to organize training courses for communities in order to build capacity for personal and financial management of small enterprises dealing with forest, agricultural and fishery products

Wildfire prevention

-to develop community fire preventive measures with active local participation

- -to develop a proper communication channel and alarming system for fire hazard information in order to take urgent actions for prevention and suppression, especially in case of emergency
- -to identify areas of high fire hazards for giving close attentions for effective prevention
- -to enhance departmental and local capacity for wildfire management through trainings

Bamboo resource conservation

-to conserve bamboo resources through collaborative management actions for sustainable harvest and regular income

- -to form, in accordance with community forestry instructions, forest users groups and encourage community forestry activities for effective conservation
- -to enhance skill and knowledge of communities required to natural management of bamboo forests for sustainable utilization
- -to conduct a series of training courses for communities to build capacity for management planning in community forestry
- -to organize training courses for communities to enhance skill and knowledge essential for producing value-added products from bamboo (e.g., basketry, furniture, bamboo shoot preservation and processing)

Security on tenure and access

- -to craft appropriate institutional arrangements that ensure security of land tenure and access to forest resources
- -to check further expansion of agricultural activities inside the reserve forests within the external buffer zone
- -to formulate an appropriate community forestry scheme so as to reorganize existing agricultural farms for ensuring tenure security of lands and stabilizing landuse and to conserve remnant forests for certifying legal access to forest resources
- -to introduce agroforestry practices in the community forestry scheme
- -to establish agroforestry demonstration plots at strategic places with different design reflecting environmental, economic, social settings of the areas for providing self-evidence for communities

Participatory rehabilitation

-to mobilize community participation to rehabilitate degraded lands so as to enhance natural resource base and vegetation cover

-to encourage for establishing agroforestry farms under the scheme of the community forestry in order to rehabilitate degraded lands for improving environmental conditions but also for enjoying economic gains and social benefits

-to conserve degraded forests through collaborative management practices for meeting local basic needs and improving vegetation cover

- -to raise awareness and boost practice of local residents about the concept and application of agroforestry through public talks and trainings
- -to distribute tree seedlings to uphold tree growing practice in and around agricultural lands
- -to conduct training courses for communities on tree nursery techniques in support to establish community nursery for agroforestry and community forestry
- -to build local capacity through workshops/trainings for planning, implementation and monitoring and evaluation of community-based resource management
- -to build departmental capacity through workshops/trainings on community relation for effective facilitation and communication in implementation of participatory resource management

Containing wildlife poaching

- -to raise an awareness campaign and generate community policing practices in order to make certain co-operation of communities in efforts to enhance law enforcement for containing poaching and trafficking of wildlife
- -to raise awareness of communities on wildlife conservation and rules and regulations of wildlife protection through public talks
- -to establish community policing practices so as to avoid misconception and to get cooperation on law enforcement activities for checking wildlife poaching and trafficking

Coordinating external supports

-to coordinate with different organizations (both Government and non-Government) for improving external supports for community development

-to make known of the objectives and activities of TNR to other line departments in the forms of occasional and special meeting, seminars or workshops

- -to establish regular contact with various Non-governmental organizations to share information and lessons learnt on conservation and community development efforts
- -to initiate collaborative efforts with other organizations in community development process

4.3. Conclusions

Protected areas have been widely considered as an effective mean for conserving biodiversity in general and for containing deforestation in particular. However, most of the protected areas across the tropical world are situated as small islands surround by a sea of agricultural farms and human habitations. Demography, landuse and land cover are being changed in a dramatic way in these areas. Ever increasing population and expansion of agricultural activities for food grains production are major threats to the protected areas. Thus, landscapes around the protected areas are guite often characterized by biological and socio-political issues due to conflicting interests between long term conservation goals and short term livelihood gains. It is now increasingly aware that exclusionary approach to the protected areas is not always successful for all circumstances in protecting biodiversity. In most cases, restrictions of local residents from access to forests resources usually produce social ramification of misconceptions and confrontations. Alternatively, sustainable uses of these resources have been proposed based on the logics that resources are better conserved when people can use and therefore value them as part of their livelihoods. Local participation is at must!

Obviously, Taninthayi Nature Reserve was created not only with national concerns, but also with global significances for its flora and fauna. The reserve is considered a typical representation of the tropical rain forest ecosystems that are disappearing at alarming rates. It also provides quality refuges for many national flagship species like tigers, tapirs and elephants and some globally endangered species. Some wildlife species are endemic to the area. However, the reserve is not an exemption: a considerable population of human beings has been residing in the areas adjacent to the reserve; they are usually poor farmers who heavily rely on natural capital for their livelihoods. Therefore, a traditional way of using exclusionary policies with institutional support will not work properly. Participatory conservation or community based resource management approach will be the best alternative that will avoid conflicts with local people, but enhance conservation effectiveness.

Accordingly, the management and conservation of the reserve are really challenges with both biological problems and social dilemmas. Sensible designation of buffer zones and its management is an integral part in attempts to embracing overall conservation goals of the reserve. A proper balance is required to be set up for adjusting between social buffering for local immediate needs and physical buffering for wildlife protect covers. In this connection, improvement of livelihood asset endowment of local communities cannot be overemphasized since the sustainable use of natural resources inside the reserve has to be constrained by habitat requirements of wildlife. In order to reduce direct anthropogenic pressures on the reserve, local people must be mobilized to actively take part in the participatory community development initiatives. Different kinds of incentives (material or in kinds) are essential in initial phases of the efforts for enhancing local self-confidence for long tern self-help community development.

5. References

- Abdrabo, M.A. and Hassaan, M.A. (2003). A Manual for Socioeconomic Study. From river catchment areas to the sea: comparative and integrated approach to the ecology of Mediterranean coastal zones for sustainable management (MEDCORE). Center for Eenvironment and Development for the Arab Region and Europe (Cedare).
- Aye Aye Htun (2007). Local Community and Environmental Conservation in Paunglaung Watershed Area. PhD Dissertation, Department of Botany, University of Yangon.
- Burgess, T.F. (2001). A General Introduction to the Design of Questionnaires for Survey Research. Information Systems Services, Guide to the Design of Questionaires. University of Leeds, UK.
- Carswell, G. (1997). Agricultural intensification and rural sustainable livelihoods: a think piece. WP 64 IDS.
- Case, D.D. (1990). The Community's Toolbox: the idea, methods and tools for participatory assessment, monitoring and evaluation in community forestry. Community Forestry Field manual 2. FAO, Rome.
- Conroy, C. (2002). PRA Tools Used for Research into Common Pool Resources. Socioeconomic methodologies for natural resources research best practice guidelines. Natural resource Institute, University of Greenwish, UK.
- Ellis, F. Allison, E. (2004) Livelihood diversification and natural resource access. Livelihood Support Programme, FAO.
- FAO (2001) Field level handbook: Socioeconomic and Gender Analysis Programm, FAO.
- Fiallo, E.A. and Jacobson, S.K. (1995). Local communities and protected areas: attitudes of rural residents towards conservation and Machalilla National Park, Ecuador. Environmrntal Conservation vol. 22:3.
- Freudentgal, S. and Narrowe, J. (1991). Focus on People and Trees: a guide to designing and conducting community baseline study for community. Swedish University of Agricultural Sciences, International Rural Development Center, Working paper 178.
- General Accounting Office (1993). Developing and Using Questionnaire. Program Evaluation and Methodology Division, General Accounting Office, United states, GAO/PMED 10.1.7.
- Kaimowity, D. (2003). Forest law enforcement and rural livelihoods. International Forest Review 5(3).
- Kweka, D. (2004). The Role of Local Knowledge and Institutions in the Conservation of Forest resources in the East Usambara. UNESCO Man and Biosphere (MAN) Young Scientist Programme.
- Luan T.D. (2006) Forest protection and sustainable livelihood of people in nthe buffer yones of Cat Tien National Park, Vietnam. Case study, Village 4, Ta

Lai Commune, Tan Phu District, Dong Nai Provience. M.Sc. Thesis, Department of Urban and Rural Development, Swedish Uni. Of Agri. Sci.

- Lynam, A.J. and Rao, M. (2007). A Management Framework and Conservation Workplan for the Thaninthayi Nature Reserve, Myanmar. Technical report, WCS, Myanmar.
- Marsland N., Wilson I., Abeyasekera, S. and Kleih, U. (2001). Combining Quantitative (Formal) and Qualitative (Informal) Survey Methods. Socioeconomic methodologies for natural resources research best practice guidelines, Natural resource Institute, University of Greenwish, UK.
- Messer, N. and Townsley, P. (2003). Local institutions and Livelihoods: guidelines for analysis. Rural Development Division, FAO, Rome.
- Nemes, G. (2005). Intergrated rural development: the concept and development. Discussion paper, Institute of Economics, Hungarian Academy of Science, Budapest.
- Nilsson, P.O. (2002). Local Management of natural resources: a case study of local communities relations to protected areas. M.Sc. Thesis, Department of rural development studies, Swedish Uni of Agri. Sci.
- Sayer, J. (1991) Rainforest buffer Zones: guidelines for protected area managers. Forest conservation programme, IUCN.
- Csialabba, N.E. and Williamson, D. (2004). The scope of organic agriculture, sustainable forest management and ecoforestry in protected area management. WP 18, Environment and antiral resource service, Sustainable Development Department, FAO.
- Scoones, I. (1998). Sustainable rural livelihoods: a framework for analysis. Wp 72, IDS.
- Shiferaw, B., Anupama, G.V., Nageswara Rao, G.D., and Wani, S.P., (2002(. Socioeconomic characterization and analysis of resource-use patterns in community watersheds insemi-arid India, SAT e-journel 2(1).
- Sutherland, A. (1998). Participatory Research in Natural Resources. Socioeconomic methodologies for natural resources research best practice guidelines, Natural resource Institute, University of Greenwish, UK.
- Thanh, H.X., Anh D.N. and Tacoli C. (2005) Livelihood diversification and ruralurban linkage in Vietnam's Red river delta. WP 11, Rural/Urban interactions and livelihood strategies, IIED.
- Taninthayi Nature Reserve project (2001). Product document: establishment and management of a Nature reserve in the Thaninthayi region, southern Myanmar. Thaninthayi Nature Reserve project, Forest Department.
- Warner, M. (2000). Conflict Management in Community-based Natural Resource Projects: Experiences from Fiji and Papua New Guinea. Overseas Development Institute (ODI), Working paper 135.

Appendix I

The work-plan for accomplishing various activities in the study

	Activities		First 5 months (Jan 2008 May 2008)				Second 5 months (Sep 2008- Jan 2009)				Remarks	
	indivines	Jan	Feb	Mar	Apr	May	Sep	Oct	Nov	Dec	Jan	Remains
1	Conceptualization											
	Literature review											
	Secondary data collecting	└───→										
	Discussion with personnel concerned											
2	Problem identification											
	Objective setting											
	Reconnaissance survey											
З	<u>Preparation for filed survey</u>											
	Survey team formation											
	Reviewing data collecting methodologies	-										
	Developing necessary survey instruments											
4	<u>Field survey</u>											
	Pilot survey											
	Modification of survey instruments											
	Selecting sample villages and respondents											
	Realizing field survey											
5	Data processing and analysis											
	Data coding and entry											
	Quantitative analysis											
	Qualitative analysis											
6	Reporting											
	Main report								-			1
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Information sheet for community profile

- 1. Name.....
- 2. Length of establishment......years
- 3. Number of households.....
- 4. Number of houses: i) Brick..... ii) Wooden..... iii) Bamboo.....
- 5.Location: proximity to

i) Road.....miles ii) Nearest village.....miles iii) Town....miles

6. Population

Gender	1-5	6-15	16-40	40-60	> 60	Total
	years	years	years	years	years	
Male						
Female						
Total						

7. Ethnic groups

Ethnicity	Buddhist	Christian	Other	Total	Special characteristics
Bhama					
Dawei					
Kayin					
Mon					

8. Migration (Households)

	Whole- family	Only parents	Only head	Family members	Total
Permanent					
Seasonal					
Total					

9. Educational status

Illiterate			
Primary	Middle	High	Graduate

10. Livelihood strategies

Principal strategy	Number of households	Principal strategy	Number of households
i) Agricultural (lowland)		v) odd-jobs	
ii) Agricultural (highland)		vi) Fishermen	
iii) Shifting cultivation		vii) Others	
iv) Horticulture			

11. Land resources

Land types	Acreages	Land types	Acreages
i) Forest		v) Fallow lands	
ii) Community forest		vi) Farmyards	
iii) Lowland rice field		vii) Commercial plantation	
iv) Uplands fields		viii) Pasture land	

12. Livestock breeding

Туре	Number	Туре	Number	Туре	Number
i) Cattle		iii) Swine		v) Poultry	
ii) Buffalo		iv) Goat			

13. Crops

Commercial	Subsistence	Others

14. Mode of transportation

Railway

Line-bus

Motortt-bike

15. Local organizations



16. Sources of domestic water supply

River/streams Tube wells

Natural springs Service wells

Trawlergi

Pipeline network Tanks (rain water)

Cart

17. Sources of energy

Firewood	Charcoal	Electricity	Gas	

18. Basic Educational facilities

School	Numbers	Number of students	Number of teachers	Drop-out rate
i) State High School				
ii) State Middle School				
iii) State High School				
iv) Monastery School				

19. Public service centers

Hospital	
Telephone exchange	

Public clinic Railway station Library

20. Credits access

Sources	Interest rate	Sources	Interest rate
i) Commercial bank		v) Local private lenders	
ii) Agricultural bank		vi) relatives	
iii) Industrial bank			
iv) Revolving fund			

21. Extension media

Radio	Television	Satellite terminal

22. Development projects			
Name	Funding agency	Duration	Comments

23. Other descriptions

•••••	 	•••••
	 	•••••

Household Profile Part I Basic information

Date	Village name
Interviewer	Interviewee

- 1. Name of household head.....
- 4. Length of settlement (years)...... 5. Family

6. Number of household members.....

7. socio-economic status of members

Sr.	Name	Gender	Age (yr)	Relation	Education	Occupation

8. Type of house

Year of construction	Roof	Post	Wall	Floor	Remarks

9. Participation in community organization

Sr.	Organizations	Status	Participants

10. Participation in training courses

Sr.	Training courses	Duration	Participants

11. Incomes from farming

Sr.	Crops	Per acre income	Acreage	Total income	Remark

12. Incomes from other sources

Sr.	Sources	Monthly income	Yearly income	Total income	Remark

13. Monthly consumption of food staff

	Commodity	Unit	Quantity	Unit price	Total amount
1	Rice				
2	Oil				
3	Chilli				
4	Onion				
5	Garlic				
6					
7					

14. Monthly consumption of meats

	Commodity	Unit	Quantity	Unit price (kyats)	Total amount (Kyats)
1	Poultry				
2	Pork				
3	Beef				
4	Fishes				
5	Dried fishes				
6	Bush meat (deer)				
7	Bush meat (wild boar)				

15. General expenditure (in Kyats)

	Particulars	Monthly expenditure	Yearly expenditure	Remark
1	Clothing			
2	House repair			
3	Medical cares			
4	Educational fees			
5	Transportation			
6	Welfare			
7				

16. Balance of ho	usehold e	conomy	Surplus	Balanced D	eficit							
Amount of debt Cause of barrowin	ig money	Place of barrowir	ıg	Interest								
17. Other commo	dities											
i) Radio iv) Television vii)		ii) Cassette v) Video desk		iii) Sewing machine vi) Generator								
18. Transportation facilities												
i) bicycle iv) Boat		ii) motor-cycle v) motor-boat		iii) Trawlergi vi) other								
19. Livestock bre	eding											
i) Drought cattle iv) Swine		ii) Dairy cow v) Goat		iii) Buffalo vi) Poultry								
20. Other owners	hip											
i) Grinding mill iv)		ii) Oil mill v)		iii) Shop vi)								

Part II Natural resource use patterns (interview guides)

1. Domestic water

2. Fuel use

3. Forest products use

4. Hunting

5. Fishing

6. Suggestions to the reserve

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Part III Measurement of attitudes towards the reserve

Don't No Yes know 1. The natural environment is our forests. 2. Deforestation will lead to frequent floods 3. More fishes can be caught if serious deforestation is prevailing 4.Deforestation will result in yield reduction in your farms 5. More wild animals can be found at denuded sites. 6. Wild animals are only dangerous to human beings 7. Shifting cultivation cannot cause deforestation 8. There is a nature reserve at the vicinity of the village 9. There are numerous legal restrictions inside the reserve Relations with staffs of the reserve

No

Yes

Knowledge about environmental issues and the reserve

1. There is an local operation unit (LOU) of the reserve in your village

2. Did you pay a visit to the LOU

3. Did you join the public talks organized by the TNR project

4.Did you see any staff from the reserve

5.Did you have personal relation with any staff from the reserve.

6. Did any staff from the reserve pay a visit to you home

Attitude towards the reserve

Statements	No	Don't know	Yes
Perception of TNR and natural resource conservation			
1. It is good this land is protected			
2. It would be better not to have the reserve here			
3. The reserve was mainly created for local communities			
It is important to protect the forests for our children			
Perception on the effects of the reserve on a personal level			
5. It was easier to make a living before the reserve creation			
6. The reserve has created problems in my life			
Perception on the benefits of the reserve to the community			
7. The reserve employees help community			
8. TNR project helps the community			
9. TNR project provides jobs to people			
Perception on natural resource use			
10. People should be able to hunt in the reserve			
11. People should be able to cut bamboos in the reserve for personal use			
12. People should be able to cut timber in the reserve for personal use			
13. People should be able to establish horti-farms in the reserve			
14. People should be able to cut bamboos and timbers for commercial use			
Perception on areas protected and restrictions of its use			
15. The reserve is too big			
16. The restrictions in the reserve is too many and severe			
17 There are more wild animals now than ten years ago			

17. There are more wild animals now than ten years ago

	Ypu	Tym	Мус	Mgl	Zba	Kst	Ypn	Hze	Hke	Wpo
<u>Resource base</u>										
Per capita land area	2	2	4	5	5	3	2	5	3	3
Per capita farmland	5	3	5	3	3	3	4	3	3	3
Pasture lands	3	3	3	3	3	3	3	3	3	3
Timber resource	1	1	1	2	2	2	2	2	1	1
Bamboo resource	3	4	4	4	4	4	4	4	3	3
Water resource	5	5	5	5	5	5	5	5	5	5
Bush meat	5	4	5	5	5	5	5	4	4	4
Environment service										
Bush fires	3	3	3	2	3	3	3	4	4	4
Catastrophic floods	4	4	4	2	2	4	4	4	2	2
	3.4	3.2	3.8	3.4	3.6	3.6	3.6	3.8	3.1	3.1

Natural capital assessment of the villages

Appendix IV (contd.)

Physical capital assessment of the villages

	Ypu	Tym	Мус	Mgl	Zba	Kst	Ypn	Hze	Hke	Wpo
Basic infrastructure										
Post office	1	1	1	2	3	2	1	1	1	1
School (primary)	5	5	5	5	5	5	5	5	5	5
School (middle)	5	4	1	2	3	5	1	1	1	
School (high)	1	1	1	2	3	2	1	1	1	1
Library	5	1	1	5	5	5	1	1	1	5
Hospital	1	1	1	2	3	2	1	1	1	1
Clinic	5	1	1	5	5	5	1	1	1	5
Electricity	5	2	2	3	3	3	2	2	2	2
Bridge across river	5	5	5	1	5	5	55	5	5	5
Groceries	5	5	5	5	5	5	5	5	5	5
Market	5	1	1	2	3	4	1	1	1	1
Railway station	1	1	1	1	1	5	2	5	1	1
Road network	5	5	5	5	2	3	5	5	3	3
<u>Consumer goods</u>										
Bamboo houses (%)	1	1	1	1	1	1	1	1	1	1
Drought cattle	1	1	2	2	1	1	1	1	1	1
Diary cow	1	1	2	2	2	1	1	1	1	1
Swine	2	1	1	4	3	2	3	1	1	2
Poultry	2	1	2	4	3	4	3	2	2	3
Domestic water	4	5	4	5	5	5	5	5	4	4
Producer goods										
Trollergy	1	1	1	1	1	4	1	1	3	1
Motor-bike	4	3	3	3	2	3	3	3	4	4
Bullock-cart	1	3	2	2	2	1	1	1	1	4
Motor-boat	1	1	1	2	1	1	1	1	1	4
Boat	1	1	1	3	1	1	1	1	1	3
Farm implements	3	2	3	2	3	3	3	3	3	3
Fishing gears	3	2	2	3	3	2	2	2	3	3
Rice grinding mechine	5	5	5	5	5	5	5	5	5	5
	2.9	2.3	2.2	2.8	3.0	3.2	2.3	2.3	2.2	2.8

Appendix IV (contd.)

Financial capital assessment of the villages

	Ypu	Tym	Мус	Mgl	Zba	Kst	Ypn	Hze	Hke	Wpo
Stock of cash										
Formal employment	1	1	1	2	2	1	1	1	1	1
Average household income	3	2	2	2	2	2	3	3	2	1
Local saving	3	1	2	2	2	3	3	3	3	3
Debt	2	2	3	4	1	1	1	3	1	2
	2.3	1.5	2.0	2.5	1.8	2.0	2.0	2.5	1.8	1.8
<u>Flow of cash</u>										
Soft loan access	3	1	1	4	4	4	1	1	1	1
Credit repayment	3	2	2	3	3	3	3	3	2	2
Remittance	2	2	2	3	3	3	4	4	4	4
Basic products price	3	3	3	3	3	3	3	3	3	3
	2.8	2.0	2.0	3.3	3.3	3.0	2.8	2.8	2.5	2.5
	2.5	1.8	2.0	2.9	2.5	3.0	2.4	2.6	2.1	2.1

Human capital assessment of the villages

	Ypu	Tym	Мус	Mgl	Zba	Kst	Ypn	Hze	Hke	Wpo
<u>Quantity</u>										
Working force	4	4	4	3	3	4	4	4	3	4
<u>Quality of education</u>										
Illiteracy rate (%)	5	2	5	5	4	5	5	4	5	5
Existence of school	4	1	2	5	4	3	4	2	5	5
Students per class	4	5	5	5	4	5	4	5	5	5
Students per teacher	4	4	4	4	4	4	3	4	5	5
Drop-out rate (%)	2	1	1	3	3	1	1	1	1	1
	3.8	2.6	3.4	4.4	3.8	3.6	3.4	3.2	4.2	4.2
<u>Quality of health</u>										
Access to doctor	1	1	1	5	5	5	1	1	1	1
Access to nurse	1	1	1	5	5	5	1	1	1	5
Access to midwife	5	5	5	5	5	5	5	5	5	5
water quality	2	5	2	1	1	5	1	1	5	1
	2.3	3.0	2.3	4.0	4.0	5.0	2.0	2.0	3.0	3.0
<u>Knowledge and skill</u>										
local knowledge	4	4	4	4	4	4	4	4	4	4
Shared knowledge	2	2	2	3	3	3	2	2	2	2
Specialized knowledge	1	1	1	2	2	2	1	1	1	1
	2.3	2.3	2.3	3.0	3.0	3.0	2.3	2.3	2.3	2.3
	3.1	3.0	3.0	3.6	3.5	3.9	2.9	2.9	3.1	3.4

Appendix IV (contd.)

Social capital assessment of the villages

	ypu	tym	myc	mgl	zba	kst	ypn	hze	hke	wpo
Structural										
Organizations	4	4	4	4	4	4	4	4	4	4
Membership	4	4	4	4	4	4	4	4	4	4
Participation mode	5	5	5	5	5	5	5	5	5	5
Leadership	3	3	3	3	3	3	3	3	3	3
	4	4	4	4	4	4	4	4	4	4
<u>Cognitive</u>										
Trust	4	4	4	3	3	3	3	4	4	2
Perception	4	4	4	2	2	3	3	3	3	1
	4	4	4	2.5	2.5	3	3	3.5	3.5	1.5
Collective actions										
Water supply problem	3	4	2	2	2	4	2	2	4	2
Welfare	4	4	4	4	4	4	4	4	4	4
Natural disasters	3	3	3	4	4	3	3	3	4	4
Labour contribution	3	3	3	3	3	3	3	3	3	3
Cash contribution	4	2	2	2	2	3	3	3	2	3
	3.4	3.2	2.8	3.0	3.0	3.0	3.0	3.0	3.4	3.2
<u>Assess to information</u>										
Radio	4	2	4	4	3	4	5	3	3	3
Television	3	1	2	1	1	2	1	3	2	2
Telephone	1	1	1	2	2	2	1	1	1	1
	2.7	1.3	2.3	2.3	2.0	3.0	2.3	2.3	2.0	2.0
Social cohesion										
Landlessness	2	2	2	4	2	1	2	2	1	1
Poorness	2	1	1	2	1	1	1	1	1	2
Religious composition	5	1	2	5	3	5	2	5	5	5
Recent immigration	4	1	1	1	1	3	3	5	3	5
	3.3	1.3	1.5	3.0	1.8	3.0	2.0	3.3	2.5	3.3
Empowerment										
Sense of happiness	4	3	3	2	2	4	4	4	4	2
Influence to local events	3	3	3	3	3	3	3	3	3	3
Influence to general event	2	2	1	2	2	2	1	1	1	1
	3.0	2.7	2.3	2.3	2.3	3.0	2.7	2.7	2.7	2.0
	3.4	2.7	2.8	2.9	2.6	3.0	2.8	3.1	3.0	2.7