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Livelihood Assessment in Support to Formulation of Buffer Zone Management for the Tanintharyi Nature Reserve



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December, 2009

**တနင်္သာရီ သဘာဝကြီးဝိုင်း၏ ကြားခံနယ်မြေ စီမံအုပ်ချုပ်မှုဆိုင်ရာပြဋ္ဌာန်းချက်များ
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လေ့လာသုံးသပ်ခြင်း**

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တွဲဘက်ပါမောက္ခ
သစ်တောတက္ကသိုလ်

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Livelihood Assessment in support to Formulation of Buffer Zone Management for the Tanintharyi Nature Reserve

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Abstract

Protected areas remain a major focus for biodiversity conservation. However, the landscapes around protected areas are often characterized by biological and social dilemma due to conflicts between biodiversity goals and local livelihood strategies. The idea of buffer zone has been introduced to provide physical and social buffer for long-term integrity of the conservation of protected area. The Tanintharyi Nature Reserve (TNR) was designed to manage in according with recognized international best practices, appropriately adopted to the country's situations. Therefore, livelihood assessment of local communities was conducted in support to formulation of effective and efficient management of the Reserve in general and buffer zones in particular. Sustainable Livelihood Framework was adopted as conceptual and analytical framework. Both primary and secondary sources of information were collected. A combination of formal (quantitative) and informal (qualitative) survey method was applied in primary data collection to improve the quality of data and the strength of analytical conclusions. Triangulation was widely applied as way to cross-check information for accuracy in data analysis and interpretation. Key findings highlighted that: Creation of TNR is one of the main causes of landuse conflict; Livelihood asset of local communities is poor and unbalanced; Livelihood options are found to be limited and vulnerable and affected by policies, institutions and processes; Local people heavily rely on natural resource based livelihood; Natural resource degradation processes are noticeable; and External assistance for community development is inadequate. Based on these, recommendation for proper identification and regulation of buffer zones and provision of assistance for community development were made. It is in conclusions that local people are not a problem, but a solution for long-term conservation of TNR and that initial livelihood input are essential for enhancing self-help community development.

Key words: Buffer zone, Tanintharyi, Nature reserve, Protected areas, Livelihood, Landuse, Assessment.

Table of Content

1. Introduction.....	1
2. Literature Review	2
2.1. Modern concept of Protected Areas	2
2.2. Development of Buffer zone	3
2.3. Sustainable Livelihood Framework.....	5
3. Methodology	9
3.1. Formation of the survey team.....	10
3.2. Pilot survey	10
3.3. Conducting intensive survey	13
3.4. Data analysis and interpretation	13
4. Results and discussions	15
4.1. Description of the study area	15
4.2. Tracking livelihood asset status	18
4.3. Vulnerability context	21
4.4. Policies, Institutions and Process	27
4.5. Household livelihood strategies	30
4.6. Current landuse patterns	38
5. Conclusions and recommendations	46
5.1. Key findings.....	46
5.2. Recommendations	46
5.3. Conclusions	48
6. References	49

1. Introduction

The Taninthayi Nature Reserve (TNR) has been legally declared in 2005 as a managed nature reserve to conserve tropical rain forests and their constituent biodiversity in the Taninthayi region of the 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.

Buffer zones may fall either outside or inside the legal boundaries of the protected areas, serving two main functions: physical buffering for wildlife and social buffering for local communities. Buffer zones therefore provide a wide range of biological and social benefits. They serve as extended spaces of those habitats contained within the protected areas and thereby allowing larger total breeding populations of plant and animal species that could survive within the reserve alone. Likewise, they also provide social buffer for local communities by allowing extractive, but restricted use of natural resources to meet basic needs. A major function of social buffer is to ensure that local communities do not need to seek forest or other products preferably inside the protected area or particularly inside the core zones of the protected areas. Therefore, the primary management objective of buffer zones is to provide basic needs of local communities in sustainable basis. This objective essentially needs to be constrained by bio-physical requirement of the area to ensure sustainable use of natural resources and to maintain the function of physical buffering. Therefore, the extent of the buffer zones should be large enough to meet the requirement or provide a cash equivalent and location of buffers should also be accessible by local communities. Obviously, proper identification of buffer zones and formulation for its management needs to reflect the livelihoods (means of sustaining live and achieving well-being) of local communities.

Conceptually, livelihoods connote the means, activities, entitlements and assets by which people make a living. Livelihood assessment is therefore a way of looking at how an individual, a household, or a community behaves under specific conditions. One of the ways to understand livelihood system is the

analyses the coping (short-term response to a specific shock) and adaptive (long-term changes in behaviour patterns as a result of shocks and stresses) strategies pursued by individuals and communities as a response to external shock and stress such as drought, civil strife and policy failure.

Accordingly, livelihood assessment was conducted to meet the following specific objectives.

1. to track Livelihood Asset status of local communities
2. to specify Vulnerability Context (changes that affect local livelihoods)
3. to identify Policies, Institutions and Processes affecting local communities
4. to distinguish household Livelihood Strategies, and
5. to characterize the existing landuse patterns

2. Literature Review

2.1. Modern concept of Protected Areas

Conservation has sometime been thought of as a protective locking away of resources by a powerful elites who have time to enjoy the beauty of nature, an essentially selfish and anti-development activities. However, the contemporary conservation theory distinguishes conservation as a level of resource use that can be positioned along the continuum of two extremes of exploitation (active use) and preservation (no use). Particularly, conservation is a point along the continuum, which must be fixed by setting a balance between environmental requirement (long term goal) and societal requirement (immediate needs). Therefore, conservation essentially means to represent rational use of natural resources- no more than the combination of two principles: the need to plan resource management on the basis of accurate inventory and the need to take protective measures to ensure that resources do not become exhausted.

Designating large tracts of land as protected areas may be desirable from a conservation point of view, but it is simply not feasible for most circumstances. Fortunately, there have a range of protected area options, each with different management objectives and each permitting different levels of manipulation, including some which are totally protected. In addition to total protection areas, there are alternative categories in which for instance limited selective forestry, hunting or controlled livestock grazing is permitted. This may help to extend proper conservation practices over a much greater area. Thus, lands designated for productive forestry or hunting can be managed in such a way as to minimize loss natural gene pool, and give prime attention to the goals of nature conservation. By applying sensible criteria to the designation of each area and applying strict controls on use, the management options and responsibilities can be regulated. Having a range of the protected area options can provide enhanced protection to the strictly protected categories by removing human pressure to those areas where sustainable use is permissible.

Even in areas with generally compatible objectives, conflicts may arise during particular season or at specific sites. Such conflict can be avoided by implementing a rotation system with temporal restrictions and a zoning system with spatial restriction of activities in part or on whole of the protected area.

Obviously, provision of the immediate needs of local communities needed to be integrated into the management objectives for effective protection of protected areas. Since provisions of the immediate needs of local communities requires permission of extractive use while ultimate goal of protected areas require total protection of natural resources within protected areas, some of the management objectives may not necessarily be compatible. One way to accommodate the problem is to separate the functions by establishment of spatial zones. Zone is an area of specific management category distinguishable on account of its objective. This is to be accomplished through area specific objectives and activities. Accordingly, buffer zone has become a primary zone within a finite area of protected areas to interact with local communities.

2.2. Development of Buffer zone

Buffer zones are areas adjacent to protected areas, on which landuse is partially restricted to give an added layers of protection to the protected area itself while providing valued benefits to neighbouring rural communities (MacKinnon et al, 1986). Buffer zones may fall either outside or inside the legal boundaries of the protected areas, serving two main functions: physical buffering for wildlife and social buffering for local communities. Buffer zones provide extended physical buffer for wildlife by extending spaces of those habitats contained within the protected areas and thereby allowing larger total breeding populations of plant and animal species that could survive within the reserve alone. Likewise, they also provide social buffer for local communities by allowing extractive, but restricted use of natural resources within the zone to meet basic needs of local communities. A major function of social buffer is to ensure that local communities do not need to seek forest or other products preferably inside the protected area or particularly inside the core zones of the protected areas. Therefore, the primary management objective of buffer zones is to provide basic needs of local communities in sustainable basis. This objective essentially needs to be constrained by bio-physical requirement of the area to ensure sustainable use of natural resources and to maintain the function of physical buffering. Therefore, the extent of the buffer zones should be large enough to meet the requirement or provide a cash equivalent and location of buffers should also be accessible by local communities. Accordingly, the buffer zone does not necessarily need to be a thin linear strip following the boundaries of the protected area (MacKinnon, 1986).

In determining the type and extent of buffer zones needed, the following factors should be considered.

- i. The reasonable needs of local communities for land, grazing areas, forest products and/or meat

- ii. The amount of land available for buffer use, whether it is currently under natural or other vegetation, and whether it is vacant or being used
- iii. The need to contain wildlife species likely to move out of the protected areas itself or the core zones
- iv. The needs of additional habitat for threatened wildlife species (knowledge of the size and habitat of the species will give some indication)
- v. The needs to serve other protective function, such as soil and water conservation or fire protection
- vi. The suitability of possible buffer crops for the particular land types and climatic conditions and interests of local wildlife (for example, bananas or palm oils should not be planted if buffer zone is next to an elephant reserve, and maize would be unsuitable near macaque or baboons)

As a general rule, first priority should go to local communities requirements for harvestable products, second to protection needs for existing biophysical conditions, and third to cash crops. All planned buffer zones should adopt the following restrictions.

- i. Prohibit permanent settlement in buffer zones.
- ii. Prohibit burning of vegetation in buffer zones. (Highly inflammable crop, such as long grass, should be avoided. Exceptions may be permitted in natural tropical grass lands where species communities are adapted to regular fire.)
- iii. Prohibit introduction into the buffer zones of animal or plant species likely to invade or threaten the protected areas.
- iv. Prohibit any activities, such as poisoning or hunting within the buffer zones which are likely to endanger threatened species in the reserve.
- v. Avoid planting crops likely to encourage wildlife to forage outside the protected areas.

The main types of buffer zones for protected areas include: i) Traditional Use Zones inside protected areas, ii) Forest buffers, iii) Economic buffer, and iv) Physical buffer.

Traditional Use Zones inside protected areas. There are situations when no land exists outside the legal boundaries of protected areas for buffer zone establishment and it is preferable to permit collection of certain natural products from some parts of the protected areas or at certain time rather than have to excise valuable lands as buffers. Examples occur where local communities still lives within large protected areas or where landless people still need to have access to the natural resources inside protected areas for their subsistence. Such enclaves could be used to satisfy some of the needs of local people for forest products. Activities permissible inside traditional use zones include: fishing without poison or explosive; traditional hunting of non-protected species without traps, modern weapons or use of fire; collection of gum and resins provided trees are not killed in the process; gathering of wild fruits and honey provided trees

are not cut or burned; collection of personal use of naturally fallen wood for lumber or fire; cutting of bamboo, reeds, thatch or rattan; and seasonal grazing of domestic animals, where native grazing species are not important component of protected areas. There are also activities that must be strictly banned in traditional use zones within protected areas. They include: grazing of exotic or domestic animals liable to go feral; plantation of any kind; cutting of live trees; burning of vegetation; and permanent settlements (if these are inevitable, they should be zoned into enclaves.).

Forest buffer. These include fuelwood or timber forests outside protected area boundaries, but on public lands. These may be natural forests, enriched secondary forests or even plantations where the emphasis is on maximizing sustained yield for local use, while maintaining good soil and water protection. The encouragement of plantation forests in buffer zones is probably the single most effective resource management strategy for ensuring long-term integrity of protected areas themselves.

Economic buffer. Sometimes economic buffering is needed to reduce the needs of villagers to take resources from protected areas. This could take the form of special agriculture, social or communication assistance in lieu of, or as well as, provision of productive buffer lands. Other examples include cash tree plantations, and wildlife cropping outside protected areas boundaries, but on state land, where the emphasis is on maximizing cash returns to benefit local communities. Such buffer lands could be provided on the public or other land around protected areas if the necessary legislation exists. Alternatively, communities may receive some cash from revenues, a system applied in some African reserves (see MacKinnon, 1986). In some cases, hunting may be permitted or even beneficial in buffer areas adjacent to reserves provided that such hunting activities do not constitute a threat to reserves' objectives. Controlled hunting of excess animals or agricultural pests can be an important source of protein and recreation for local people, but the management authority must regulate which and how many animals are killed.

Physical buffer. Where no lands is available for buffer zone development, the boundary itself must serve as a buffer and there is sometimes a need for physical barriers such as fences, ditches, canals, walls or spiny hedges. These help discourage wildlife from leaving the reserve and deter people and domestic stock from entering. In some cases, all that may be required is a clearly visible boundary such as a cut trace line or single row or thin belt of distinct tree (bright leaves or flowers) as a living boundary.

2.3. Sustainable Livelihood Framework

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. The framework provides a way of understanding the factors that influence the ability of people to achieve sustainable livelihood in a particular circumstance. 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. It also provides an analytical structure, highlighting key components of livelihoods and making the complexity of livelihood more manageable (see figure 2.1).

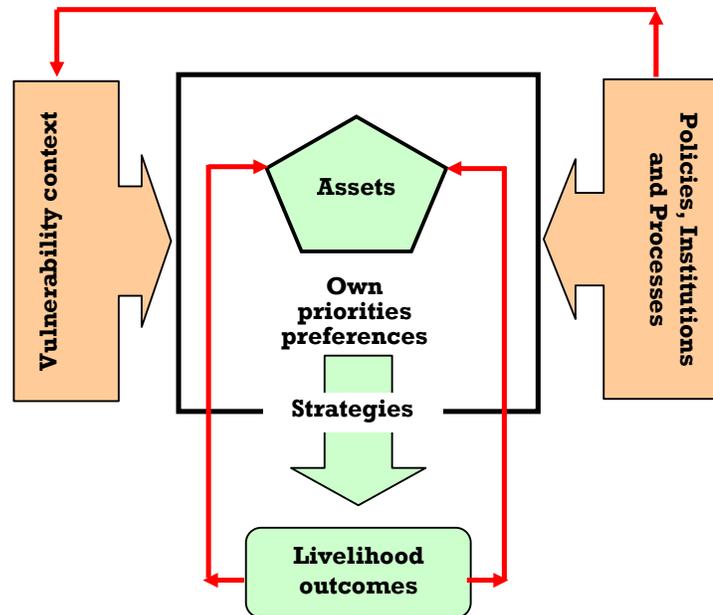


Figure 2.1 A simplified sustainable livelihood framework (modified based on DFID, 2000 and Messer and Townsleys, 2003)

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 regard 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).

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 2.2).

Natural capital: Natural capital is made up of the natural resources used by people: land, soil, water, plant, animal and minerals. They provide material goods and environmental 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 helps meet the needs of people through provision of access to other capitals via transport or infrastructure.

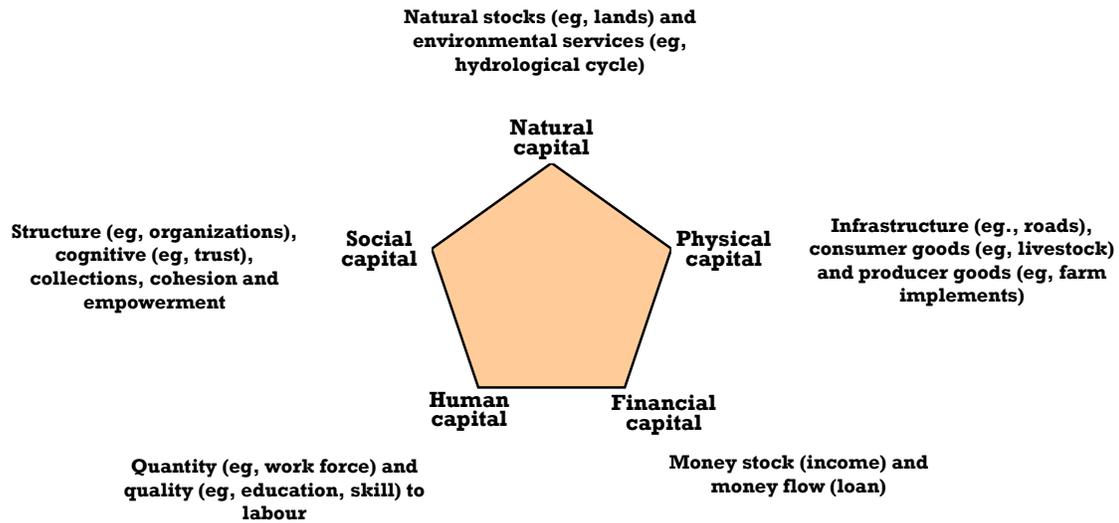


Figure 2.2 The livelihood asset pentagon

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).

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 risks. 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 compatible 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.

3. Methodology

The present assessment requires both quantitative and qualitative data of various socioeconomic aspects. Some data were gathered from the secondary sources such as project document, reports, working plan and other relevant literature. 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 listen 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-askers, 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.

3.1. 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, 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.

3.2. 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 | (e) Yepone |
| (b) Mayaungchaung | (f) Heinze |
| (c) Migyaunglaung | (g) Hnankye |
| (d) Zimba | (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.



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 was scrutinized 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. 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. In the pilot stage, a cluster of five households were randomly selected in each pilot village, amounting to a total of 40 households across the sample villages. 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.

3.3. 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 main and complementary) of the pilot survey were organized only in two added villages, but household interviews were conducted in all villages including the pilot villages. Again, 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. Therefore, a total of 140 households (40 in the pilot and 100 in the intensive survey) which represents 13% of all households over the study villages were included in final analysis of household level basic socioeconomic data.

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 in their livelihoods. Another important topic of discussion was coping and adaptive strategies in face of changes of various forms.

3.4. Data analysis and interpretation

The study used both qualitative and quantitative methods to analyze and interpret data in line with the SL Framework. 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 3.1](#) for triangulation process in the study). Moreover, various matrix-based tools were used in analyzing landuse conflicts and stakeholders involved.

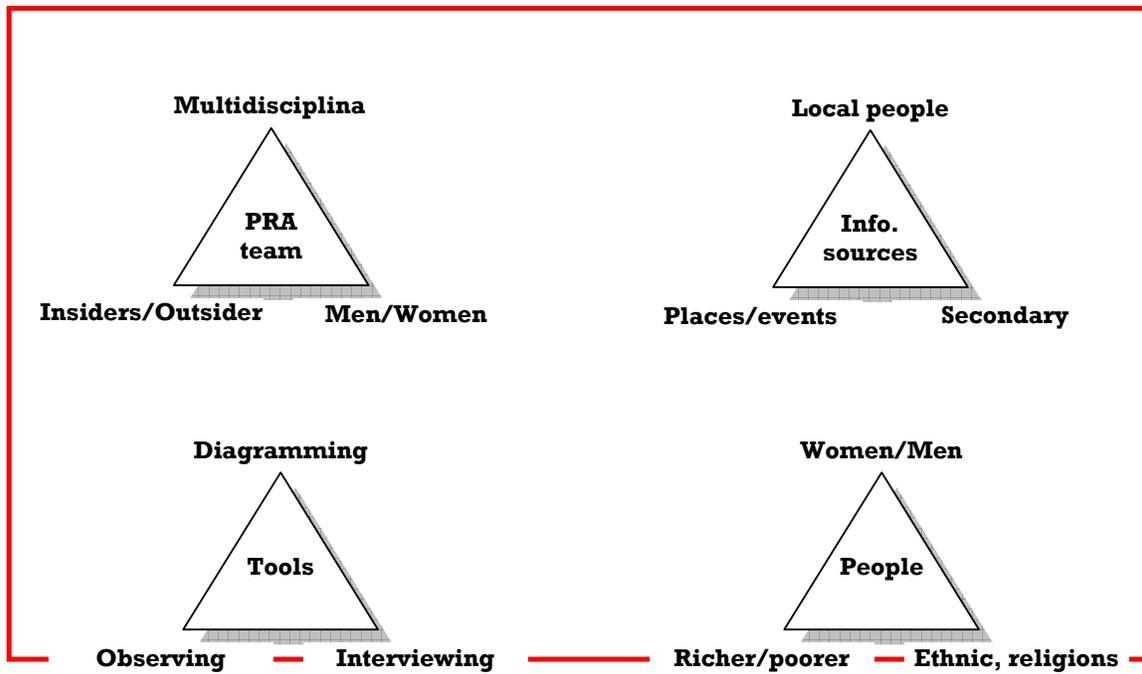


Figure 3.1 Triangulation in cross-checking information for accuracy in qualitative analysis in PRA exercises

4. Results and discussions

4.1. Description of the study area

4.1.1. Geography

Tanintharyi Nature Reserve (TNR) lies between the Dawei 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 under the jurisdictional boundaries of Yebyu and Dawei Townships, Dawei District of the Taninthayi Division, southern Myanmar. The location of TNR is given in [figure 4.1](#).

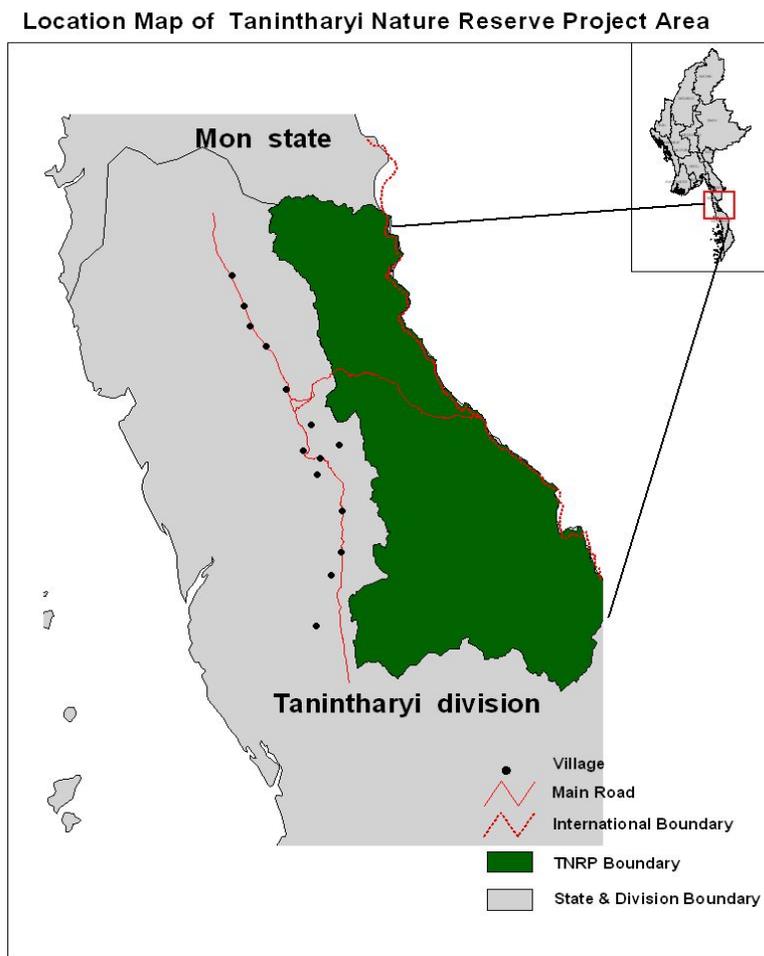


Figure 4.1 Map showing location of Tanintharyi Nature Reserve

TNR with a total area of about 1700 square km was notified as a Nature Reserve in 2005. It stretches over some fractions of three Reserved Forests, namely, the Kaleinaung, the Heinze and the Luwaing Reserve.

Most area around and inside TNR 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 seasons, with some difficulties in the rainy season. At the northern parts of the area, the road runs in the west side of, but 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 a high rainfall. According to the meteorological records of Dawei District, average annual rainfall is found to be 5,000 mm with an average annual temperature range of 25-28°C. There are about 145 raining days from May to October in a year. The hottest month is reported as March and the coldest as 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 forests were found in the lowlands. However, the areas mostly outside TNR have been seriously affected by human interferences. 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.

4.1.2. Demography

There is a long history of settlement around TNR and four ethnic groups (Kayin, Dawei, Mon and Bhama) 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. Nowadays, Dawei are the most dominant ethnicity, representing about 40% of the people residing in the area (see figure 4.2).

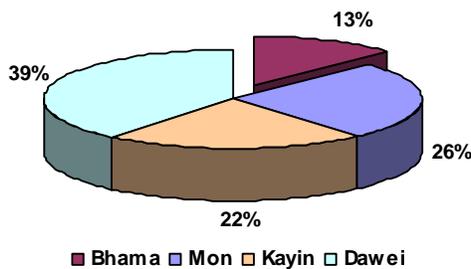


Figure 4.2 The ethnical composition of the area

Villages have inhabitants within a range of a maximum of 1078 (Yapu) to a minimum of 326 (Heinze). The average household size (members/household) of the area seems to be not very large, ranging from 3.7 (Heinze) to 6.4 (Yepon). The numbers of inhabitants, households and average household size of the study villages are given in table . 4.1. 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.

Table 4.1 Average household size of villages under investigation

	Ypu	Tym	Myc	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		Wpo= Wunpo		

Across the entire area, there are slightly more females than males, with the ratio of 45:54 (males to females). In general, overall sex ratio of 45: 54 indicates that reproductive potential of the area is fairly high. 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 table 4.2).

Table 4.2 Age distribution of the villages in question

	Village	0 - 5	6 -15	16-39	40-60	> 60	Total
<p>21% 5% 12% 23% 39%</p> <p>■ 0 to 5 ■ 6 to 15 ■ 16 to 39 ■ 40 to 60 ■ > 60</p>	Yapu	120	262	453	184	59	1078
	Tharyarmon	57	109	171	94	20	451
	Mayanchaung	71	49	251	61	39	471
	Migyaunglaung	77	110	175	64	26	452
	Zimba	93	195	285	80	16	669
	Kyaukshut	75	185	302	149	44	755
	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

The total fertility rate of 3.4¹ is observed over the entire area. 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. In average, age of women

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

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. 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. 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.

To gain insight into the population dynamics of the area, a relative population trend (figure 4.3) 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.

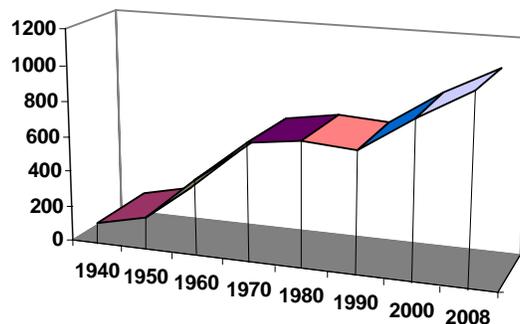


Figure 4.3 The relative trend of population dynamics in the study area

4.2. Tracking livelihood asset status

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. Summaries of assessment results for different villages are provided in table 4.3.

Table 4.3 Summarized results of livelihood assets status tracking of different villages

	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	3.1
Mmiddle zone average	3.5	3.0	2.8	3.7	2.9
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

When looking at the livelihood assets pentagon of the whole area in figure 4.4, 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 out of 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.

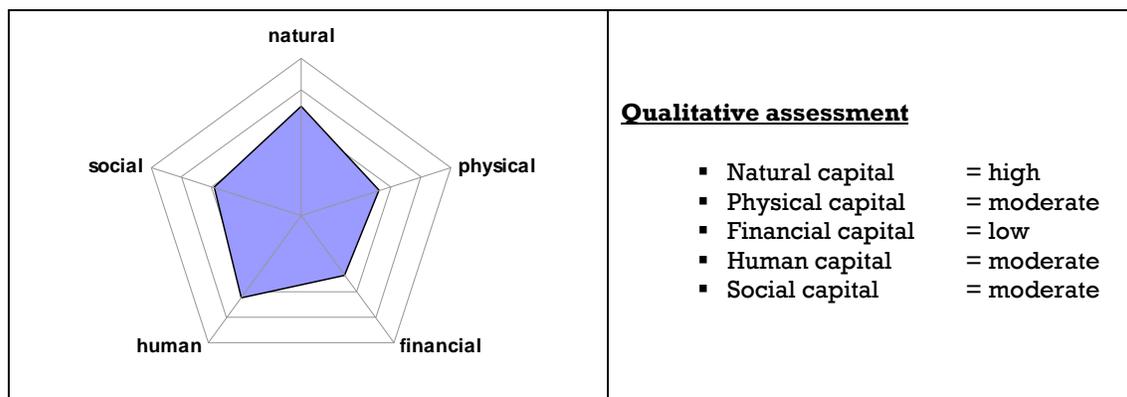


Figure 4.4 The livelihood assets pentagon of the entire area

Livelihood assets pentagon of the northern zone, the middle zone and the southern zone are given in figure 4.5. 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.

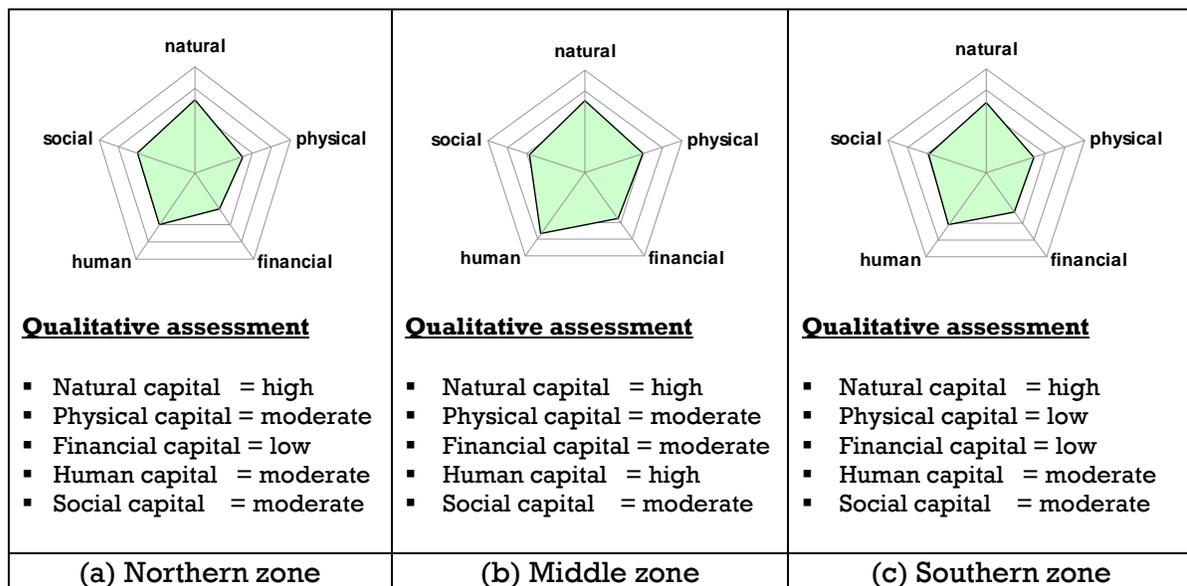


Figure 4.5 Livelihood assets pentagons of particular zones of the area

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.

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.

4.3. 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 faced high degree of risks for 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.

4.3.1. 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 potentials 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 couples 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 over-exploited; 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 systems 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 and 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 meats both in the communities and markets more restricted year after year. Such an increase in pray species might indicate signs of decrease in predator populations (especially tiger). 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, like electric shocks, mines and poisons. For the time being, tremendous efforts are necessary for a successful 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 incomes. The most prevailing socioeconomic problems identified in a series of community meeting are listed in [table 4.4](#) Coping and adaptive strategies of local people for the most seriously perceived problem of “no regular jobs” were mentioned in participatory problem analysis in Yepon village ([Box 4.1](#)).

Table 4.4 Most prevailing socioeconomic problems in villages under study

Problems	Scores										Total scores	Rank
	Yapu	Tharyarmon	Mayaungchaung	Miyyaunglaung	Zimba	Kyaukshut	Yepon	Heinze	Hnankye	Wunpo		
No regular job	-	7	-	-	9	10	10	-	5	10	51	I
Restrictions on cutting bamboos & woods	-	-	-	6	10	4	3	9	10	5	47	II
Land scarcity	-	6	-	9	-	8	-	10	9	-	42	III
Health problem	-	10	-	-	-	-	9	7	-	8	34	IV
High prices of basic commodities	-	-	-	-	-	9	3	7	5	-	24	V
Wildfire	-	-	-	10	-	7	6	-	-	-	23	VI
Water supply	-	8	-	-	-	-	8	-	-	6	22	VII
Crop yield fluctuation	-	-	9	-	-	-	7	-	-	-	16	VIII
Difficulties in transportation & communication	-	9	-	-	-	-	-	-	-	7	16	VIII
Reclamation of farmlands	-	-	-	-	7	-	-	-	-	4	11	IX

Remark: the most serious problem perceived by residents of respective village is scored of 10 points.

Box 4.1 Problem Analysis: no regular job (Yepon village)

No regular job

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

4.3.2. 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 areas 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.

Wildfires 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 wildfires are outbreak, it is very difficult to suppress them 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 wildfire control (**Box 4.2**)

Box 4.2 Problem Analysis: wildfire 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 labours to create their livelihood into a great debt. It is also not uncommon that people died of malaria. If this happens to the family head, the remaining members of the family will completely 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.

4.4. 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, organizations, 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 (gateway) 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, hence underlying livelihood sustainability. Thus, an insight into these processes is also a key to finding entry point of interventions.

4.4.1. 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, socio-cultural 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 Buddhists 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 deaths. 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 4.6** particularly outlines organizational relationships of Yepon village and generally provides clues on that of other villages.

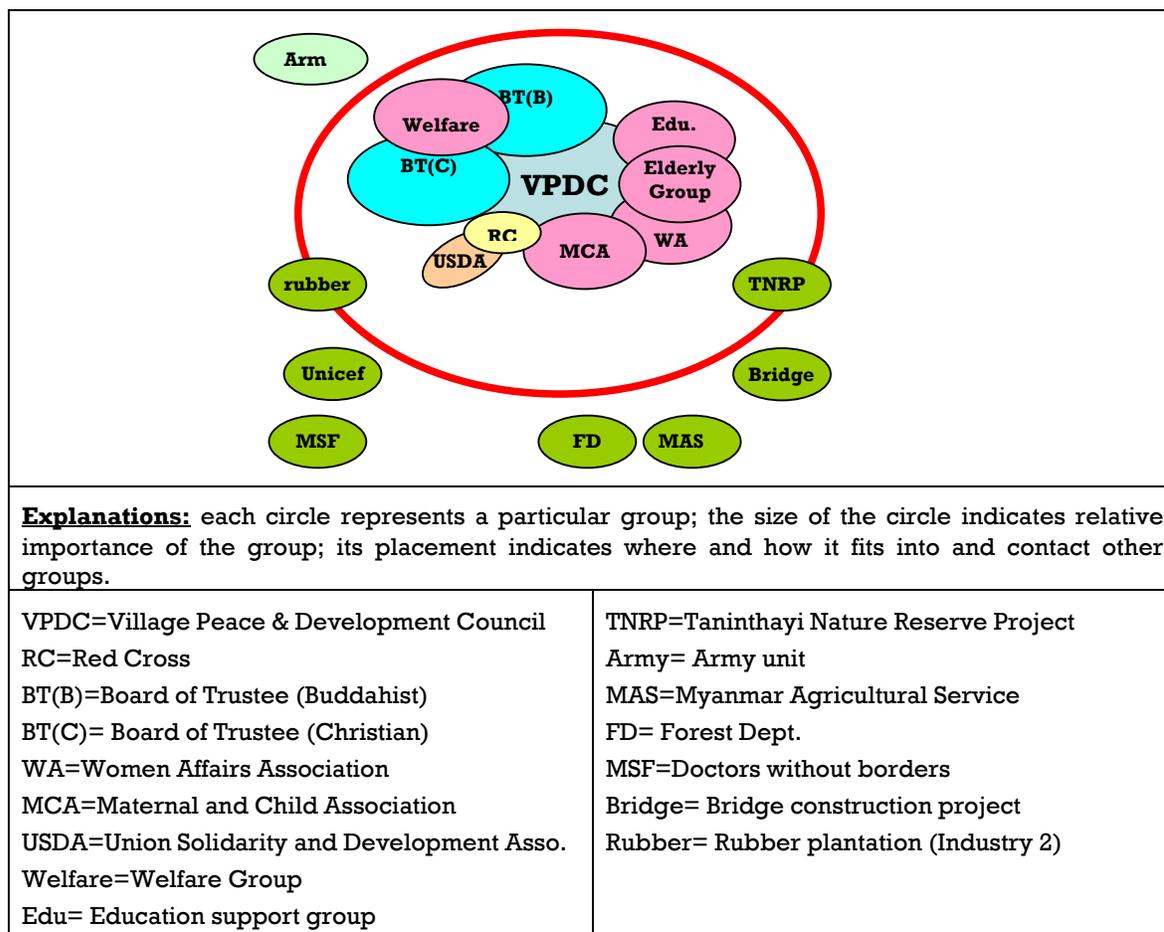


Figure 4.6 Venn diagram showing organizational relationship within Yepon village

4.4.2. 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 leaders (official or customary).

4.4.3. 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 the National Forest Policy, the Ministry of Forestry, the Forest Department, the 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 4.3**).

Box 4.3 Problem Analysis: denying access to nearby forests (Zimba village)

Denying access to nearby forests

Causes:

- 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 community
- To permit mining concession for villagers

4.4.4. Agricultural commercialization

Another policy level institution is agricultural commercialization process in the area. Agro-climatic conditions of the Taninthayi 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 4.4) exemplified the problem and solutions.

Box 4.4 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

4.4.5. 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.

4.5. Household livelihood strategies

With limited resources at their disposal, possible risks and uncertainties, people of the area have to pursue different strategies in order to make livings. 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 4.5)

Table 4.5 Livelihood composition of study villages (by households)

Village	Shift-culti	horticul	Lowland	Odd-job	Other	Total
Yapu	20	112	1	25	35	193
Tharyarmon	41	34	4	25	-	104
Mayaungchaung	29	30	5	19	1	84
Michaunglaung	37	20	-	10	7	74
Zimba	50	30	10	34	15	139
Kyaukshut	15	86	-	46	11	158
Yepon	14	66	-	20	7	107
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

The pie chart illustrates the distribution of livelihood strategies across the study villages. Horticulture is the most prevalent strategy at 44%, followed by Odd-job at 23%, shifting-cul at 20%, Other at 9%, and Lowland at 4%.

These principal strategies pursued by the households generate different productive results, contributing to different levels of utilization. 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 4.7** illustrates principal livelihood strategies of the households of the villages and their contribution to different utilization 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.

4.5.1. 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 residing in villages under the 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 4.6**.

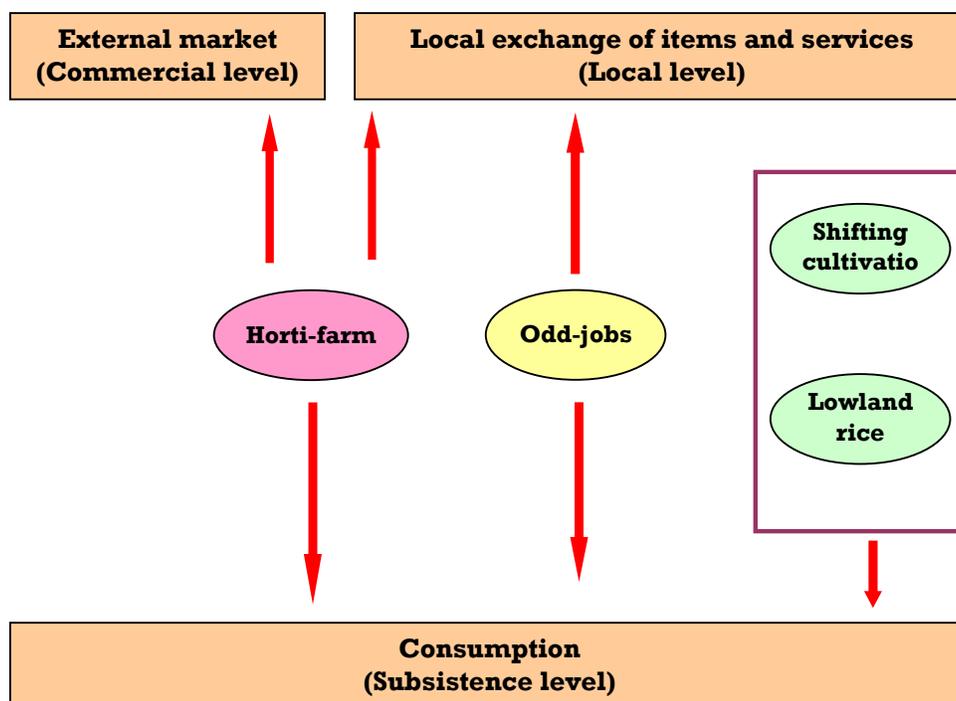


Figure 4.7 Principal livelihood strategies of local people around TNR

Table 4.6 Major characteristics of horticultural farming households

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)	100.0	-	80.0	300.0
Cashew: per acre yield (viss)	200.0	-	100.0	300.0
Rubber: per acre yield (lb)	10.0	-	-	-

Remarks:

- 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 moisture, thus are 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 tree up to the age of more than 50 years. Hence, a betel palm can make about 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 100-300 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, they demand 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 became eager to invest 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.

Horticultural farming households also pursue secondary activities for more desirable livelihood outputs. A portfolio of activities usually taken by horticultural farming households is given in [figure 4.8](#).

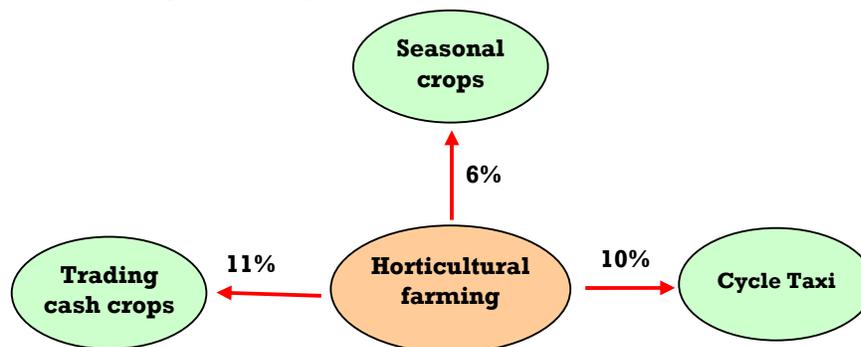


Figure 4.8 A portfolio of livelihood activities constructed by horticultural farmers

4.5.2. 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%). Major characteristics of shifting cultivator households are given in [table 4.7](#).

Table 4.7 Major characteristics of shifting cultivator households

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

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 4.9](#).

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.

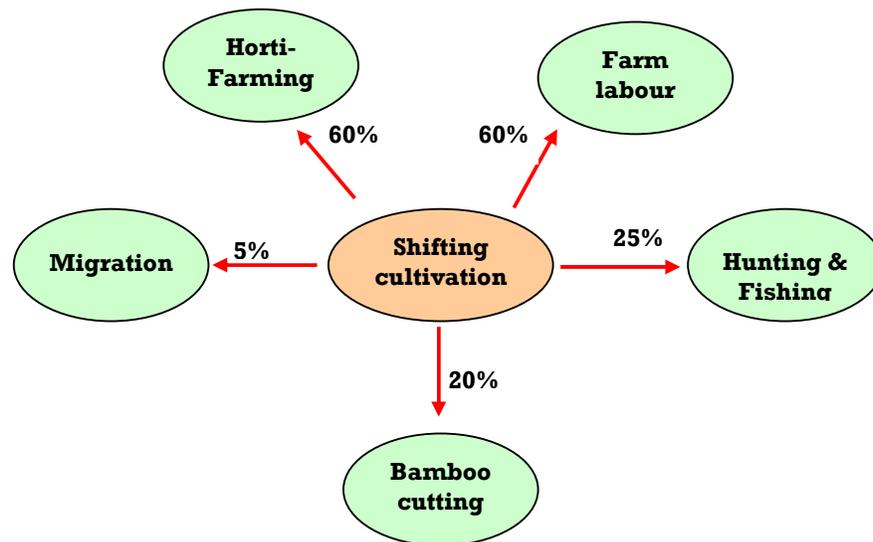


Figure 4.9 Livelihood diversification model of shifting cultivators

4.5.3. 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 the 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. 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 4.8 for major characteristics of lowland rice growing families).

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 4.10).

Table 4.8 Major characteristics of lowland rice cultivator households

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

Remarks:

- 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.

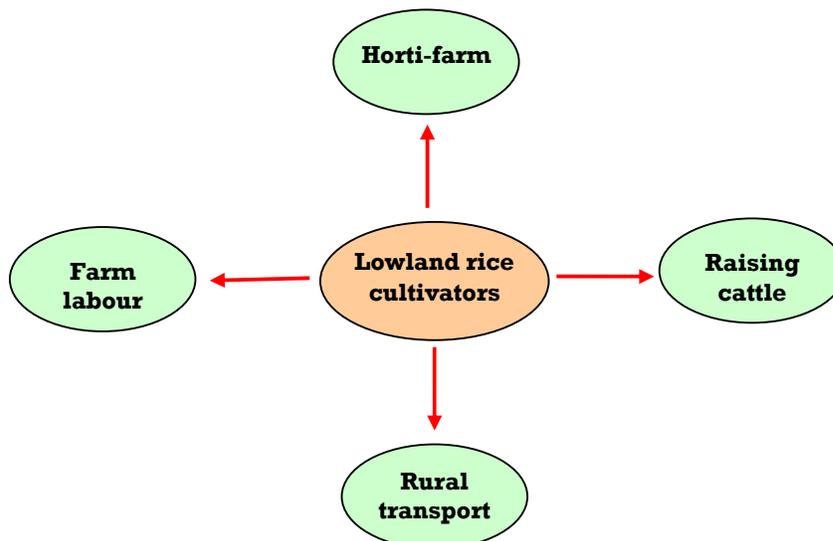


Figure 4.10 Livelihood diversification model of lowland rice cultivators

4.5.4. Odd-jobs

Odd-job working is another principal livelihood strategy constructed by many of households in the area. Community level data shows that 23% of households across the sample villages are connecting to the odd-jobs. The household level survey covers 31 respondents that represent 13% of all odd-job workers from the villages under the investigation. Most of them (around 80%) 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 average, every working member supports about 1.3 nonworking ones. This reveals

burdens of these households in making their livings (see table 4.9 for major characteristics of sample odd-job workers).

Table 4.9 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

Remarks:

- Sample size= 31 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 4.11 demonstrates various activities pursued in different combination by odd-job workers.

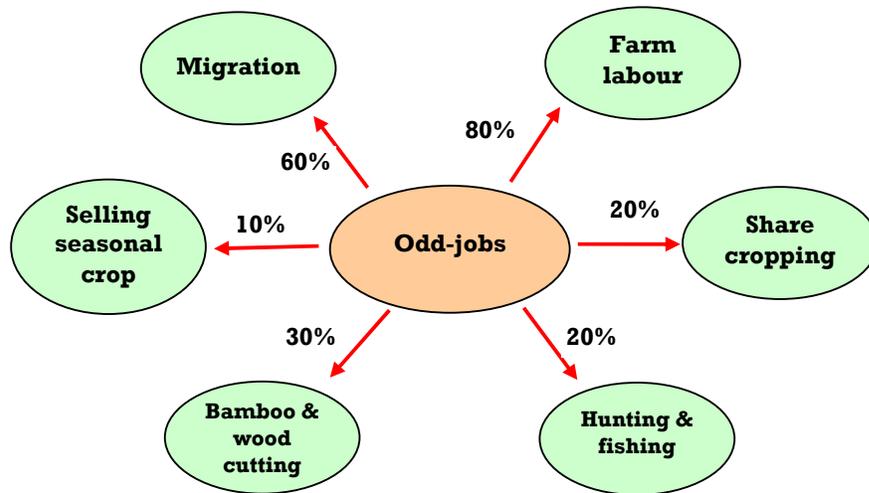


Figure 4.11 Livelihood diversification model of odd-job workers

4.5.5. 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.

4.6. 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 village 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 areas stretching over 10,570 acres around Migyaunglaung and 7,306 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 designated areas. 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 then 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 open-access 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 covered 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 4.12) laid down with some local knowledgeable persons represents a typical landscape outside TNR in the northern part.

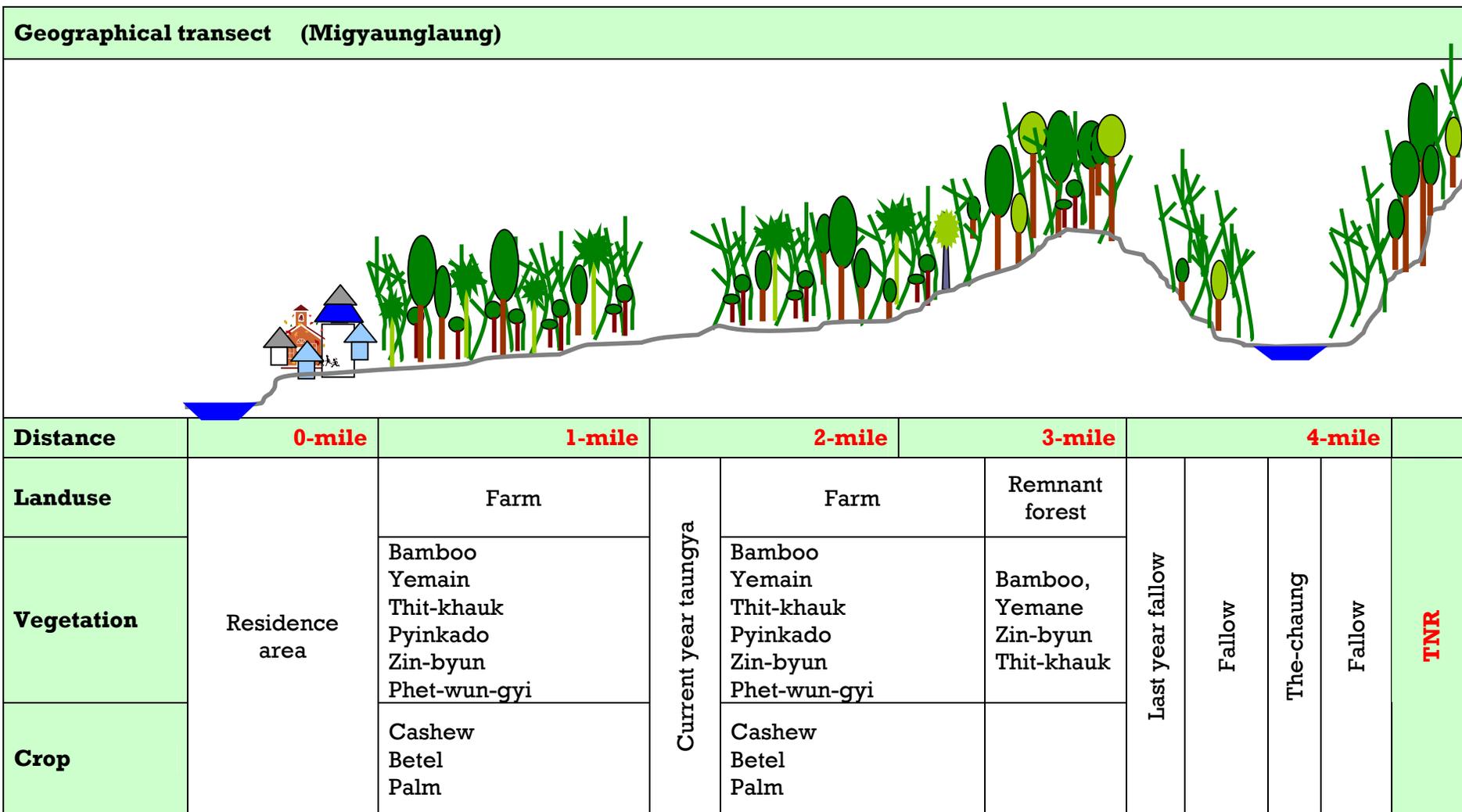


Figure 4.12 Geographic transect between Migyaunglaung village and TNR boundary

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 reserves 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 practices and assumed 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 titles 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 4.13).

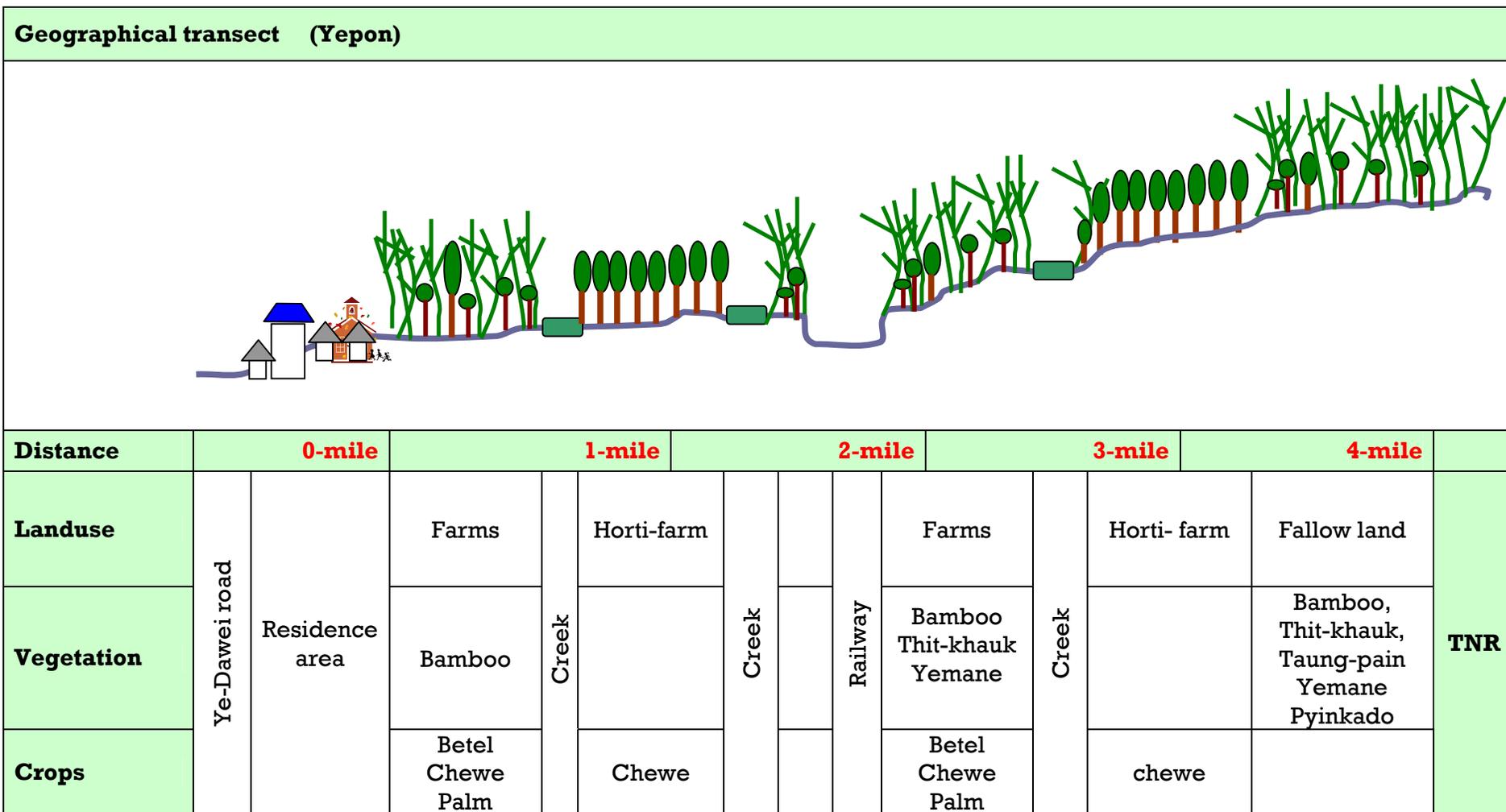


Figure 4.13 Geographic transect between Yepon village and TNR boundary

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 appears 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.

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.

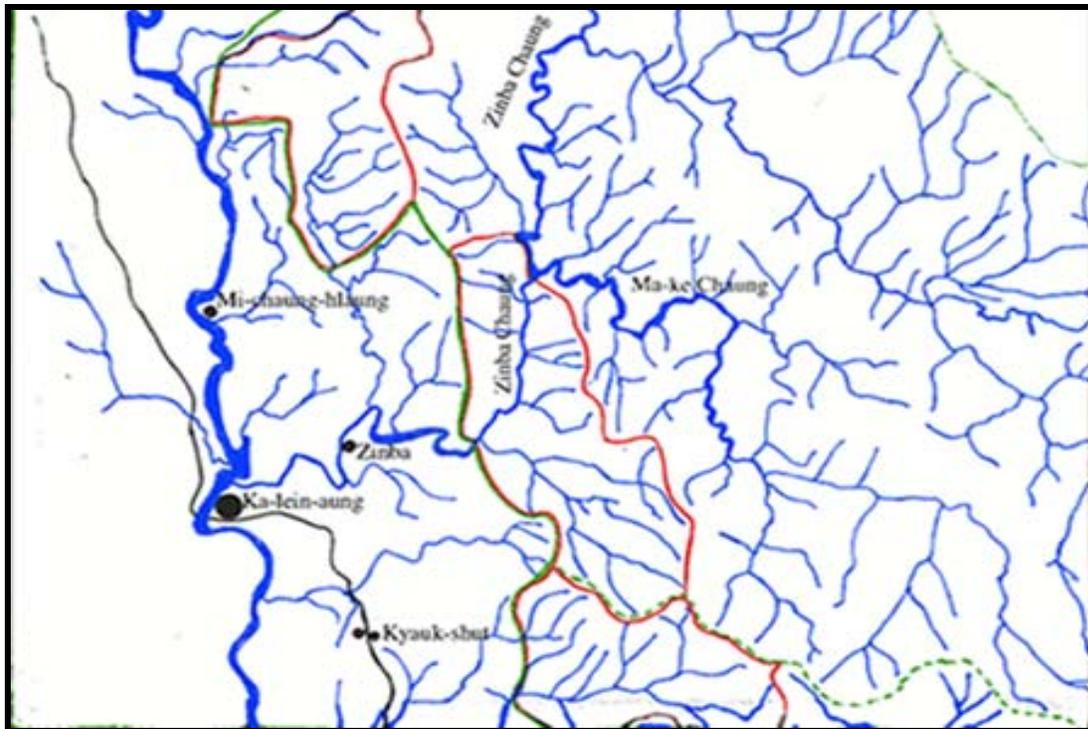
In this connection, local people normally exploit the lands elsewhere inside TNR even far upstream areas. More preferably, gentle sloping grounds, usually near the streams, within a short distance from villages are selected for convenience of transporting products from the working sites back to the villages. 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 appreciable, but much more similar to deserted tracts. Thus, a number of small patches of fallows and deserted 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 bringing 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 inevitably 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 money-making. 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 interviews and informal discussions in 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 terrains were rather rough and steep; vegetation cover was quite sparse and 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, traditional use zones inside TNR were identified for Migyaunglaung, Zimba, Kyaukshut ([figure 4.14](#)), Yepone and Hnankye village ([figure 4.15](#)).



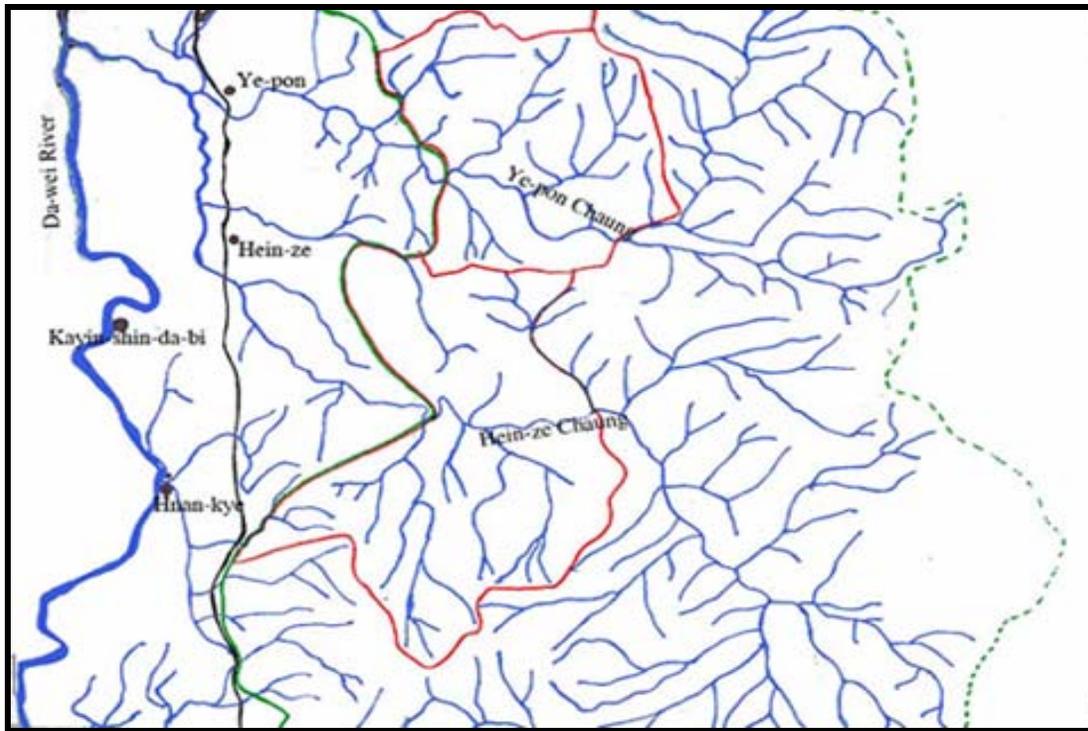
(a)



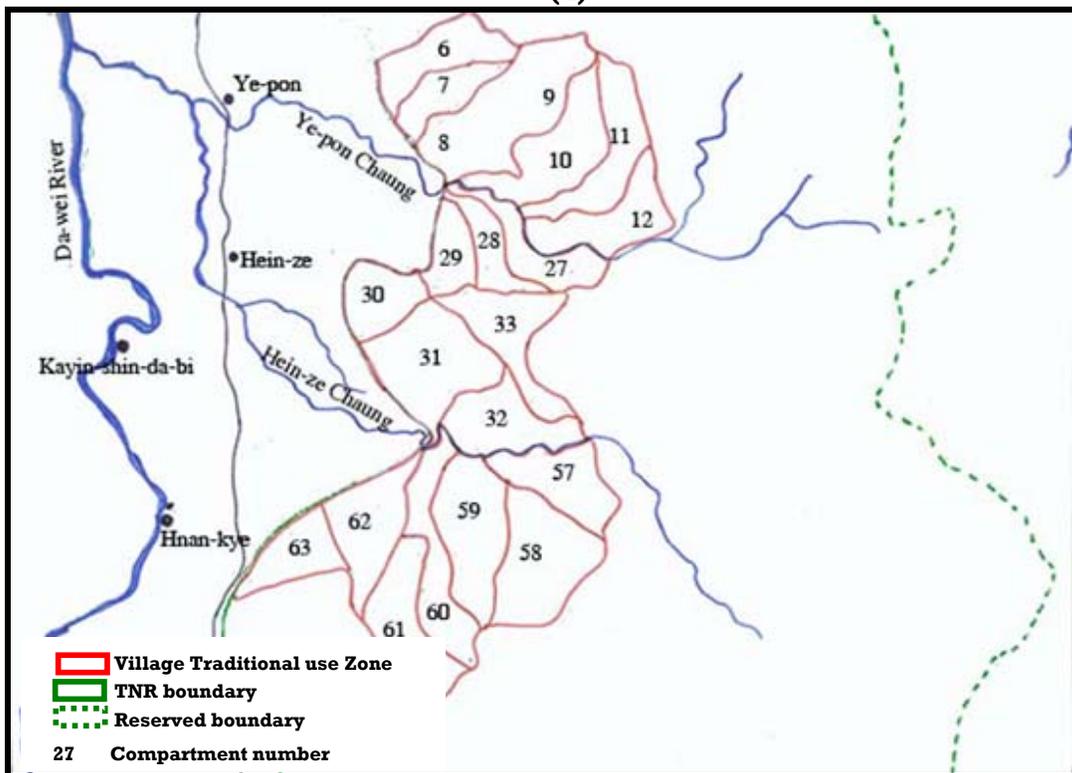
(b)

Scale 1 inch : 1 mile

Figure 4.14 Map showing village traditional use zones of Migyaunglung, Zimba and kyaukshut village (a) location of the zones and (b) detail descriptions of the zones



(a)



(b)

Scale 1 inch : 1 mile

Figure 4.15 Map showing village traditional use zones of Yepon, Heinze and Hnankye village (a) location of the zones and (b) detail descriptions of the zones

5. Conclusions and recommendations

5.1. Key findings

A lengthy discussion mentioned earlier can be summarised into following key findings.

- Creation of TNR is one of the main causes of landuse conflict in the area.
- Local people with low capital asset endowment heavily rely on natural resource based livelihood strategies.
- Local communities have traditionally used some areas inside TNR for shifting cultivation, cutting bamboo and small timber, subsistence hunting and fishing.
- Severe degradation of lands and forest resources are noticeable in the area due to shifting cultivation and indiscriminate cutting.
- Devastating wildfires are frequent.
- External assistance for community development is inadequate.

5.2. Recommendations

RNR is established in reflect to regional and national significance for biodiversity conservation. However, it is obvious that creation of TNY is one of the main causes of landuse conflict in the area. Most of the local people are landless poors who need to use natural resources inside TNR for their subsistence and income. Threat of subsistence hunting is found to be relatively high. Land and forest resource degradation is noticeable while wildfires are frequent. However, community development activities are rather limited. In these situations, regulatory approach with resource-oriented outlook to biodiversity conservation will not properly work for TNR. TNR needs to be managed in a way that brings not only long-term benefits to regional and national level but also immediate benefits to local communities. Local people are not problems, but solution to the prevailing conservation issues of TNR. Obviously, provision of the immediate needs of local communities needed to be integrated into the management objectives for effective protection of TNR. To accommodate incompatible functions of utilization (passive use) and preservation (no use), identification of buffer zones in appropriate areas outside or inside is essential. Accordingly, following management and development interventions are recommended for effective and efficient management of buffer zone in order to support long-term integrity of TNR.

Identification and regulation of buffer zones

-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 areas inside TNR where local people traditionally used for gathering forest products and subsistence hunting to provide social buffer
- to demarcate the "**physical boundaries**" of the external and internal buffer zones based on natural features which can be easily recognizable in the ground (such as ridges and streams) and publicize using posts, pillars, sing-board, blazes ect.
- to regularize gathering of forest products and fishing and hunting of non-protected fish and wildlife species inside the internal buffer zones by developing "**traditional landuse agreement**" to guarantee long-term access to resources to bona fide traditional users on a sustainable basis
- to encourage "**collaborative forest management**" in the internal buffer zones to support participatory rehabilitation of degraded lands and ensure sustainable harvest and regular income from remnant secondary forests
- to formulate an appropriate "**Community Forestry**" scheme so as to reorganize existing agricultural farms inside the external buffer zones for ensuring tenure security and stabilizing landuse
- to introduce "**Agroforestry**" practices by establishing demonstration plots at strategic places with different design reflecting environmental, economic, social settings of the areas for providing self-evidence for communities
- to develop a proper "**administrative mechanism**" (for example, Landuse Supervision Committee) for collaborative conflict management of land disputes in the external buffer zones through active participation of all key stakeholders

Community Development (for improving livelihood asset endowment)

- to upgrade local Operating Units (LOU) as "**Community Resource Centers**" for providing assistance and information concerning utilization, conservation and management of natural resources
- to support for improving portable "**water supply**"
- to create a "**soft-loan system**" for improving access to credits
- to create "**income-generating opportunities**" by encouraging production of value-added products with a attractable market using local resources such as bamboo, cane, betel nut shells and so on
- 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 launch an "**awareness campaign**" for concept, principles, rules and regulation of wildlife conservation and establish community policing practices in order to make certain co-operation of communities in efforts to enhance law enforcement

- to conduct a series of training courses on value-added production, community forestry and Agroforestry, rural enterprise management
- to coordinate with different organizations (both Government and non-Government) for improving "**external supports**" for community development

5.3. 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 quite 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 forest 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 regional and 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 term self-help community development.

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