Shifting Cultivation in Myanmar:

Case Studies from Southern Chin State and Bago Division

POINT,
August 2015

"Shifting cultivation is our customary practice, our culture and our life. Through this we earn our livelihood. We are happy when we are in our farm because we love farming; we love the beauty of the farm and crops we cultivated. So we would like to carry on our customary way of life of shifting cultivation."

Villager, Taungya Village D, Bago Division

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Promotion Of Indigenous and Nature Together
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Norad

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Abstract

Shifting cultivation is an important livelihood strategy of millions of people in Myanmar. Various ethnic groups throughout the country practice unique styles of this system, which are adapted to their specific local ecological and social conditions. In Myanmar, an estimated 2 million families depend on shifting cultivation for their livelihoods.[1] Despite its continuing importance to many people's livelihoods in Myanmar, shifting cultivation has not been officially recognized and supported in Myanmar to date. This study was carried out in order to promote a better understanding of this type of agro-forestry system and to feed into the current policy and legislative discussion about land governance—which is central to Myanmar's current reforms. The research objectives include the following:

a. To understand how shifting cultivation is carried out, and the value it contributes to local livelihoods
b. To give a basic understanding about shifting cultivation as there are still popular prejudices against shifting cultivation, in particular the perception that it leads to deforestation
c. To derive recommendations from the findings in order to contribute to policy discussions about ethnic customary land use systems

This comparative field research covers the Taung Nyo mountain range in Western Bago Division and Kanpetlet Township in Southern Chin State and demonstrates the diversity, challenges and strengths of Myanmar's shifting cultivation systems. This paper describes the environmental conditions and management strategies employed in both cases, including ecological and climatic conditions, crop choice, seasonal and annual livelihood patterns, and community governance of land allocation and use.

The cases show that shifting cultivation does not, by itself, lead to deforestation when there is sound regeneration of the forest due to systematic practice of shifting cultivation and a long enough fallow period of about 8 to 9 years in Kanpetlet. However, challenges such as climate change, population growth and other factors, such as illegal logging in Bago and the orchid trade in Kanpetlet, have in recent years contributed to deforestation.

These cases highlight the need for more research on shifting cultivation systems throughout the country, as well as for policies that recognize and support existing systems while supplementing traditional livelihoods strategies in response to new pressures. The study concludes that shifting cultivation is essential for communities' livelihoods, food security, social and cultural institutions. The recognition and protection of this system by law is crucial for food security, maintaining of culture and customary good practices and their identity.

[1] Dr. San Win, Investigation on Shifting Cultivation Practices Conducted by the Hill Tribes for the Development of Suitable Agroforestry Techniques in Myanmar, December 2014, p 7.

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1 Introduction

1.1. Environmental and Political Context

Myanmar is the largest country in mainland Southeast Asia with an area of 676,557km^2. The country is located between the two most populated countries of the world, India and China. It borders Bangladesh and India to the northwest, China to the northeast, Laos and Thailand to the southeast, and the Andaman Sea to the south and west.[2] Except for the two valleys of the Ayeyarwaddy and Sittaung rivers located in central and lower area of the country, the remaining areas are mostly hilly and mountainous. The hills and plateaus occupy two-third of the area of the country.[3] The highest point of the country is mount Hkakabo Razi in Kachin state with an elevation of 5,882 m (19,295ft).[4] There are several mountain ranges in Myanmar, namely the Rakhine-Yoma, the Bago-Yoma, and the Shan Plateau which generally run from north-to-south from the Himalayas. The average elevation of the mountains in the western range (Rakhine-Yoma) is around 1,800 meters (6,000 feet), although some peaks rise in height to 3,000 meters (10,000 feet) or higher. The average elevation of the Shan plateau is between 1,800 and 2,600 meters (6,000 to 8,600 feet). The average maximum length of the country from north to south and, its width from east to west are 2,090 and 805 km respectively. Four main rivers: the Ayeyarwaddy, the Chindwin, Sittaung and the Than Lwin flow from north to south and all are navigable.

Myanmar is located in the monsoon region of Southeast Asia, but its climate is greatly modified by its geographic position and its topographical relief. Most of Myanmar lies between the Tropic of Cancer and the Equator. The tropical south covers two-third of the country and the sub-tropical and temperate north covers the remaining one-third. The monsoon winds cause two distinct seasons: the dry season from mid-October to Mid-May, and the wet season.[5] The rainy season lasts approximately from mid-May to end of September or early October. The rainfall in the northern and southernmost areas is as high as 2,500 mm. However, central Myanmar is a rain shadow area with a rainfall less than 1,000 mm. The cold season lasts from the month of November through January with less or occasional rain. Starting from February, the temperature increases gradually reaching a maximum in May up to as high as 40 degree Celsius or more.

There are 14 administrative regions in the country: Seven States, namely Chin, Kachin, Kayin, Kayah, Mon, Rakhine and Shan, and Seven regions, namely Ayeyarwady, Bago, Magway, Mandalay,

[2] *National Biodiversity strategy and Action Plan (2015_2020),* prepared by forest department and consulted by IUCN, October 2015, p 1.

[3] Ibid., p 20

[4] R. Lee Hadden, *The Geology of Burma (Myanmar): An Annotated Bibliography of Burma's Geology, Geography and Earth Science,* Alesandria, Virginia: Topographic Engineering Center (TEC), September 2008, p 6.

[5] Ibid., p 7-8.

Sagaing, Tanintharyi, and Yangon. Nay Pyi Taw is the capital of Myanmar. The names of the States are based on the names of predominant ethnic nationalities (e.g. the Chin nationality in Chin State). According to the result of the 2014 census, the total population of Myanmar is 51 million.[6] Agriculture and forestry industries are the mains sectors of Myanmar's economy and 75% of the total population live in rural areas.[7]

1.2. What is shifting cultivation?

Shifting cultivation has been practiced in Europe until the middle of the 20th century, and the method is still prevailing in many tropical countries worldwide. 15% of the population in the Asia-Pacific region is considered "forest-dependent," and many of these are shifting cultivators.[8] Shifting cultivation is practiced throughout the ASEAN, especially in upland areas. Both Cambodia and the Philippines provide legal mechanisms for recognition and support of shifting cultivation systems. In Laos, there is some recognition of customary forest use rights and rights over agricultural plots. Drafts of the National Land Use Policy and Land Law in Laos recognize customary land rights and allow for communal titles, but it is still in the process of piloting to integrate it within the state legal system.[9]

The term shifting cultivation is used interchangeably with the term 'swidden' agriculture. It is a land use method characterized by a short 'cultivation phase' of a few years followed by a relatively longer 'forestry phase', usually referred to as the 'fallow'.[10] When clearing a field, the standing vegetation is cut down and then burned, its ashes enriching the soil. In shifting cultivation, after cultivating the field for one or two years the fertility of the soil is reduced and weed control more difficult, thus cultivators leave the field to fallow and move to another plot. A long fallow period allows the forest, and critically, soil nutrient, to regenerate in the field, which is essential to ensure sustainability in the shifting cultivation cycle.

Generally, fallows of medium duration are preferred (7 to 10 years) because that is a good compromise between the amount of labour needed for clearing a field on one hand and the level of soil fertility and labour needed for weeding on the other hand because one of the main functions of fallow is not just to restore soil fertility but to eradicate weeds. Older fallows have more fertile

[6] *Summary of the provisional results: The population of Housing census of Myanmar,* 2014. http://countryoffice.unfpa.org/myanmar/drive/SummmaryoftheProvisionalResults.pdf (Accessed on 24 August 2015)

[7] *Dr. San Win, Investigation on Shifting Cultivation Practices Conducted by the Hill Tribes for the Development of Suitable Agroforestry Techniques in Myanmar,* December 2014, p 2.

[8] *"The Future of Swidden Cultivation in Myanmar,"* presentated by Dr. Oliver Springate-Baginski & Professor San Win for Customary Land Tenure Workshop, Nay Pyi Taw, Februarcy 2015.

[9] Presentation of Jeremy Ironside (MRLG project) on *"the Recognition of Customary Land Tenure in Loas PDR",* on February 22, 2016.

[10] K.P. Aryal and E.E. Kerkhoff, T*he right to practice shifting cultivation as a traditional occupation in Nepal: A case study to apply ILO Conventions* Nos. 111 (Employment and Occupation) and 169 (Indigenous and Tribal Peoples), 2008. p 8.

soils and less weed but it takes a lot more work to cut, burn and prepare the field properly.[11] In shifting cultivation, the longer fallow period is better for the regeneration of trees and soil. While specific planting and fallow periods vary from site to site, this pattern of short periods of cultivation followed by natural regrowth of forest over a longer period is characteristic of this agricultural system. During fallow period soil fertility, weeds and trees are regenerated. According to Wallace's understanding of agro-ecology, the swidden landscapes had the right amount of human industry to produce a 'patchy' environment and, thus, an abundance of insect life.[12] In swidden systems, crops are typically integrated into fallows and not just the early cultivation stage. Many traditional swidden systems also include rules to avoid contaminating water or destroying watersheds. According to the well-studied case of the Karen, their upland-rice swidden systems are a sustainable management of forests.[13] There are studies conducted decades ago which showed that the shifting cultivation system is ecologically sound, meets a great variety of human needs and is highly productive in terms of total yields measured in calories produced per unit of labour spent.[14] However, due to different factors, such as increases in land scarcity because of population growth, immigration, land grabbing and other external interventions, fallow periods are shortening in many areas. In some areas, owning to external interventions such as legal and illegal logging and wild fires, deforestation is taking place in indigenous areas. A lack of understanding and appreciation of existing comprehensive and reliable research on shifting cultivation results in the continuing accusation of shifting cultivation as a main driver of deforestation and biodiversity loss.

1.3. Overview of Shifting Cultivation Policy in Myanmar

In Myanmar language, shifting cultivation is called "shwe pyaung taung ya" " which literally means "moving hill-farm", or in short "taung ya" ("hill farm").[15] Shifting cultivation practice is the dominant agricultural system in Kachin, Kayah, Kayin, Chin and Shan states but is also practised in other states and regions of Myanmar. In 1993 the Forest Department of Myanmar estimated that 22.8% of the total land area of Myanmar is subject to shifting cultivation and that approximately 2 million households practised shifting cultivation. This 22 year old data still continues to be cited in various reports however it is not clear how this data was derived.[16] Almost 72% of Myanmar's total population is rural and 42% out of the 72% of the rural population lives in upland areas. According

[11] *Christian Erni, ed. Shifting cultivation, livelihood and food security: New and old challenges for Indigenous peoples in Asia,* Bangkok: Asia Indigenous peoples' Pacts, 2015, p 7

[12] Malcolm F. Cairns, ed., *"Shifting cultivation and Environmental change: Indigenous peoples, agriculture and forest conservation",* (London and New York: Routledge, Taylor and Francis Group, 2015), page 26-27. Article 2. Shifting cultivators and the landscape: An essay through time by Harold Brookfield. p 19.

[13] Ibid., p. 73.

[14] Christian Enri, ed. *Shifting cultivation, livelihood and food security: New and old challenges for Indigenous peoples in Asia* (Asia Indigenous Peoples' Pacts, Bangkok: 2015), p 8.

[15] In English, both "shifting cultivation" and "rotational farming" refer to the same set of practices, the latter emphasizing the rotational nature of most (though not all) shifting cultivation systems.

[16] UNREDD 2014, Dr San Win 2014

to the presentations of Myanmar scholars, 155,607 km2 or 38.5% million acres are under shifting cultivation.[17]

The prevailing mainstream view of shifting cultivation by the general public, government officials and researchers in Myanmar is that the practice is a form of destructive land use that should be discontinued. According to the forestry department shifting cultivation is often reported to be the main underlying cause for deforestation in Myanmar. The Myanmar Forest Policy (1995) gives the directive "to discourage shifting cultivation practices causing extensive damage to the forests through adoption of improved practices for better food production and a better quality of life for shifting cultivators." The government is currently reviewing Myanmar's forest policy.

Article 116 of the 2012 Farmland Law by-laws
currently legislate the cessation of shifting cultivation;

> The central farmland administrative body shall take effective effort for the cessation of slash and burn cultivation with introduction of terrace cultivation on the high land, environment conservation, preservation of watershed area of the forests and the top soil towards climate.

Furthermore, the 2012 Vacant, Fallow and Virgin Land Management Act represents a major threat to continuation of rotational fallow farming, since it grants the state the right to confiscate fallow or "vacant" land for commercial purposes such as large scale land concessions and land leases.

While these longstanding perceptions and policies are now being challenged by civil society advocacy, for example at the national dialogue on customary tenure and rotational fallow farming held in Nay Pyi Taw in February 2015, the belief that shifting cultivation is backward and unsustainable remains strongly prevalent in the mainstream discourse. In January 2016, the government approved a new National Land Use Policy which incorporates numerous positive articles towards the recognition of customary land management systems. However, existing laws are explicit in trying to undermine and eliminate the shifting cultivation systems and it remains to be seen how shifting cultivation systems will be recognised in the national legislative framework and national land law.

[17]— Kirsten Ewers Andersen, *Study of Upland customary communal tenure in Chin and Shan states: Outline of a Pilot approach towards Cadastral Registration of Customary communal tenure in Myanmar* (Sep 2015, p 25).

2 Research Methodology

In Chin State, research was conducted in two villages in Kanpetlet township, which is located in the southern part of Chin State. The real names of the villages will not be disclosed in this study and changed for ethical reasons and reasons of data protection. In this study they are called "Taungya village A" and "Taungya village B", located in the western part of Kanpetlet township. Data collection was conducted in Taungya village B during March 7 to 14 and Taungya village A during March 16 to 25 in 2014. Interviews were supplemented with focus group discussions, informal discussions and participant observation. In-depth interviews were conducted with 11 villagers (9 male and 2 female) in Taungya village A and 8 villagers (6 male and 2 female) from Taungya village B, all of them recently practicing shifting cultivation. All interviews were conducted in the local language and recorded with audio recorder, and in addition notes were taken.

The research in Bago Yoma was conducted in Taungya village C and Taungya village D in the periods of 7 to 11 April, 14 to 15 August, in 2014, and 9 to 13 February in 2015. During the first trip, 10 households were interviewed and a focus group discussion conducted. In the focus group discussion, 8 villagers (5 male and 3 female) were participating. In Taungya village C, 5 households were interviewed and 7 people (4 male and 3 female) were participating in focus group discussion. In the second trip to Taungya village D from 14 to15 August 2014, the findings of the first trip were verified and informal interviews were conducted. The researcher conducted in-depth interviews in Taungya village C from February 9 to 11 and focus group discussion in Taungya village D on 12 February, 2015. 4 villagers (3 male and 2 female) were interviewed in Taungya village C village, and 8 villagers (6 male and 2 females) participated in focus group discussion in Taungya village D. In addition, informal discussions were also conducted together with field visits to the cultivation sites. Those who participated in in-depth interviews and group discussions were elders and those practicing shifting cultivation. All of the respondents in the village are shifting cultivators with extensive knowledge about shifting cultivation and their environment.

3 Findings of Two Case Studies:
Chin and Bago Yoma

3.1. Findings in Chin State

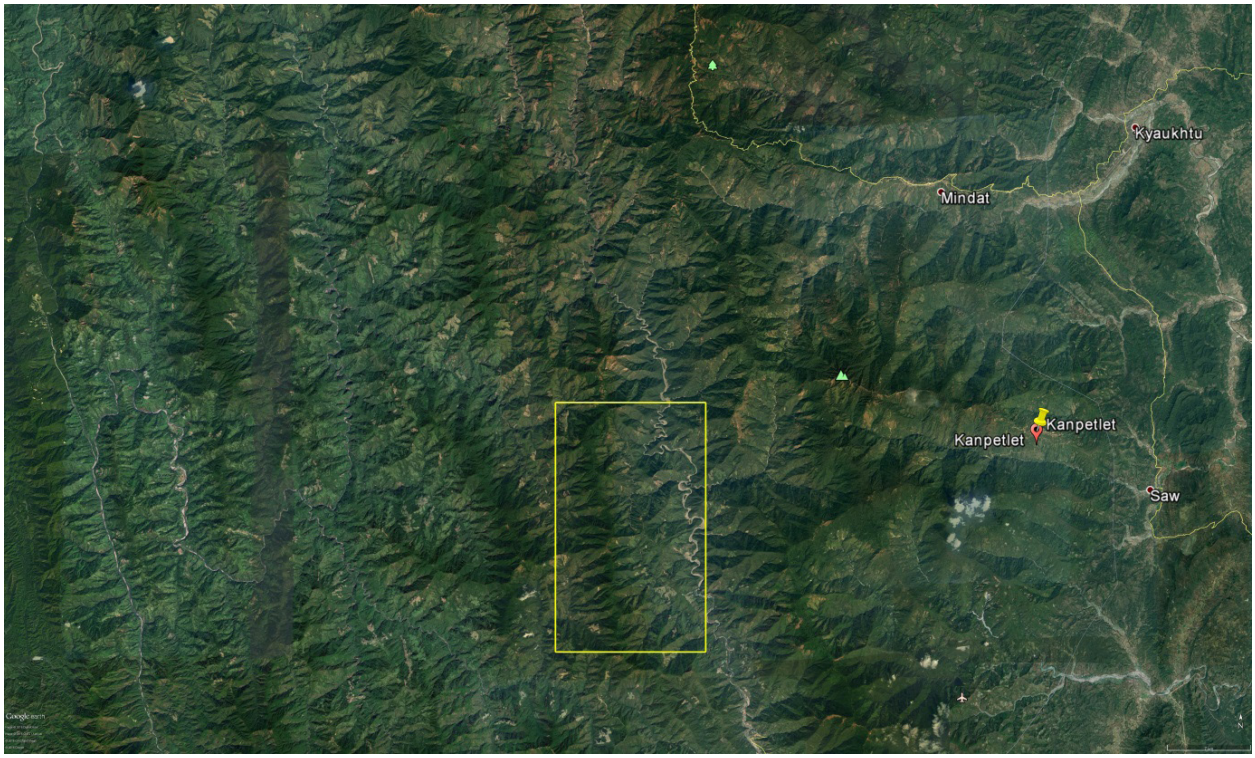

Figure 1: Map of the research area in Kanpetlet Township, Chin State

3.1.1. Brief profile of the research area in Chin State

Kanpetlet township is located in the southern part of Chin State. The research areas, Taungya village A and B are situated in the western part of Kanpetlet township. Currently, the research area is accessible only by motorbike since the road condition does not allow transportation by car. Recently telephone is accessible partly in one of the research villages and the area is not connected to the electricity grid; solar energy is used through solar panels. The research was conducted in Kanpetlet township from 7 to 25 March 2014. In these two villages, almost all of the people except some teachers and pastors are practicing shifting cultivation. This means that almost all people's livelihoods depend on shifting cultivation. Taungya village B has 39 households with a total population of 226 persons. The people in these villages belongs to Dai ethnic groups and speak Dai language. There are 60 households in Taungya village A and the total population is 381. There is basic education available: primary and middle school. Currently the government is upgrading the provision of local education to basic high school education. There is no medical clinic in these villages and those who got serious health problems have to be brought to the municipal town Kanpetlet. Lack of access to proper transportation, health services and education are big challenges and difficulties for the people in this area.

There are large areas of mountains with closed evergreen forest that the villagers conserved customarily in both villages. According to the respondents, "As deforestation is low in these villages, forest covers almost all of the land. Even shifting cultivation area occupied more than half of the total land, fallow lands were recovered with trees during fallow period. There is no abandoned land because of shifting cultivation. All the fallow lands were regenerated enough for slashing when the fallow period is about 7 or 8 years." As all of the villagers are still doing shifting cultivation, the villagers know well about land use such as the location and properties of different shifting cultivation areas, forest areas and watershed areas. There are many kinds of wild animals such as deer, bear, wild pig, rabbit, foxes, monkey, serow, and so on. Also there are many different kinds of birds in these areas.

The villagers are still hunting wild animals and fishing in the streams for their own consumption. In the forests, there are valuable timber trees such as, mountain teak tree, sal tree, and also pine. There are wild bamboos and planted bamboo and other trees useable for buildings. The forest is rich in different kinds of orchids, and wild yam. Cultivated yam is grown in the village as a cash crop and has in recent years become the major source of income for the village . Since the late 1990s, orchid collecting has been one of the main causes of deforestation in the study villages in Kanpetlet. Because when they search for the orchids (in local language, M'cung Sen, M'cung M'bok, Kyei She Jui, etc.), many orchid-bearing trees are cut down in the season of orchid collecting (usually from October to at the end of January) every year. Many species of orchids were lost in this period. Orchids were bought and collected by native people and some external merchants and carried to Mandalay markets. Two decades ago, about 30 kilos of the orchid called "Psung Mpok" in native language, could be collected per day. But now it is impossible to find even one kilo, leading the community to ban this practice in order to allow its regeneration. At the moment, orchid collecting decreased in most of the villages and is prohibited in some villages, however, some people are still doing it.

3.1.2. Current Livelihood System

Almost all of the villagers in both Chin research areas depend on shifting cultivation and irrigated land during rainy season for subsistence, animal husbandry, collecting forest products and labour migration to earn cash. Rice and corn are the staple food of the villagers from shifting cultivation. The main source of food is farming and they earn cash from the sale of yam and fruits. In their orchards they plant orange, lime, lemon, mango, banana, sugar cane, and papaya along with yam. The villagers practice home animal husbandry including raising pigs, chicken, dogs and mithuns which are used in customary ceremonies, such as weddings and other celebrations, and are sometimes sold to earn cash income.[18] When shifting cultivation and other farming does not yield sufficient food or when cash is needed to to pay school fees by collecting orchids, yam and other tubers in the forest and by selling animals. Shifting cultivation is usually done for subsistence.

[18] Mithun (Bos frontalis) is a bovine raised in Chin State and adjacent areas in North-western Myanmar and Northeast India. Mithuns are not used for any work but raised just for their meat and their cultural value. Mithuns are not kept in enclosures but roam freely in the forest and fallow areas. The owners go and find their Mithuns once or twice in a month in the forest.

Wild and grown bamboo and different kinds of hard wood trees for buildings are collected from the forest. Timber is used just for the buildings in the village and not for sale, so the forests are still well stocked. Some villagers hunt wild animals for consumption, and only rarely make money by hunting. Presently, hunting is decreasing as wild animals are becoming rare.

In 1992, government forestry department officers told the villagers to stop shifting cultivation. However, as it is the traditional way of life on which they depend for their livelihoods and there is no alternative villagers continued practicing it. Shifting cultivation is a deeply rooted practice of the community. Villagers repeatedly explained that without shifting cultivation there would be no way for them to earn a living and feed their families. Because of the emphasis on education and increasing cash needs to buy goods (motor bikes, solar panels, construction materials, etc.) the villagers have to earn more cash to cover these expenses than in the past. This situation led families to try to diversify their incomes by small scale commercial yam production and by establishing orchards to supplement shifting cultivation. Diversification of livelihood also leads to greater resilience. When the weather is not good, some do not harvest enough food. If there is a natural disaster also linked to climate change or problems with pest like rats infestation in 2007,[19] food insecurity becomes a major problem. According to the experience of the elders, such disasters used to happen once in 50 or 60 years. At the times of crisis, they sell animals such as mithuns, pigs and chicken to cope with the difficulties. Food insecurity is also caused by family members falling ill, reducing a household's labor force to perform labor intensive activities such as weeding.

Those who have irrigated land tend to have better food security. Irrigated lands were usually located beside main streams and those lands were converted from shifting cultivation plots into privately owned land.

Migration is one of the means for the local people to address livelihood problems. Malaysia is the country where the majority of Chin migrants are working and some of them continue their journey to USA, Australia, Canada, and other countries. By working abroad, the migrants can support the families back in Myanmar and some of them return home later.

3.1.3. Overview of Shifting Cultivation System

The cultivation period in shifting cultivation is between January and November. Villagers start to cut the trees in January and the fields are burned at the end of April and beginning of May. Villagers usually plant seeds around the middle of May when the rainy season starts. Harvest time for paddy is usually in November. Shifting cultivation is providing different kinds of vegetables, beginning in June with rosella leafs, pumpkin shoots and other local leafy vegetables, and from the middle of July they can harvest corn, pumpkin, cucumber and other vegetables. Diversification of vegetables

[19] In a report of the Chin Human Right Organization (CHRO), the bamboo began to flower in 2006 in Chin state. The fruit produced by the bamboo which is rich in nutrients, triggered an explosion in the rat population. After feeding on the fruit, rats reproduced in a rapid rate. The rats turned on people's crops and food supplies, causing massive food shortages for local villagers dependent on farming for their livelihood and subsistence. Chin Human Right Organization, *On the Edge of Survival: The continuing rat infestation and food crisis in Chin state, Burma,* Chin Human Rights Organization 2 Montavista Avenue Nepean, Ontario K2J 2L3, Canada, September 2009, p 5.

is the essence for food security in shifting cultivation. The main crops harvested through shifting cultivation in the research area in Kanpetlet are rice, corn, millet and pumpkin. The other crops are rosella, beans, peas, cucumber, gourd, sweet potatoes, tomatoes, ginger, and sesame. All the crops in shifting cultivation are only for subsistence except the castor oil plant which is grown to earn some cash income.

The system of shifting cultivation in the two research areas in Kanpetlet is rotational with a fallow period of about 8 to 9 years. The fallow period is still stable up to this day. The plots are utilized for agriculture for only one year and then they shift to another plot. During the fallow period, trees and bushes grow rapidly and replenish soil fertility and biodiversity. Shifting cultivators leave forests on mountain tops and around paths to farms for shade, and to protect against the danger of strong wind and erosion. In these areas, the forest cover is denser than that of other places.

In some places, villagers said, the fertility of farms is decreasing due to climate change. However, the fallow period did not decrease in these two villages. Over the past few decades, many of the families moved to Kanpetlet town and migrated abroad. This out-migration and off-farm activities are some of the reasons why the long fallow period has been maintained. Because of a rat infestation in 2007 not enough rice was harvested. Though the situation has improved and they are harvesting more rice the villagers continue to worry about natural disaster such as bamboo flowering or drought.

In both villages, shifting cultivation is the basis of livelihoods for the vast majority of residents. In Taungya village A, there are only three families who do not practice shifting cultivation. One owns a small village shop and the other two own orchards. Ten families own plough land ("ng'lai" in Dai language" those are permanent and irrigated during rainy season. Irrigated lands were converted from shifting cultivation lands which were already privately owned. Those who own irrigated lands are also doing shifting cultivation because not enough rice can be harvested from the paddy fields due to their small size.

3.1.4. Benefits, Challenges and Perceived Future of Shifting Cultivation

It can be said that shifting cultivation is still the anchor for the livelihoods of the people in these two villages. While shifting cultivation cannot always cover expenses such as school fees, costs of health services and housing, the villagers believe that shifting cultivation is the only way for securing their livelihoods.

Owners of orchards can earn more cash than shifting cultivators. However, without doing shifting cultivation gardeners face food insecurity due to the lack of access to proper transportation and markets. Yams are particularly profitable, though gardeners also plant banana and other crops for sale and family consumption. Some of the people earn cash by constructing buildings for other people and from making furniture.

In Taungya village B, about 10 families planted small-scale yam plantations in addition to practicing shifting cultivation. Yam plantation sizes are between 1 and 2 acres. Those who have small-scale yam plantations earn about 200 to 800 US dollar in a year. The villagers considered that doing orchards would be more beneficial along with shifting cultivation, but there is little land where water is accessible and the land is fertile enough to plant orchards. Even where there are proper lands for orchards, people cannot afford to buy pipes for irrigation. In this village some families plant orange, lime, lemon, yam, coffee and sugar cane but they have only made modest incomes from these so far. Some families have orchard near the streams without cutting trees and some families converted shifting cultivation areas into orchards.

The average income of the people in the research area in Kanpetlet is estimated between 20 US dollars and 50 US dollars per households per month. The average income of the households in the village from shifting cultivating is 500 US dollars per households in a year.[20] Shifting cultivation is part of the self-sufficiency economy, i.e. people do not depend on the market for livelihood. According to a villager from Tuangya village B, who has one of the largest yam plantations, "shifting cultivation is still the only way to ensure food security in our community. The plots are still regenerated enough during 8 to 9 years fallow period and the fertility of farms is better than in past years. The decreasing of fertility of farms is mainly caused by climate conditions."

However, in other areas, it is possible that climate change, population growth with a lack of alternative livelihoods and natural disasters can threaten food and livelihood security of the villagers. Moreover, this may lead to land scarcity and shortening of fallow periods, resulting in greater stress on the environment and lower soil fertility.

Villages have also avoided deforestation by maintaining systematic conservation practices. For example, villages customarily protect forests along the streams, along the roads, on mountain ridges and make fire breaks at the time of burning cultivation areas. Moreover, the villagers maintain hill evergreen forest. These practices also help the recovery of trees in fallow fields. The farms beside or around the mountain ranges where the forests are conserved have higher density of trees compared to other areas. Leaving forests at the headwater areas of streams is for the purpose of maintaining watersheds. The villagers also plant trees near the houses, beside the roads and near resting places for cooling.

3.1.5. Land Governance and Policy

Shifting cultivation plots belong to the villagers according to the "*Dama ucha* principle". "*Dama ucha* principle" means any village would ideally hold residents that comprise the descendants of the first founders who "wielded the machete" (*dama ucha*) to clear the land and establish benevolent

[20] Hung Mana, "Poverty Reduction Strategies: From the Perspective of Dai People in Kanpetlet Township, Southern Chin State", (Myanmar Institute of Theology, Insein, Yangon: 2014), P32.

relations with the spirit of the land.[21] However, all plots are privately owned; the villagers share the plots in the village meeting and they managing the land communally.[22] The clans share among them and also share other plots to families of other clans even outside the village. All the villagers have the right to access plots every year in shifting cultivation but not on irrigated land. The criteria of sharing plots are mainly based on family size and labor force because the plots have different sizes. Labor sharing is essential for shifting cultivators in this area. In the villages, some people own the land and have use rights for many plots, while some people own only few plots of land. Especially, sharing of plots is usually influenced by clans instead of a family of a clan. If a larger land owner grants the rights of use to a household with less land, the head of that household will customarily give a gift such as a hen or a blanket but not cash. Decision making in allocation of land is led by the village administration elected in every three years and the customary land owners. It is dominated by men and women also involved in the meetings for allocation of the land. Allocating of the plots usually takes one or two days.

The owners of plots of land have the rights to sell the land but the approval of the clan is needed. However, selling land to outsiders is not allowed and can be done only among the villagers. They consider that uncultivated forests are communal lands, including evergreen forest and watershed areas.

There are no maps of plots in the village and villagers use signs such as trees and stones to demarcate their boundaries. There is no land registration on shifting cultivation land, only irrigated land is registered by the land record department in Kanpetlet. Though there is no formal land registration in the village except for small parts of irrigated paddy land, the villagers absolutely believe that they own this land. Even though, plots are not registered and mapped, the villagers know the owner of the land and the boundaries. It shows that the villagers are deeply connected to the land. Almost all of farmers who are doing shifting cultivation in Kanpetlet do not know about the existing land use policy and farmland law. Although the government told the villagers to stop shifting cultivation, villagers have continued shifting cultivation anyway. When questioned about this, the villagers answered that there is no alternative available for them from which they can make a living even if there are laws and policies restricting this practice.

[21] Kirsten Ewers Andersen,. *Study of Upland customary communal tenure in Chin and Shan states: Outline of a Pilot approach towards Cadastral Registration of Customary communal tenure in Myanmar,* September 2015, p 23.

[22] "Sharing of the land," means that in the village, the land is own by the clans and families. For instance, A clan or family own many plots in area 1 but own less land in area 2., where B clan own many plots. In this situation, A clan shared plots to B clan members when they slashed area 1. When area 2 is slashed, B clan shared the land with A clan. The land is shared in the village meeting. Every family has the right to access the land.

3.2. Findings in Bago

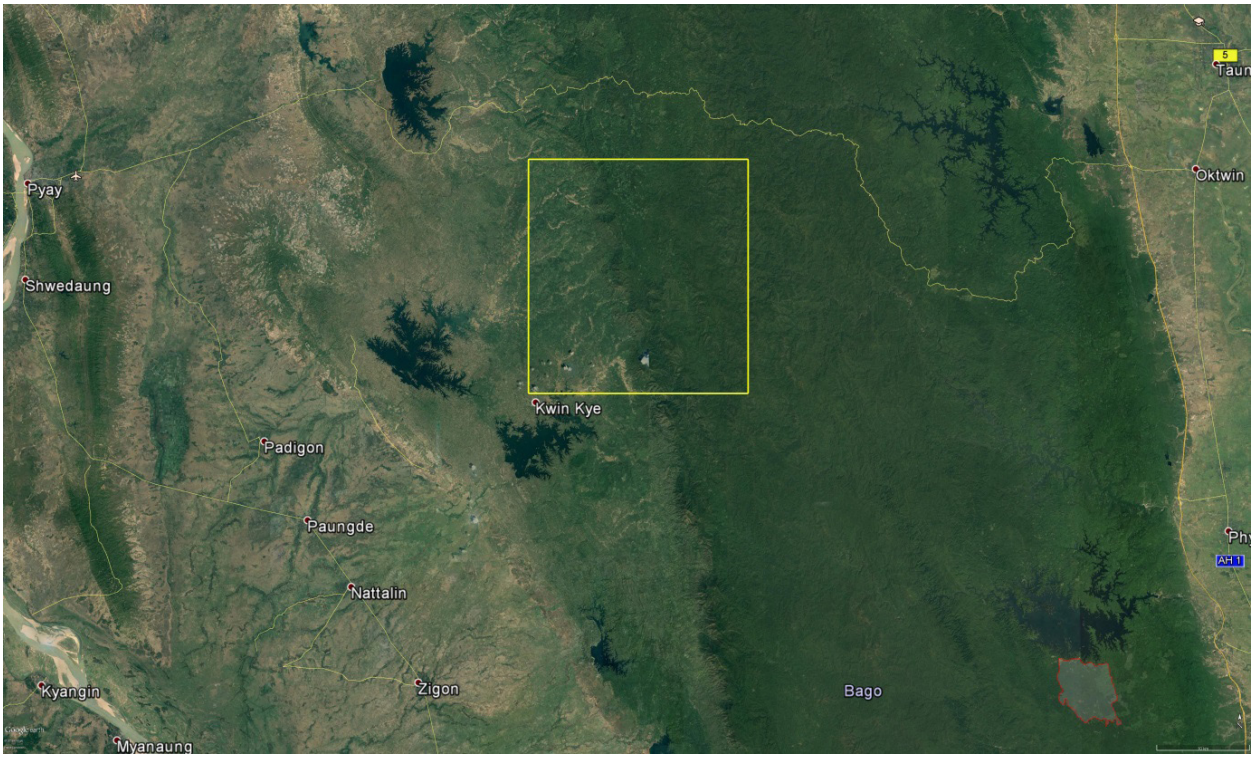

Figure 2: Map of Research Area in Bago Division

3.2.1. Brief Profile of the Research Area in Bago

The research was conducted in two villages, here referred to as Taungya village C and Taungya village D, in Western Bago Division on the Taung Nyo Mountain Range. The landscape surrounding the villages is slightly hilly and the villagers do farming in small plots near their homes and shifting cultivation at the edge of the mountains on a few plain areas.

Although the villages are not far from town, transportation is difficult. Boats, ox cart and motorbike can be used in winter and summer to Taungya village D. However, there is no road and river connection to Taungya village C, which can be reached only on foot. During the rainy season, one has to go on foot and walk for two days to reach the villages since roads are unsuitable for vehicles. There is no electricity available in the villages and there is only one family with a solar panel while two families own a generator. Lack of access to proper transportation, education and health care services are critical issues for the villagers.

There are 31 households in Taungya village C with a total population of 147 and 73 households in Taungya village D with 378 persons. These two villages belong to Karen ethnic group and speak Sakaw Karen language. For their livelihoods the villagers depend on shifting cultivation, hunting and fishing, and using other natural resources for subsistence. Most of the villagers have no formal

education. Only one or two persons reached 9th standard, with the majority completing only fourth standard. There are high schools in the municipality of Nat Ta Lin and Paung Dae but most families cannot afford sending their children to study in town. There is neither a hospital nor clinic and health care is provided by local health attendants.

There is much wildlife in the areas, such as wild pig, elephants, a kind of mountain goat, deer, sambar, monitor lizard, gaur, gaur, turtle, and many species of birds such as woodpecker. Wildlife such as wild pig, mountain goat and peacock are becoming extinct because of overhunting. Previously, birds like "woodpecker" were not hunted due to taboos, but now all kinds of birds are hunted. Hunting is decreasing at present and hunting elephants is forbidden by the communities. In the forest, there are many useful plant species such as yam, bamboo, timber trees, orchid, medicinal plants like the "taung nyar bark" and a tree bark which is used to cure malaria. There is a stream where the villagers go fishing in the rainy season and cold season but since 2012 the stream gets dry every year during the hot season. These territories used to be rich in natural resources including teak tree, but mainly because of external intervention (illegal logging) these resources have been nearly completely lost.

3.2.2. Current Livelihood System

Agriculture is the main source of livelihood, comprising shifting cultivation and small-scale permanent farming on small plots near the houses. The fallow period in Taungya village C is 13 to 15 years and 5 to 7 years in Taungya village D. Shifting cultivators grow chilli, sesame, and cotton for sale and paddy and corn for consumption. Other crops grown in plots are vegetables like rosella, beans, gourd, and pumpkin. Regularly, they grow the same crops seasonally but since 2-3 years ago. Currently, the villagers diversify crops by growing new crops such as mug bean and green gram for the family, along with local tomatoes and eggplants. From the cotton they grow, they produce textiles and clothes in small cottage industry. From the bark of trees they get colours for dying the textiles in traditional ways.

Apart from cultivation, villagers raise livestock (pig, chicken, and cattle) for domestic use and to barter goods (oil, snacks, salt, fish paste, dry pickled tea leave). Sometimes they sell livestock to meet other needs of the family. Cattle and buffalo are used for working in the field. Half of the villagers own cattle or buffalos.

Villagers also collect bamboo shoots, various roots such as wild yam, turtles' eggs and orchids from the forest. Turtles and orchids species are endangered due to uncontrolled collecting and selling on the market for cash. Another forest product is the teak tree, but the villagers did not commercialize teak trees. There is small scale logging in Taungya village D to earn income but not in Taungya village D. The teak trees in these areas have been logged by outsiders for two or three decades

legally or illegally. At the moment illegal logging is increasing and many illegal loggers from the surrounding plains are coming daily to log trees. This is the main cause of deforestation in the area where the forests are conserved or left without slashing for cultivation by the local villagers.

Bad weather and climate conditions are a main cause of food insecurity and financial shortage. When facing health problems, the villagers borrow money from relatives who are staying at the nearby village or township and have to pay back the debt the following year. They mainly earn cash income during October to November. In the rainy season, there is no cash income and they barter livestock for food and sell for cash to other villages and towns.

Normally, the villagers use traps to protect their fields from wild animals (especially wild pigs) during harvesting time. Sometimes, the villagers go for hunting and get turtles, sambar deer and wild pig. Turtles are found during rainy and cold season. Hunting is not commercialized but for domestic consumption.

Often, farming does not cover all their needs. Food insecurity can be increased by bad weather condition, wild fires, insect or mice infestations, or by illness in the family. When they face difficulties, villagers adapt in several ways such as by collecting orchids, selling cotton, sesame and chilli from shifting cultivation. The villagers have to get an advance payment for these crops, but the actual value of these advances end up being about fraction of the actual market price. Some migrate out to work in the cities but there is no migration to other countries from this area.

3.2.3. Overview of Shifting Cultivation System

The cultivation season in shifting cultivation is from January through November. The clearing of trees starts in January and burning in April. With the beginning of the the rainy season in June the cultivation also starts. After that, various crops are harvested month by month till November.

Shifting cultivation is mainly for subsistence and if there is no crop loss due to pest, drought, and over-raining, almost all of households harvest enough food for the whole year. Along with paddy the villagers also plants cash crops such as cotton, chilli and sesame. Previously, there was more land available and the land laid fallow 14 to 15 years in both villages, so that the soil was good. Now, due to population growth and in-migration, the fallow period has declined to only 5 to 7 years, which is leading to a decrease in soil fertility and crop yield in Taungya village C. Therefore, the villagers transformed unused plain land to permanently cultivated land ("Pone Soe Le") to grow sesame, chilli and cotton.[23] However, study villages in Bogo region belong to bamboo-dominated forest that the regeneration of fallow period is faster.

[23] Wild Plain Land refers to the land which is not usually used for cultivation in the plain land but now the villagers (only Sin Swal village) cleared these areas to plant sesame by ploughing in the spring, but not for irrigation. There are few plain lands in this area and almost all of the land is occupied by hilly land.

Taungya village D has enough land for a fallow period of 13 to 15 years but they often rotate fields between 5 to 7 years because of better regeneration of forest. There is less population pressure and fewer wild fires.

3.2.4. Challenges, Benefits, and Perceived Future of Shifting Cultivation

The villagers are concerned about bad weather due to climate change, the scarcity of water and bamboo blossom, even though the latter does not happen often. Five years ago, there was rat infestation due to bamboo blossom which destroyed the crops. Recently, crops such as rice, sesame, and cotton were infested by insects. As the population is increasing, the villagers try to find alternative ways of doing agroforestry to increase income. However, villagers want to continue with shifting cultivation since they are currently lacking other opportunities.

By itself, shifting cultivation can be environmentally sustainable. Villagers have good environmental conservation practices. For example they protect watershed areas, leaving big trees in shifting cultivation areas and along the streams and do not shoot certain birds such as the Great Hornbill. The villagers use manure as natural fertilizer. In Taungya village C they also have the practice of creating a fire break to protect against forest fires, but the villagers in Taungya village D did not make fire break. In the fact that wild fire is widespread.

Other challenges are illegal logging by outsiders and wildfire. Illegal logging is taking place in both areas, however, wild fire rarely takes place in Taungya village C. Therefore, there is better regeneration of forest and forest cover in Taungya village C than that of Taungya village D. Logging teak trees in Bago Yoma in Taungya village C and Taungya village D area started in 1995. At the beginning, teak trees were logged systematically according to the government regulations regarding prescribed size and they were left for three years in the jungle to dry. Since around 2000, companies have come and logged teak trees and other hard wood trees carelessly without following the regulations. All the teak trees were logged indiscriminately. According to the respondents recently, about 200 tons of teak trees are logged in a week legally or illegally. The illegal loggers in Taungya village C and D are mainly from plain land from Natalin township. Illegal loggers come in big groups of more than 60 people and the villagers feel threatened by them. Another problem is that the loggers pluck chilli and other vegetables from the farm after the paddy is harvested without asking for permission.

Shifting cultivation is the main way for the people to earn their living with little other livelihood opportunities. In Taungya village D, the population growth due to immigration resulted in a shortening of the fallow period and extending of agriculture area to previously unused areas (“Pone Soe Le”). However, shifting cultivation will still plays a critical role for food security in these two villages, especially in Taungya village C with better fallow periods and better regeneration of forest.

3.2.5. Land Governance and Policy

According to customary land governance system, the land is owned communally and there is no private land in shifting cultivation areas. Every household has the right to use and access the forest. Shifting cultivation plots were shared among the villagers through village meetings. However, there are no clear landmarks (demarcation of each plots) for shifting cultivation. Villagers working in the area simply mark the size of the land that they are able to cultivate. Irrigated lands are owned privately in Taungya village D. There is no irrigated land or "Le Myay" in Taungya village C.

Until 2010, villagers had to pay taxes of 600 Kyats per acre to the forestry department for using the land. But it is no longer paid because according to the law, shifting cultivation is not allowed. Since communities have always depended on shifting cultivation they continue this practice until today. Even though, the forestry department staff forbid doing shifting cultivation, they have to carry on this practice because of lack of alternative means for their livelihood.

The presence of the forestry department and government institutions in general is limited, though occasionally, and without warning, forestry department staff ask villagers to collect teak seedlings, plant the teak and clear the weeds. Although the villagers try to maintain their forest, outsiders from the plain land come in, together sometimes with the support of forest authorities, and log the forests, particularly teak trees. According to the villagers, the recognition of their land tenure rights by law is essential for environmental conservation and security of livelihood.

4 Discussion and Comparison of Two Focus Areas

4.1. Livelihood Opportunities

Shifting cultivation is essential to the livelihoods of the people interviewed in this study. Their economy primarily depends on shifting cultivation, though shifting cultivation alone cannot cover all livelihoods needs of the people in both areas. And it has become more difficult due to worsening climate conditions.

Many of the respondents in Kanpetlet township would like to have orchards along with shifting cultivation to meet their needs. Growing yam is rare in Bago, but increasing in Kanpetlet township. Villagers in the study area in Bago township earn cash income from cotton, sesame and chili grown in shifting cultivation fields, while villagers in Kapletlet rarely earn cash from shifting cultivation. They earn just a little from selling pumpkin seeds and castor oil seeds. Communities in both research areas do animal husbandry for consumption and sale or exchange for oil, snacks, salt, fish paste and other commodities. Cows and buffalos are used to plough farms but in Kanpetlet mithun are kept for meat consumption, which in the past happened mostly on special social occasions. Today mithun are bred mainly for sale.

Labor migration and cash remittances are new but important factors in the local economies of both areas. Many of the people from Kanpetlet township migrated abroad and remittances are a major source of income now. The people from Bago division go to find jobs in the nearest towns instead of going abroad. This local migration is seasonal and short term, i.e. it occurs when there is no farm work and in times when the harvest is not good.

Table 1. Comparison of the methods of shifting cultivation (SC) and other livelihood strategies

Village	Crops cultivated in SC	Fallow period	Cash crops (gathered, SC, or orchards)	Other livelihood strategies	Challenges
Taungya village A	Rice, corn, millet, pumpkin, rosella, beans, peas, cucumber, gourd, sweet potatoes, tomatoes, ginger, sesame	8-9	Banana, lime, yam	Orchid collecting, selling yam, animal husbandry, working abroad, irrigated land (once in a year, only paddy)	Pests, climate change, the price instability of yam, transportation
Taungya village B	Rice, corn, millet, pumpkin, rosella, beans, peas, cucumber, gourd, sweet potatoes, tomatoes, ginger, sesame	8-9	Orange, banana, lime, yam	Orchid collecting, selling yam, animal husbandry, working abroad	Pests, climate change, the price instability of yam, transportation
Taungya village C	Rice, sesame, chili, cotton, corn, pumpkin, rosella, beans, peas, cucumber, gourd, sweet potatoes, tomatoes	13-15	Sesame, chili, cotton	Orchid collecting and yam	water scarcity, illegal logging by outsiders, pests, transportation,
Taungya village D	Rice, sesame, chili, cotton, corn, pumpkin, rosella, beans, peas, cucumber, gourd, sweet potatoes, tomatoes	5-7	Sesame, chili, cotton	Ploughed farm (not irrigated)	Water scarcity, illegal logging by outsiders, pests, in-migration and land grabbing for shifting cultivation and of plough farms (Ley Kone), transportation,

In comparing to livelihood strategies of two research areas, basically they grow the same crops in shifting cultivation/rotational farming in the past. However, regarding to cash crops research villages from Bago region mainly grow sesame, chili and cotton, while orange, banana, lime and yam are grown in research areas from Chin state. Both side grow cash crops along with subsistence crops.

In addition to shifting cultivation, both of study areas used to collect different kinds of orchid, other non-timber forest products and do small-scale animal husbandry. The people from Bago region find jobs in nearest towns during hot season, while the people from Kanpetlet, chin state go abroad. Even though three Taungya villages still maintain their fallow period without decreasing, the fallow period has been decreased to 5-7 years in Taungya village D due to population growth and immigration. All study areas have challenges such as pests which destroy crops, climate change regarding to shifting cultivation, lack of proper transportation to reach products to the market and to import food and other goods to village. Another challenge in Bago region is illegal logging.

4.2. Food Security

Food security in both areas essentially depends on shifting cultivation, and therefore adequate fallow periods for the regeneration of trees and soil fertility. The longer the fallow period, the better the regrowth of fallow forest and restoration of soil fertility. If the fallow period is too short the yields of crops decrease.

Villagers in Bago are especially concerned about the decreasing fallow period due to population growth, and in all four villages about climate change, natural disasters and pest infestation. Transportation problems and therefore lack of access to markets is an additional problem for securing food security. Due to transportation problems, there are difficulties to carry food from markets to local areas even when the people could afford to buy food. In the Kanpetlet villages, food security is ensured for those few families who not only practice shifting cultivation, but also have a sedentary farm (Le Myay) and for those who plant large amounts of yams. For the majority of the people the only sources of income are shifting cultivation and the occasional collecting of non-timber forest products.

The villagers in Bago diversified crops grown in shifting cultivation to generate cash income, which contributes to better food security. In both areas, shifting cultivation still play the role of their food security. Shifting cultivation provides not only food security but also some cash income, thus shifting cultivation is not only for subsistence. Important is that the land governance in shifting cultivation in these

4.3. Shifting Cultivation Practices

A sufficiently long fallow period is critical for the sustainability of shifting cultivation and this the livelihood of the people practicing it., In both villages in Kanpetlet the fallow period is currently about 8 to 9 years. In Bago the current fallow period is 13 to 15 years in Taungya village C and and 5 to 7 years in Taungya village D.

Careful fallow management is practices in all four villages, which ensures a rapid regrowth of forest. Trees are cut at the height of one meter so they remain alive and start to make new shoots soon afterward. They also leave large trees, which are merely lopped to avoid too much shade for the crops. Except for in village D in Bago, people routinely create firebreaks in order to protect surrounding forests when burning the fields. Forest degradation take place more in the area without fire break than the areas where fire break is usually made. Because, if there is no fire break, forest are burned extensively every year.

People from both research conserve forest around the village and prohibit farming in conservation areas. In the Kanpetlet villages, forests are also preserved along the road and on mountain ridges which contributes to the regeneration of fallow in nearby farming areas. The farms beside or around the mountain ranges where the forests are conserved have higher density of trees compared to other areas.

Another good practice is that forest is maintained at water sources and around streams for the purpose of protecting the watershed. The people understood that streams may dry up when trees are cut down.. The people in the study areas in Kanpetlet maintain better management of shifting cultivation than the people in Bago, where they are facing widespread illegal logging and wild fires, especially in Taungya village D.

In both research areas, shifting cultivation is closely connected to community life and culture. There are songs, stories and festivals related to shifting cultivation. For instance, in Chin State, a new crop festival is celebrated at the time when the harvest of new shifting cultivation rice begins. Shifting cultivation is not only integral to food security and natural resource management but also to local tradition and culture.

Figure 3: Big trees that have been preserved in a new shifting cultivation field

Figure 4: Regenerated tree which was cut 3 meters above the ground five years before

Figure 5: Five years old fallow forest next to a newly cut field

Figure 6: Regenerated trees and bamboo after five years of fallow

4.4. The Role of Women in Shifting Cultivation

In Kanpetlet township, women's participation in allocating farm land is weak. No woman participated in the administration committees of the two villages studied. However, some women from female-headed households participated in the allocation of plots. The role of women in decision-making is very weak because according to customary practices men play the leading role in managing community affairs. Men and women work together in slashing trees, planting seeds, weeding, harvesting and bringing harvested crops home. However, women spend more time in planting seeds, weeding and harvesting. All this work takes substantial time. Shifting cultivation fields need to be weeded three or r four times, a task performed more by women than men.

In the study villages in Bago, the allocation of new plots is carried out after the harvest. Like in Kanpetlet, decision-making in the allocation of the plots is dominated by men. Women's participation is very weak. Men are responsible for slashing the forest when a new field is cleared and women are not involved in this part. Planting the seeds, weeding and harvesting are done by women and men jointly, but women spend more time on farming than men. Harvesting cotton, chilli and sesame is done mainly by women.

4.5. Future Potential of Shifting Cultivation in Study Areas

According to the respondents from in Bago, the villagers want to continue shifting cultivation since it is essential to their livelihood. According to one of the villagers in Taungya village D, "Shifting cultivation is our customary practice, our culture and our way life. Through this we earn our livelihood. We are happy when we are in our farm because we love farming; we love the beauty of farm and crops we cultivated. On the other hand, we are familiar with shifting cultivation in which we can make a livelihood. So we would like to carry on with our customary way of life of shifting cultivation."

The villagers in both study areas are adapting their shifting cultivation practice in response to new needs and opportunities, like growing cash crops along with paddy on the shifting cultivation plots. Or they complement shifting cultivation with establishing orchards or permanent fields, in particular paddy fields. However, there are considerable obstacles, such as the lack of technical inputs for expanding orchards, scarcity of suitable land for permanent farming, water scarcity and lack of road access and means of transportation. Therefore, in none of the study villages would it be possible, nor would anybody want to abandon shifting cultivation.

Figure 7: Yam plantation in Kanpetlet

5 Conclusions

The findings of this study show that shifting cultivation is a key component of the livelihood system of all four villages. Shifting cultivation is so far the only feasible agricultural option for the farmers in the study areas. Furthermore, it is an important aspect of the communal life and culture of the local people.

Shifting cultivation is operating under a land tenure system that ensures that everybody has access to land. There are no landless people and those villagers who own only little land have the right to use land of other community members for cultivation. Therefore the land tenure security of the local communities practicing shifting cultivation is a key component that ensures food security for all.

The communities in the research area have already incorporated sustainable management practices into their shifting cultivation system. However, illegal loggers in Bago region, orchid collection in Kanpetlet, encroachment of outsiders on land are contributing to deforestation and potentially loss of shifting cultivation fallow lands thereby shortening fallow periods. While destructive orchid collection is an internal problem of the communities affected and can be dealt with by their own governance institutions, it is difficult for the communities to address the problem of encroachment by illegal loggers and land grabbing by outsiders as long as their rights over their land and resources are not clearly recognized and protected. Only then will they be able to confront the encroachers. All over the country, the lack of security of tenure for upland populations makes them vulnerable to land expropriation. If this is not corrected many shifting cultivation households could become displaced. On the other hand, social instability will take place through projects which has potential negative impacts on the communities, land concession and other external interventions. Furthermore, shifting cultivation is sustainable when there are good conservation practices but if conducive conditions do not exist and good practices are not followed anymore it will lead to forest degradation.

6 Recommendations

Based on the findings of our study,

- Shifting cultivation must be recognized as an essential livelihood strategy and way of life of the local community
- Government extension services need to support shifting cultivation and not try to replace it with something else
- Good practices of sustainable management in shifting cultivating should be shared and promoted
- Customary land tenure of the local communities must be recognized in policy and law
- A program assisting shifting cultivation communities in diversifying their livelihood strategies could substantially increase livelihood and food security
- In order to increase local resilience to threats such as climate change and pests, additional and appropriate agricultural trainings should be promoted
- Additional research should be carried on the specific contribution to shifting cultivation such as dietary and self-sufficiency etc.

Bibliography

Andersean, Kirsten Ewers. September 2015. *Study of Upland customary communal tenure in Chin and Shan states: Outline of a Pilot approach towards Cadastral Registration of Customary communal tenure in Myanmar.*

Aryal, K.P. and Kerkhoff, E.E. 2008. *The right to practice shifting cultivation as a traditional occupation in Nepal: A case study to apply ILO Conventions Nos. 111 (Employment and Occupation) and 169 (Indigenous and Tribal Peoples).*

Cairns, Malcolm. F., ed. 2015. *Shifting cultivation and Environmental change: Indigenous peoples, agriculture and forest conservation.* London and New York: Routledge, Taylor and Francis Group.

Chin Human Right Organization. September 2009. *On the Edge of Survival: The continuing rat infestation and food crisis in Chin state, Burma,* Chin Human Rights Organization 2 Montavista Avenue Nepean, Ontario K2J 2L3, Canada.

Erni, Christian, ed. 2015. *Shifting cultivation, livelihood and food security: New and old challenges for Indigenous peoples in Asia. Bangkok:* Asia Indigenous Peoples' Pacts.

Hadden, R. Lee. September 2008. *The Geology of Burma (Myanmar): An Annotated Bibliography of Burma's Geology, Geography and Earth Science.* Alexandria, Virginia: Topographic Engineering Center (TEC).

Ironside, Jeremy. February 2016. *The Recognition of Customary Land Tenure in LoasLaos PDR.* Presentationed by Jeremy Ironside (MRLG project). February 22, 2016.

Mana, Hung. 2014. *Poverty Reduction Strategies: From the Perspective of Dai People in Kanpetlet Township, Southern Chin State.* Yangon, Insein: Myanmar Institute of Theology.

Ministry of Labour, Immigration and Population (2014). *Summary of the provisional results: The population of Housing census of Myanmar,* 2014. http://countryoffice.unfpa.org/myanmar/drive/SummmaryoftheProvisionalResults.pdf

Ministry of Natural Resources & Environmental Conservation Forest Department. October 2015. *National Biodiversity strategy and Action Plan (2015_2020).* October 2015. prepared by forest department and consulted by IUCN.

Oxby, Clare. *Changes in shifting cultivation in Africa.* http://www.fao.org/docrep/r5265e/r5265e06.html <retrieved on February 4, 2014>.

Springate-Baginski, Oliver and Win, San. February 2015. *The Future of Swidden Cultivation in Myanmar.* February 2015/ Presentationed by Dr. Oliver Springate-Baginski & Professor San Win for Customary Land Tenure Workshop, Nay Pyi Taw.

Win, San. 2014. UNREDD 2014, Presentation by Dr San Win 2014.

Win, San. December 2014. *Investigation on Shifting Cultivation Practices Conducted by the Hill Tribes for the Development of Suitable Agroforestry Techniques in Myanmar.*

Annex 1. Research Questionnaires

1. Brief profile of the research area (Community/ ies)

- Geographic location, natural environment, human and natural resource base (available land and other resources, population dynamics etc.), infrastructure/ access to market etc.

2. General description of the current livelihood system

- Main components of the present livelihood system and how they are relate (e.g. shifting cultivation, paddy, cash – crops, daily/ seasonal wage labor, animal husbandry, forest products etc.)
- Variation of livelihood systems within the communities: What household do what? And especially: how many and which households (criteria like: poor/ wealthy, those which much/ little land, with/ without paddy land etc.) practice shifting cultivation?
- What is the land rights situation of the communities covered by the study? What are the respective land and other relevant laws and how do they impact on land and forest use?

3. Description of the shifting cultivation system

- The present shifting cultivation system (cycle length, main crops grown etc.) and changes that have occurred or are occurring
- Legal/ policy framework: what is the legal status of shifting cultivation; what policies exist and how do they impact on people practicing shifting cultivation
- If there are restrictive laws and policies: How do people cope and adapt?
- If diversity within communities: How many households practice shifting cultivation, why do some households practice it and others not?
- What are the advantages and disadvantages of shifting cultivation and the alternatives as identified by the people?

4. Livelihood and food security

- To what extent does the current livelihood system meet the needs of the people in the community (income vs. expenses, food security etc.)? Which households have problems and why?
- What are recent and ongoing changes in livelihood and food security? What are the driving forces?
- What is the contribution of shifting cultivation to overall livelihood security? What has changed and why?

- What is the situation as compared to other households that are practicing other forms of livelihood?
- Identify external (Macro – economic, political, legal, policy) and internal (social and cultural) factors that hinder and facilitate achieving and sustaining livelihood and food security
- Identify specific good practices in adaptive changes among shifting cultivation communities in relation to livelihood and food security, biodiversity conservation, land tenure and natural resource management
- Identify intervention measures supporting and promoting good practices in adaptive changes among shifting cultivator communities in the region, including reviews of relevant law and policies

5. Prospects and recommendations: The future scenario from the perspective of the farmers themselves

- Do the farmers want to continue practicing shifting cultivation of would they prefer other alternatives? What are the reasons given?
- What future role do they foresee for shifting cultivation, if any, with respect to livelihood and food security?
- What are the challenges for continuing shifting cultivation?
- Does shifting cultivation have any other particular benefits, or what benefits could it have in the future?
- What are the particular needs with respect to policy and extension intervention?