



Diversity *Degraded*

**Vulnerability
of Cultural and Natural Diversity in
Northern Karen State, Burma**

**A report by
The Karen Environmental and
Social Action Network**

December 2005

ACKNOWLEDGEMENTS

Thank you to Terre Des Hommes-Germany for funding the research and publication costs for the Karen report, Novib for supporting the English version and Images Asia Environment-Desk for providing some resources. Special thanks to Katie Friendship who has put a lot of her energy into translating, compiling and editing the English version of this report. Thank you also to all who were involved in the editing process as well as to J.F. Maxwell for his expertise in identifying plants, to Liane Chamsai for her scientific advice and to Molly White for help in the initial research. Our heartfelt thanks go to our advisor *Ajarn* Supaporn Phokaew for her communication expertise guidance in our research process. We would also like to express great appreciation to all the people from Ta Paw Der Village. Without their help offered under great risk, the report would not have been possible.

About KESAN

KESAN is a non-profit, grassroots organization created by Karen individuals who share a concern for the future of our Indigenous land. It is the first Indigenous organization of its kind that attempts to unite and address both socio-cultural and environmental issues.

KESAN addresses environmental concerns from a local, Karen point of view. We believe that the preservation of our Indigenous knowledge can protect our rivers, forests and lands for the future. We furthermore believe that when we care for our Indigenous lands, we are simultaneously protecting Indigenous culture. The two are inextricably linked. Environmental and cultural protection begins with empowerment; giving our people a voice, room to grow and giving expression to our knowledge and experience.

KESAN was the result of networking and the subsequent merging of different individuals along with the grassroots Karen Nature Conservation Group, established in 1997. Officially founded along the Thai-Burma border on November 18, 2001, KESAN has since implemented many environmental projects and carried out valuable field research. KESAN's environmental efforts are aimed specifically at Karen lands in and around Karen State, Burma.

ACRONYMS

| | |
|-------|---|
| DKBA | Democratic Karen Buddhist Army |
| IDP | Internally Displaced Person |
| KESAN | Karen Environmental and Social Action Network |
| KNU | Karen National Union |
| NTFP | Non timber forest products |
| SLORC | State Law and Restoration Council |
| SPDC | State Peace and Development Council |



TABLE OF CONTENTS

| | |
|--|----|
| Preface | 6 |
| Executive Summary | 7 |
| Introduction | 8 |
| Rationale and Methodology | 9 |
| Background | 10 |
| Land | 10 |
| People | 10 |
| History..... | 10 |
| Biodiversity in Burma..... | 12 |
| Karen State and Mu Traw District..... | 13 |
| The Situation Today: Current Problems Affecting Biodiversity | 14 |
| Increased Militarisation..... | 15 |
| Destroyed Villages and IDPs..... | 15 |
| Relocation Sites..... | 16 |
| Refugees in Thailand..... | 16 |
| Community profile | |
| General facts | 18 |
| Location..... | 18 |
| Religion | 18 |
| Traditional Dress | 19 |
| Health | 19 |
| Livelihood of local people and local resources | 21 |
| Forest..... | 21 |
| Wildlife..... | 23 |
| Water..... | 24 |
| Deforestation..... | 24 |
| Traditional Knowledge and the Natural Environment..... | 25 |
| Agriculture..... | 26 |

| | |
|--|----|
| Local strategies for the protection of agricultural diversity | 29 |
| The Karen Rotational Farming System..... | 29 |
| Karen Calendar..... | 34 |
| Site Selection..... | 35 |
| Weather..... | 36 |
| Seed Planting Strategies..... | 36 |
| Seed Collection and Storing Techniques..... | 37 |
| Rice Properties and Techniques..... | 38 |
| Seed Exchange | 39 |
| | |
| Problems in cultivation management | 42 |
| Pests and Diseases..... | 42 |
| Animistic Aspects in the Karen agricultural system | 42 |
| | |
| Role of women | 45 |
| Children and biodiversity | 48 |
| Rituals and beliefs | 50 |
| Thet Ku..... | 50 |
| Ther Tor Toe..... | 50 |
| Bue Mo Bwa..... | 51 |
| Selection of trees for building..... | 51 |
| Animal ownership..... | 53 |
| Pwo Poe Deh Baw..... | 53 |
| Tha Lay..... | 53 |
| Funerals..... | 53 |
| The Clearing and Planting Process..... | 54 |
| Land that is Never Used..... | 55 |
| Ker Wor Hee..... | 56 |
| Other Beliefs..... | 55 |
| | |
| Thoughts and concerns for the future | 58 |
| Conclusions | 59 |
| References | 60 |
| Glossary | 61 |

Appendices

- Appendix 1: Map of Karen State
- Appendix 2: Map of Mutraw District
- Appendix 3: Upland Rotational Crops
- Appendix 4: Common Garden Plants
- Appendix 5: Traditional Medicinal Plants
- Appendix 6: Detailed Information of Medicinal Plants
- Appendix 7: List of Local Rice Varieties and their Current Status
- Appendix 8: List of Local Sticky Rice Varieties and their Current Status

Photo tables

| | |
|---|----|
| TABLE 1: Traditional Dress..... | 20 |
| TABLE 2: Non Timber Forest Products..... | 22 |
| TABLE 3: Natural Resource: Bamboo..... | 27 |
| TABLE 4: Rotational Farming System..... | 30 |
| TABLE 5: Diversity of Cultivated Plants..... | 31 |
| TABLE 6: Diversity of Cultivated Plants..... | 32 |
| TABLE 7: Local Bean Varieties in Upland Fields..... | 33 |
| TABLE 8: Seed Preservation and Crop Storage Techniques..... | 40 |
| TABLE 9: Animist Tradition, Paying Respect to Nature..... | 44 |
| TABLE 10: Women’s Role in Food Security..... | 47 |
| TABLE 11: Children’s Relationship with Nature..... | 49 |
| TABLE 12: Animist Tradition; Paying Respect to Nature..... | 52 |

Preface

First of all, I would like to congratulate KESAN and the research team for putting together this outstanding report. I do not exaggerate when I say that this book is the outcome of true bravery. There are so many silent communities in Burma who do not have the chance to be seen or heard by the world due to the ongoing civil war. This includes the ethnic Karen village in Mu Traw District, Northern Karen State, focused on in this report. To conduct research in this war torn area, where people have little security and no freedom of expression is both difficult and risky. Indeed, the courageous work of the research team and the brave participation of the local people are the most crucial factors leading to this report's success. Therefore, the outcome of the research published in this book not only reflects Karen traditional livelihood and community but also echoes the voices of these silent people.

After reading this report, I feel tremendously disheartened with the finding that, "the longstanding civil war is having great effect on the Karen's traditional livelihoods and is preventing them from using their environment in a sustainable manner". In this book, the Karen's unique wisdom, found in their traditional methods of managing natural resources and preserving biodiversity, is collected and documented. The report's analysis clearly demonstrates that Karen forest management practice and the richness of the forest biodiversity are both closely related and endangered.

However, there is a ray of hope in the existence of this report. Rather than being an end in itself, this research paper is highly invaluable as a means to an end. By using participatory research methods, the local people are more confident, and are prouder of their traditional knowledge and practices regarding the sustainable management of their natural resources. In addition, the Karen youth in this research team have had an opportunity to learn and now to disseminate their ancestors' wisdom to the general public. As a result, the Karen may be better able to maintain and develop their traditional knowledge from generation to generation so that the biodiversity of their land can be preserved. Lastly, this report confirms my understanding and firm belief that to protect natural biodiversity we equally need to protect Indigenous culture.

Supaporn Phokaew

Lecturer

Faculty of Communication Arts, Chulalongkorn University



Executive summary

In traditional Karen society, knowledge and culture are closely linked to the natural environment. This report examines the effects of the longstanding civil war on Karen communities' cultural and natural environment with specific focus on the diversity of cultivated and collected plant species. The information for this case study is based on a survey done in an ethnic Karen village in Mu Traw District, Northern Karen State, Burma.

The case study provides a general overview of the community with a detailed look at the local knowledge-based farming systems. The traditional Karen rotational farming system is described in detail including selection of land and crops to be cultivated, the seasonal calendar, techniques of seed conservation and planting, together with spiritual beliefs that are connected to the agricultural practices. The report also outlines the importance of non timber forest products (NTFP) in food security and in women's traditional work.

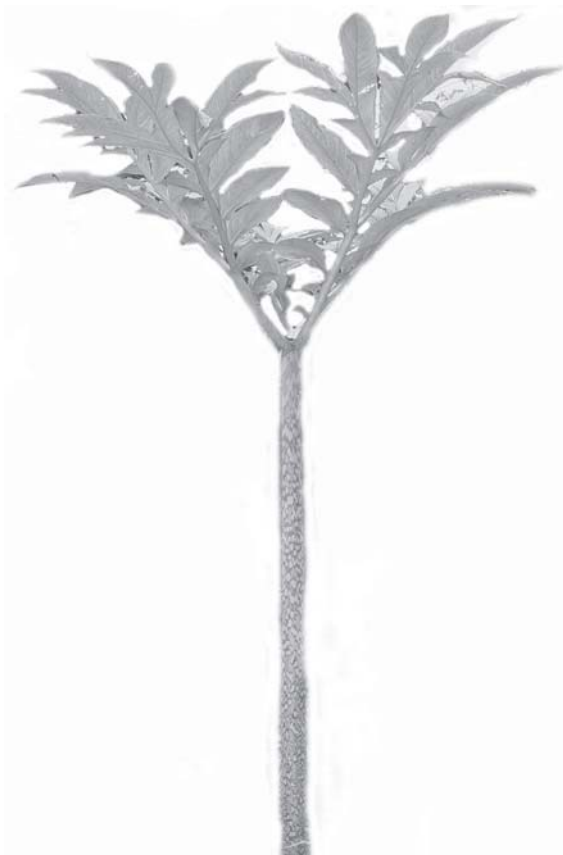
The results of this case study clearly shows that the civil war, which has been raging for almost sixty years between the State Peace and Development Council (SPDC) and the Karen National Union (KNU), is the primary reason for the loss of both traditional culture and biodiversity in Karen State. The fighting has caused tremendous human rights abuses imposed by the Burmese military regime who have adapted the strategy of targeting civilians in order to gain control over the ethnic insurgents. The local people have been relocated or forced to live as Internally Displaced People (IDPs) in the forest, far from their former villages and farmlands. This has resulted in massive population influxes into formerly uninhabited forest areas and has thereby led to the loss and degradation of forests and biological diversity. Relocation into areas less suitable for farming and the unsettled life of IDPs caught in conflict areas have disrupted the traditional agricultural practices. As a result, the food security of local Karen communities is threatened because many traditional seed varieties and wild edible plant species have been lost. The culture of Karen society also suffers because of its close connections and relationships to the environment and agricultural practices. Many aspects of Karen culture and local knowledge have already been lost.

Introduction

Cultural and biological diversity are strongly interconnected and are the basis for sustainable development and management. A loss in cultural diversity throughout the world, results in the loss of traditions, practices and ways of life for ethnic groups. Natural diversity ensures survival and allows for stability in the environment. Unfortunately biodiversity in ecosystems, species and genes are being challenged and becoming endangered. Ecosystems are being lost or changed, species face extinction everyday and genes are being modified for the "benefit" of human development. In order to avoid this global homogenization and disintegration both in terms of cultural and natural diversity, local cultures need to be strengthened and natural resources need to be protected. One way to effectively implement this is by reaching today's indigenous youth. It is vital to encourage the younger generations to conserve their cultures and their environment. It is also essential to analyze how indigenous cultures have been practicing sustainable livelihoods and using their knowledge for so many generations. The best way to stop cultural erosion and loss of biodiversity is to return to and maintain these deep understandings and traditional sustainable practices.

Burma's environmental destruction is caused in large part by the ongoing civil war, the regime's (the State Peace and Development Council or SPDC) continual struggle for power, and the people's struggle to survive under these conditions. Both legal and illegal economic development such as logging, mineral extraction, infrastructure development and modern agriculture have also caused severe degradation. Politics are driving Burma to exploit its natural resources and its pristine environment causing a major loss of biodiversity and devastating some of the world's most fertile and resource-rich lands.

The Karen people have suffered greatly for many generations. They have experienced extreme conflict with the Burmese military dictatorship that has ruled the country under different incarnations since 1962. They have been in a state of civil war since the end of British colonial rule in 1948, and since the late 1980's the war has increasingly



turned against nature. In an attempt to expand and modernize their armed forces, the military regime initiated the "Open Door Trade Policy" in 1988, opening the country to foreign investment. This has resulted in major exploitation of the country's natural resources. Logging, mining, gas and fishing concessions have been sold to neighbouring countries such as China and Thailand at alarming rates. The environment has suffered serious degradation; this in turn has had a major impact on hundreds of thousands of ethnic people who depend on the land for their livelihoods.

In the late 1960s the "Four Cuts Policy", a counter-insurgency approach, was initiated. With this policy, the SPDC aims to gain control over the ethnic resistance groups by targeting their civilian supporters. It undermines the supply of recruits for the resistance groups by cutting off access to intelligence, food and finances (Global Witness, 2003). The Karen people continually face problems of food scarcity, social insecurity, economic hardship and forest degradation. As well, many areas that were once controlled by the Karen are now occupied by the SPDC. The villagers have been forced into military-controlled relocation sites or have fled to the hills and the Thai-Burma border.

Rationale and Methodology

The purpose of this report is to assess the civil war's impact on biodiversity in Karen State, with specific focus on edible plants. It aims to illustrate the Karen communities' reliance on wild and cultivated plants for survival, and how the Karen protect and conserve their environment in order to sustain their lives. Research was conducted in Ta Paw Der Village, Mu Traw District, Northern Karen State, Burma by the Karen Environmental and Social Action Network (KESAN) (For map see Appendix 1).

During the study, the community was involved in educational workshops and focus group activities. Participatory research methods were also used in order to gather information that reflects local perspectives. Data collected during the field trip consists of personal observation, results of focus group discussions, in depth interviews with knowledgeable individuals and case studies. This report is a preliminary study and the researcher experienced several difficulties when in the field, including both personal security, and safety for the individuals involved in the research, due to the ongoing civil war. The researcher returned to the village on three separate occasions and spent a total of six months Karen State collecting data. The data was then analysed together with the research team and related experts.



Land

Burma has an area of 678,599km² and borders Bangladesh, China, India, Laos and Thailand. It is located along the "greenbelt" of the Equator and is home to some of the world's most lush and diverse rainforests. Natural resources include petroleum, timber, minerals, precious stones, natural gas and hydropower.

Its climate is that of a tropical monsoon: cloudy, rainy, hot and humid summers, (June to September), with less clouds, sparse rainfall, milder temperatures and lower humidity during the winter (December to April).

People

Burma is divided into seven states and seven divisions. It is home to many different ethnic groups. It is estimated that 68% of the population is Burman, 9% are Shan, 7% Karen, 4% Rakhine, 3% Chinese, 2% Indian and 2% Mon. Numerous small ethnic groups such as the Kachin, Karenni, Chin and Wa make up the remaining 5% of the population (CIA, 2003). There are over 100 different dialects and distinct languages used in Burma. As of July 2003, the population was estimated to be 42,510,537. Other sources quote the population to be closer to 50 million, (Global Witness, 2003; The World Bank Group, 2002). In 2000, 25% of the population was estimated to be living below the poverty line (CIA, 2003). 75% of the population live in rural areas as subsistence farmers. Buddhism is the main practiced religion (89%), however Christianity (4%), Islam (4%), Animism (1%) and other religions (2%) are practiced as well (CIA, 2003).

History

For over 50 years Burma has experienced civil war and political unrest. Colonised by the British in 1885, Burma gained its independence from Britain in 1948. However, peace and progress did not come with independence. During colonial rule, British schools were set up throughout the country and the Karen accepted this offer of schooling more willingly than many of the other ethnic groups. Consequently, they rose to high positions in both the colonial administration and armed forces. Japan

entered Burma in 1942 and along with the Burmese, initiated the fight for independence against the colonists. The Karen however, revolted and fought for the British, causing deep resentments between the Burmese and the Karen. The borders of the Union of Burma were redrawn before the British colonists left. These borders encompassed seven of the resource-rich ethnic states, including Karen State, into the country. Since this integration, ethnic groups living in these states have been fighting for their autonomy. After the war in 1945, the movement for a separate Karen State, Kawthoolei, developed alongside Burma's independence movement .

Burma's political system was a parliamentary federal system that was replaced by a military dictatorship in 1962 when General Ne Win seized power. He established the "Burmese Way to Socialism", a policy which nationalized all private property and closed the country's door to the outside world. In the late 1960's, the "Four Cuts Policy", a counter-insurgency approach was initiated. With this policy, the SPDC aimed to gain control over the ethnic resistance groups by targeting their civilian supporters. This undermines the supply of recruits for the resistance groups by cutting off access to intelligence, food and finances (Global Witness, 2003).

In 1988, General Ne Win retired and the State Law and Restoration Council (SLORC) was formed. SLORC, in desperate need for cash, reversed the "Burmese Way to Socialism" to the "Open Door Trade Policy", opening the country to foreign investment. This resulted in the major exploitation of the country's natural resources. Logging, mining, gas and fishing concessions were quickly sold to neighboring countries, causing devastation to some of the world's most fertile and resource-rich lands. The money gained from foreign investment was used to purchase weapons and support armed forces and military intelligence to fight ethnic resistance groups. A semi-enforced boycott has prevented Burma from receiving loans from the World Bank and the International Monetary Fund. However, investments from China, Japan, France, United States and Southeast Asian countries have continued to play a major role in contributing to the Burmese economy (Global Witness, 2003).

Worldwide, nations have condemned the Burmese government for its human rights violations. One of the most notorious actions of the regime was the massacre of thousands of students peacefully protesting against the government in August 1988. In an attempt to shed some of the negative reactions it was receiving, the SLORC changed its name to the State Peace and Development Council (SPDC) in November 1997. Its top leaders remained in position maintaining and enforcing military rule and dictatorship.

Biodiversity in Burma

According to the most recent FAO assessment more than 40% of Burma is covered with forest. 75% of the forest cover is tropical rainforest and the remaining 25% is temperate forest cover (Global Witness, 2003). Burma is one of the most biologically diverse countries in mainland Southeast Asia. Half of the remaining closed forests in Southeast Asia are found in Burma and the country is home to a large number of endemic species.

Burma has approximately 11, 800 reported species of plants with 100 bamboo species and 800 orchid species (Ministry of Information, 2002). Over 1,000 of these plant species are endemic (SPDC, 2002). There are 300-recorded species of mammals, about 1,000 birds, 360 different reptiles and amphibians and 300 freshwater fish species (Eberhardt, 2002; Global Witness, 2003; Clarke, 1999; Forest Department Myanmar, 1991). There are 145 globally threatened species found in Burma including several large mammals such as the Asian Elephant, Gaur, Tiger, Clouded Leopard, Asian Golden Cat and the Asian Black Bear (Eberhardt, 2002). Burma has the largest population of wild elephants in Southeast Asia (~ 4,000) (Global Witness, 2003).

There are 34 officially protected areas in Burma which are classified as wildlife and bird sanctuaries, national parks, protected areas and elephant ranges. These areas make up 2% of the country's total land area (Clarke, 1999).



Hills of Mutraw District, Karen State

Karen State and Mu Traw District

Karen State is in the southeast of Burma, sharing its eastern border with Thailand and other borders with Mandalay Division, Pegu Division and Shan, Mon and Karenni States. The population of Karen State, which is divided into seven districts, is estimated to be 1,431,377 (Ministry of Information, 2002). The seven districts in Karen State each face different levels of control by the SPDC (For map see Appendix 1). Approximately 1/6th of the population live as Internally Displaced People (IDPs) (261,000 people) and more than 116,800 Karen refugees are living along the Thai border (Global IDP Database, 2003; UNHCR, 2003). It is also estimated that approximately 7 million Karen people live throughout Burma (Singaporean Karen Seminar, 2003).

In this report we focused on Mu Traw District (referred to as Papun Township by the Burmese military government). The district has a population of 125,320 (CIDKP, 2000). This includes an estimated 37,000 IDPs (6,617 families) that are hiding in the district's forests (Global IDP Database, 2002).

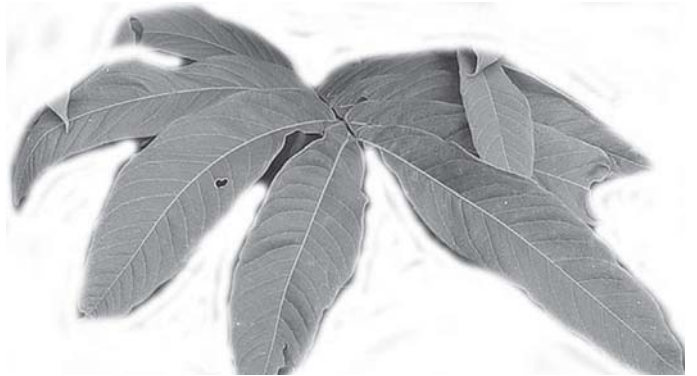
Mu Traw District is in the north of Karen State, where 96% of its population is Sgaw Karen. The remaining 4% are Shan, Burman and Pa-O. Mu Traw is a very mountainous region and the Karen practice wetland rice cultivation and traditional rotational farming. Main food crops include more than 40 varieties of rice, sesame, sugarcane, chillies and coconut. Here, the rainy season lasts from May to October, followed by a cool season from November to January and a dry/hot season from February to April.

1 Internally Displaced People [...] are "[...] persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border." (Global IDP Project, 2003)



The Situation Today: Current Problems Affecting Biodiversity

The Karen are intimately connected to the land and the transmission of conservation-based knowledge is an integral part of their culture. Before the civil war, the people in this region lived peacefully, practising rotational farming while sustaining the environment and maintaining regional biodiversity. There was no need for cash crops to be cultivated and families would solely rely on subsistence farming. Additional food supplies were gathered from reserved areas of forest that were rich in edible plants. Parts of the forest were also off-limits to cultivation in order to give wild animals a space to live.



Properly practiced rotational cultivation uses the land for one year and then leaves it fallow for seven to ten years before it is used again. This method allows the soil to recover and maintain its fertility, making chemical fertilizers unnecessary. This form of cultivation involves long, complex and deliberate systems using extensive forest management techniques. The Karen have been able to preserve many seed varieties, giving them a rich variety of cultivated plants. Today in Mu Traw District, traditional rotational farming has become almost impossible because the military had it abolished. Seed varieties that have been cultivated and preserved for generations are being lost. Unsustainable agricultural practices are increasing, resulting in the loss of more and more pristine forest areas.

During recent years, the natural resources of Karen State have faced increasing exploitation, both legal and illegal. Logging, gold mining and charcoal production by foreign investors, the SPDC, ethnic resistance groups and the urban-poor have all contributed to the exploitation of Karen State's resources. Commercial logging and unsustainable agricultural practices have seriously affected the environment and economy in Mu Traw District, resulting in numerous social and ecological problems. Local temperatures are reportedly rising, water levels in the streams are dropping and both wild and cultivated plant species are on the decline. The loss of natural resources is threatening the livelihood and the food security of the local people.

Increased Militarization

In order to secure access to natural resources and to triumph over the KNU, the SPDC has particularly been putting intense pressures on the people of Mu Traw District since 1997. The SPDC wants to gain complete control of the area for commercial logging and hydropower development on the Salween River. They are forcefully trying to bring all rural villages under military control by increasing military presence in the area, forcing villagers into SPDC-controlled relocation sites and by burning and destroying villages. They are also building roads to solidify control and to bring supplies to the new army camps. In 2000, there were 36 battalions in the area, compared to 21 in 1998, plus 32 mobile units (CIDKP, 2000). Not only does the Karen community in Mu Traw have to deal with the pressures of being caught in the middle of the SPDC-KNU conflict, but they also must cope with the presence of the DKBA; a pro-SPDC splinter group of the KNU which is also involved in the fighting. Having the DKBA in the area puts even greater pressure on the villagers.

Destroyed Villages and IDPs

The SPDC's warfare strategies against the KNU, the Karen insurgents, threatens the lives of Karen civilians. Civilians have become the target for military offences and the SPDC aims to weaken the KNU by cutting off provision, supply lines and other possible support from the local people.

In Mu Traw District at least 200 villages have been burned down, destroyed or abandoned since 1997, leaving an estimated 37,000 villagers hiding as IDPs in the hills (CIDKP, 2000). The farmers' fields, and areas surrounding the villages are mined to deter villagers from returning. The cultivated land has to be abandoned and with the danger of landmines it is impossible to practice traditional farming systems or even harvest the crops that have already been planted.

SPDC soldiers seek out and destroy food supplies hidden in the forest by the IDPs. The soldiers have orders to either shoot the villagers on site or force them to the SPDC relocation sites. In the forests, the IDP families sleep on the open ground or in small makeshift shelters. Health care and education is nearly non-existent. They rely on traditional medicine to prevent and cure diseases. The majority have to cope with starvation and are severely malnourished.

The Karen IDPs secretly try to cultivate small plots of rice in the hills to avoid detection. In order to prevent becoming victims of the SPDC, they must abandon their traditional cultivation methods and ignore their own environmental protection

rules. The Karen are forced to encroach into areas that are not suitable for farming and under these unfavourable circumstances the environment becomes severely degraded.

Relocation Sites

There are 127 military-controlled relocation sites in Karen areas (99, 765 people) with 14 (12, 200 people) being in Mu Traw District (BBC, 2002). At these sites space is extremely limited. There is little land to grow crops and no paying jobs available for the villagers. Fields at the relocation sites are being used year after year, allowing no chance for the soil to renew its nutrients. Villagers at these sites face forced labour or portering. They often work for no pay for the military or for foreign companies that have moved into the State. The villagers are always at the mercy of the regime whose treacherous human rights abuses include torture, threats, rape and extrajudicial killing. The villagers have to satisfy demands from the army for food and money. They have to pay taxes, fees and meet crop quotas; otherwise they face serious repercussions. There are strict curfews and the farmers are constantly labouring for the SPDC: this leaves little time to plant and care for their crops and results in food shortages. Many villagers flee to the hills or go to the Thai border in order to avoid relocation to SPDC-controlled sites.

Refugees in Thailand

Escaping to the Thai border is difficult and very dangerous, taking 3-5 days on foot through hills and jungle. Even if successful, life in the refugee camps is not easy; the camps are very crowded (more than 116,800 refugees) and space is limited. The Karen cannot live by traditional means. There is barely space to grow small vegetable gardens and the surrounding forest areas have been exhausted. They are forced to rely entirely on international support for food and other basic essential needs.

The Karen villagers are passionately attached to their land. Many are Animists who worship the spirits of the land and their ancestors; most would rather die than leave their land and country, often they have no choice.



Community profile



Location

Mu Traw District lies in north-eastern Karen State, Burma. It borders the Salween River, which runs between Burma and Thailand. The case study concentrates on Ta Paw Der Village, located in Yeh Mu Plaw Village Tract, Lu Thaw Township in Mu Traw District. Ta Paw Der has a total land area of approximately 16.45km². The KNU controls ten of the twelve village tracts located in Lu Thaw Township. Ta Paw Der is believed to be about 300 years old and relics indicate that an ancient Ger Wa village (tribal group) resided in the same area. Four other village settlements in this area have been destroyed by the Burmese military during the civil war. (For map see Appendix 2)

There are 17,345 IDPs in Lu Thaw Township and 272 IDP families, amounting to 2,343 people within Yeh Mu Plaw Village Tract (CIDKP, 2000). According to the Ta Paw Der village headman as of July 2004, the village population is 211 people divided into 31 households.

After the initiation of the "Four Cuts Policy" in 1975, many villagers had to flee Ta Paw Der. Some went to the Thai border, others went to the cities of Papun and Toungoo, some fled to the Salween River area and others moved away after marrying outside of the village. The civil war has kept villagers constantly on the move in an effort to escape the control of the State Peace and Development Council (SPDC). In 1997, the remaining villagers were forced to move again, most to different areas around the original village site.

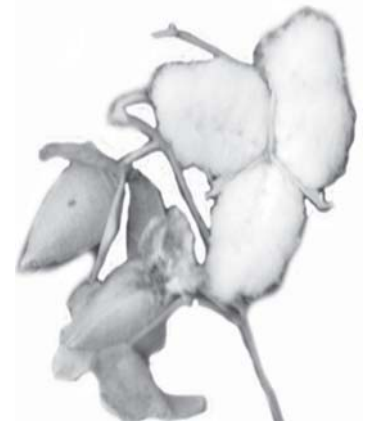
Concerns about safety and survival at the village have meant that villagers must constantly be on guard and cannot easily settle. According to the village headmen, Ta Paw Der would have a higher population if it were not for such security measures.

Religion

The main religion practiced in this area is Animism. There are also several practicing Christians.

Traditional Dress

The Karen have several forms of traditional dress. In Mu Traw District, the majority of Karen are Sgaw Karen. This dictates that single women wear a long white cotton dress (*Seh Mo Wah*), while married women wear a shorter black shirt with flowers and other decals (*Seh Moe Thu*). The cotton shirts are worn with a traditional sarong that is also made of cotton (*Nee Ghee or Nee Kok*). The men wear one of two types of red cotton shirts (*Seh Pah Kaw* or *Seh Pah Gwah*) and tie a cloth around their head (*Ko Per Tha Doe*: red or green; *Ko Per Ghee*: white, black, blue and green). Young boys also wear a red and white cotton shirt or a longer dress (*Seh Pah Gwah*).



Cottonplant

Health

The Ta Paw Der villagers have little access to western medicine. Hospitals and public healthcare do not exist. Only in severe cases will villagers try to go to the closest hospital which is in Day Bu Noe, a two-day walk from Ta Paw Der.

The community relies on the forests for traditional medicine. The village elders treat cases of malaria, cough and fever using forest products. The forest holds medicinal plants such as Nya Bo Jaw, Noe and Naw. The bark of these three trees is used to treat malaria. Diarrhea is cured by Tha Ko Kwee fruit, cuts are healed using Chaw Po Gway and toothaches are stopped by Ghray Tee bark.


In the past, the Karen relied solely on the use of traditional medicine but now very few people know these techniques; much traditional knowledge has been lost. Many people no longer know how to use the resources in their forests for healing. Furthermore traditional resources are also becoming very difficult to find or are no longer available. If the SPDC finds western medical supplies there could be severe consequences for the villagers. The SPDC does not allow the ethnic people to have access to western medicine in order to prevent them from sharing these resources with the ethnic insurgent group, the KNU. However with the lack of traditional resources they choose to brave the SDPDC and rely on western medicine. But the lack of education in the proper use of modern medicine could lead to fatal mistreatment and prove to be very dangerous. In addition to this, it is also very expensive to purchase.

TABLE 1: Traditional dress



1 Cotton plant (*Gossypium* spp., *Malvaceae*)
2 Traditional dress of Karen child
3 Married Karen women in traditional dresses
4 Fabrics with traditional Karen patterns made by hand loom

5 Traditional dress of Karen men
6 Young unmarried Karen women traditionally wear a long white dress
7 Karen woman weaving, using a hand loom



Community profile: Livelihood of local people and local resources

Forest

Ta Paw Der is located in the mountainous area of Mu Traw District. The remaining forest is in the Bilin River watershed and is tropical evergreen rainforest, called K'ner Ko in Karen. K'ner Ko is situated at a high altitude of approximately 3,500 feet above sea level. The climate is cooler and wetter than the lowland areas and various valuable soft and hard woods such as pine trees and Dipterocarp trees are found growing in the area.

The villagers depend on the forests for agriculture, wild food, building materials, traditional medicines, firewood and income. Many religious practices and ceremonies are related to the forest as well. In Ta Paw Der, villagers have an abundant food supply of more than 150 different kinds of edible forest products. Wild foods collected include banana, bamboo shoots, mushrooms, honey, varieties of ginger, ferns and many tubers and root species. Forests are incredibly important for food security, adding diversity to the diet, providing snacks, fodder for animals, and helping to make up for seasonal shortfalls. They must also help to supply food during transitional periods between the main harvest and the early stages of the planting season. Leaves are the most widely consumed forest food used in soups, curries and other dishes that accompany rice. Leaves and wild meats increase the nutritional quality of the food by providing protein, vitamins and minerals. Nuts and seeds provide oil and protein, while tubers and roots are an excellent source of carbohydrates and minerals.

Many forest materials are used for construction or to make various kinds of tools and sundries. There are at least 180 different kinds of trees and 28 different kinds of bamboo in the forest that are used by Ta Paw Der villagers. Sap from trees is used as glue. Musical instruments such as the horn, *D'Kree* (mouth instrument) and *Baw Gu* (The Karen xylophone, made from bamboo), which are commonly used for wedding ceremonies, are made from forest products.

Now, the situation has changed: it is not safe to hunt, or to collect vegetables from the forest. Villagers are prevented from going to parts of the forest because of the threat of landmines or the presence of SPDC forces.

TABLE 2: Non Timber Forest Products



1 Edible fern from the forest (*Diplazium esculentum* SW., *Anthyriaceae*)
 2 Eggs can be collected from ant nests as a source of protein
 3 The *Thu Lei* forest flower indicates that it is time for rice pollination
 4 The wild banana flower is another edible forest product

5 The fruits of this fig tree (Karen: *Ter Ku Tha*) can be eaten fermented or raw, the leaves are also edible when boiled.
 6 Cane shoots are edible and the stems can be used to make furniture
 7 The young stem of the *Ka* plant is edible
 8 Bee hive

| Tab 1. Natural Resources currently used in Mu Traw District | |
|--|-----|
| Crops planted in Upland Rotational farming systems | 200 |
| Forest Products | 166 |
| Beneficial Trees | 137 |
| Bamboo | 28 |
| Garden Plants | 38 |
| Mammals | 68 |
| Birds | 78 |
| Aquatic Life | 45 |

"When I was young, my grandfather planted rattan, banana, pineapple and many different kinds of food, made traps to catch the small animals from the forest and hunted using bow and arrow. In the summer, we would collect honey from the forest. We could also do a lot of fishing in the river." (statement by villager)

Wildlife

Detailed records of the fauna from Karen State are not available. However, according to local knowledge, the district was once rich in mammals such as guar, banteng, wildcats, bear, wild pig, pangolin, squirrels, monkey, gibbon, deer and barking deer. Large birds such as *Toe Kawk* (Great Hornbill), *Toe Kay* (Wreathed Hornbill), *Toe Pwa* (Peacock) and many other birds and reptiles inhabited Mu Traw's forests. Rare species such as tiger and rhinoceros could be found in the deep forests. But over the last decade wildlife biodiversity has been largely reduced. One villager said, *"In the past there were many hornbills and gibbons but now there is less forest and there are fewer animals"*.

"We stay in the jungle and we survive from forest products. We do not need to go to the town and buy things. We live in the jungle and we know that the forests are useful and important for our livelihood. If there is no forest we've lost our livelihood. There are different types of vegetables that people can eat, for example in the summertime black cane, bitter cane, K' Yeh (toddy palm) and wild vegetables are the food for the dry season. In the rainy season we get Por Du (ginger family), wild bananas, mushrooms, bamboo shoots and wild vegetables. If there is dot fruit, cardamoms and honey we can make income for our family too." (statement by elder woman)

The animals are being pushed out by IDPs who are forced to move deeper into the forest to cultivate land for food. Traditionally protected areas and species are now being used for food.

Water

The villagers in Ta Paw Der depend on the many small tributaries of the Bilin River for their daily water supply. The water is channeled into a central collection area for general use by using bamboo piping. Streams are not needed for agricultural practices as paddy rice is no longer cultivated in the lowlands and the upland rice cultivation depends only on rainwater. The water quality is high in The Ta Paw Der area, as many of the streams come directly off the mountainside, adding to the beauty of the district with their many waterfalls.

Deforestation

Unlike other areas in the Karen State, the main causes of deforestation in Ta Paw Der is from non-traditional shifting cultivation rather than from commercial logging, mining or charcoal production. Huge problems are caused by the great influx of IDPs who have been forced to leave their former land. Survival depends on agriculture and the increased cultivation encroaches into virgin forest areas.

Since there is not enough land to allow for the traditional fallow period of seven to ten years, fallow periods are now between two to four years, resulting in poor quality crops and reduced soil fertility. Many villages have been forced to further encroach onto old growth forest land.

"In the past I didn't cultivate on the very sloped land and in the very old forest. But now because we have to leave our land and move around, there is not enough land to cultivate and we have to do it in the old forest. If we do not do this we cannot survive. I know that these are not good places to use for cultivation but I have no choice. In the past the other villagers never practiced cultivation in the deep forest too, but like me they have no choice. This problem is because of the civil war. If the civil war in the area cannot stop, we will be faced with many more problems for our lives. Our land will be lost and the environment will be even more destroyed."

(says one villager from Ta Paw Der village)

The farmers are intimately attached to their land but their knowledge is localized. When they are forced to relocate they must farm in areas that they are not familiar with and do not understand as well. The Karen have many designated ecologically-

sensitive areas that are traditionally prohibited from being cleared, such as ridges, steep slopes, old growth forest and watershed areas. Even these areas are now being encroached upon.

In Ta Paw Der area, food security is not yet a serious problem but people are facing both increasing shortages of forest products and lower crop yields. The Karen culture is being eroded as they are forced to use traditionally protected land. The communities are frightened of losing their valuable resources but they do not know how to control the situation. They realize that what they are doing is causing serious problems for the environment but with the ongoing civil war they have little or no choice at all.

Traditional Knowledge and the Natural Environment

Karen culture is maintained by a strong oral tradition and lives predominantly in stories encoded with cultural values that are passed down from the elders to the youth.

***"Mo Seet Ger Daw Khu A Klee, Pa Seet Ger Daw Nweh A Klee
Ger Daw May Bweh Tor ther Hsee, Ta Kah Na Khay Per Der Thee"***

**"The mother advised us to save the seed of the taro,
The father advised us to save the seed of the yam.
If we save up to thirty kinds of seeds,
our lives will be sustained in times of crisis."**

This Karen poem told by the elders to the youth stresses the importance of protecting biodiversity. It explains the need to take care of the seeds in order to sustain their lives during periods of hunger.

Karen livelihood principles respect and acknowledge the need to take care of the entire environmental system. If they are going to use fish they must also take care of the water. Their traditional knowledge integrates practices of sustainable use and biodiversity management.

Young Karen achieve an understanding of traditional knowledge through observation, experience and practice. There is no formal education, though advice is given when needed. The Karen pass on their knowledge through storytelling, proverbs and poems. With the demise and loss of plant varieties and resources, some knowledge in these matters cannot be passed on and is disappearing. Furthermore, the great relationships and interconnections between nature and culture and the important links between local knowledge, biodiversity and natural resource management are being broken.

Agriculture

Traditional Karen agriculture relies on flatland paddy and rotational cultivation. The rotational system is a short cultivation and long fallow system. With the traditional system, the Karen are able to remain sedentary, establishing permanent villages by rotating between fields in one area. There is no need to continually search for new land. The Karen use a mixed cropping system to maintain diversity and high yields. Bulbs and vines such as taro and beans are planted together with the rice. While planting the upland rice, seeds of herbs and flowers are attached to the rice-planting spade and are simultaneously distributed throughout the field. A small section of the land is used for planting vegetables such as chillies, eggplant and tomato. Millet and cassava are planted along the edges of the land.

The farmers also have fruit orchards. The Karen will usually keep a small house garden growing pumpkin and gourd and pea varieties. In some areas, they are starting to use sugarcane gardens to generate income.

Mu Traw is a mountainous area and traditionally there is little flatland rice paddy agriculture practiced. The paddy farms are established on the plains near the rivers. The fields depend on the river's water. Water buffalo or cattle are used to plough the fields. Farming takes place in the rainy season and farmers can plant every year for many generations.



During the rice harvest farmers from the same or from different villages practice joint labor to get the work done

These traditional practices have been greatly jeopardised and in many places are no longer possible. In Ta Paw Der, the people depend entirely on upland rice cultivation. Since 1975 they have not been able to safely grow paddy rice due to the close proximity of the SPDC military bases. Aunt Nah Nah, a Ta Paw Der villager remembers,

TABLE 3: Natural resource: Bamboo



- 1-3 House floors and walls are made of carefully selected bamboo stems
- 4 Bamboo is used for house construction
- 5 Bamboo is also used for basket weaving, which is usually done by men
- 6 Icons made from bamboo can be used in the fields to protect crops from animals

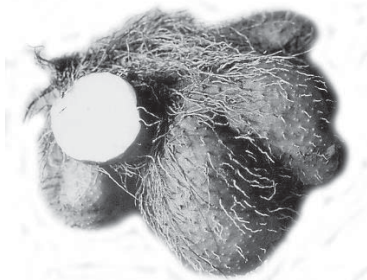


Pumpkin,
*Cucurbita
maxima*

Chilli,
*Capsicum
frutescens*



Fruits from a vine
cultivated for the edible
roots are being dried for
seeds



Edible root cultivated
on Karen uplands farms



Bottle gourd,
*Legenaria
siceraria*

"In the past (before 1975), we did not have to move all the time, we were able to practice cultivation and we had paddy lands. We were able to let the land fallow for seven to ten years and we could choose the good places to practice cultivation. Because we were able to do agriculture in this way, we had different vegetables and all our plants grew well. But now, because we are displaced and the village is not stable there is not enough land to practice cultivation and many cannot practice in the same way. We cannot let the land fallow for the right time and some people only wait two years because there are no good places in the forest to grow our food. There are many problems with the plants not growing and insect pests destroy the rice paddy. We cannot get the vegetables and fruit like we could before."

One of the major problems with being a displaced person is that it is very difficult to find places to practice cultivation. Consequently, some villagers move higher up into the mountains to grow their food or have to move deeper into the forests. Ideally, land should be left to lie fallow for ten to twelve years (depending on the regeneration rate of the forest). In practise seven years of fallow is the norm. During the fallow period, shrubs and small trees grow back allowing the fertility of the land to be restored. Because of land shortage, at present, it is being cultivated after only two to four years of lying fallow. The result is a decline in soil fertility and an increase of pests and weeds. Furthermore, after the short fallow period, there is less accumulated biomass and the land does not burn as efficiently when cleared. In the past, the villagers would plant bamboo, orange trees, jackfruit and other usable trees. These days such efforts are not made as villagers are constantly on the move or having to abandon their crops. Although they worry about losing seed varieties, they feel they cannot control the situation and do not want to waste their energies planting something they won't be able to harvest and use.



The Karen Rotational Farming System

"The people who are farming are the people who are balancing on top of the bamboo," is a proverb used amongst the Karen. Rotational cultivation is complex and heavily dependent on the weather, forest and land conditions. Like the proverb says, the farmer has to balance cultivation practices very carefully in order to achieve good results. By strictly following customary practices and rules you can stay balanced and be successful.

Karen upland farmers begin cultivation after clearing and burning the area. Each rice field holds many other species. In one community, in Lu Thaw Township, researchers identified 120 different kinds of edible plants used in rotational farming. In the past, about 180 species were used. Some examples include tobacco, cotton, chilies, eggplant, sesame, yam, taro and other vegetables. These additional crops can be cultivated throughout the early stages of rice cultivation and harvesting.

Planting begins in April/May and ends with the main harvest in October/November. The size of the area cleared for planting depends on the size of the family, the amount of seed available and the soil quality. The better the quality of the land, the fewer seeds that are needed because each seed will have a higher yield and so can be spaced further apart in the field.

After the main harvest, the land (Thi) is used as a seed bank for the Karen farmers. Perennials planted during the cultivation period continue to be harvested for several years. Chili, eggplant, yam, taro, cassava, herbs and other crops are left to grow on the fallow land for one to two years before the land is left to completely regenerate. Banana, papaya and pineapple can be reaped from the Thi for three or four years afterwards. These gardens allow the land to return to its natural biologically diverse state quickly. During the fallow period farmers will control the vines and thorn bushes to make future cultivation easier.

Cassava and millet are planted around the edges of the fields as a buffer between the forest and the rice crop or to separate different fields. These buffer crops protect the main crops from wild animals and birds who eat the buffer plants first.

TABLE 4: Rotational farming system



1 Clearing of uplands field

2 Uplands field ready to be planted after burning

3 Process of planting rice in the uplands field; men use sticks to dig holes, women sow the seeds

4 Young rice plants growing in uplands field

5 Rice is ready to be harvested

6 Collective harvest; unmarried men and women work together during rice harvest

7 After harvest the rice has to be dried for two weeks

TABLE 5: Diversity of cultivated plants



1 Woman collecting tobacco

2 *Mer Tru* is cultivated in uplands fields; the stem can be eaten raw or cooked

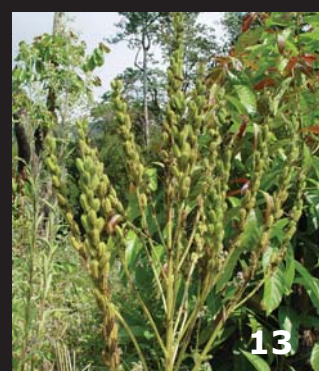
3 Mixed cropping in upland farm; corn is planted and harvested before the rice

4 The *La Tha* vine with sweet edible roots is planted below trees left in the uplands field

5 *Lu Tha* gourd

6 The *Paw Baw* flower is an important part of Karen ceremonies

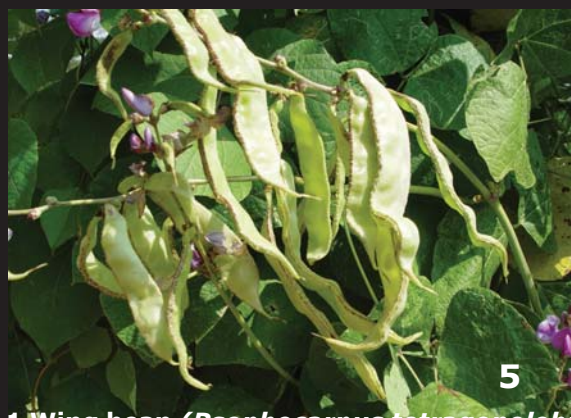
TABLE 6: Diversity of cultivated plants



1 *Da Tha* gourd; young fruit is edible, dried fruit is used to make cups
 2 Chilli plant in uplands farm
 3 *Ter Kaw Ka*; eggplant variety
 4 *Hor Pwee* (basil variety) is used as insect repellent in rice barns and seed banks
 5 Black millet is planted at the edges of the fields and is used to make whiskey
 6 *Paw Htoo* (Karen: "golden flowers")

7 *Paw Gaw* (Karen: "red flower") used for Karen ceremonies
 8 White rosella (*Hibiscus sabdariffa*)
 9 Okra (*Abelmoscus esculentus* (L.) Moench)
 10 Taro (*Colocasia esculenta* (L.)
 11 Millet (*Panicum miuaceum*)
 12 A Cereal; can be eaten like pop corn, stem edible
 13 Sesame (*Sesamum indicum* Linn.)

TABLE 7: Local bean varieties grown in uplands fields



- 1 Wing bean (*Psophocarpus tetragonolobus* D.C.)
- 2 Bean variety (Karen name: *Baw Ba Pa Doe*)
- 3 Yam bean (*Pachyrhizus erosus* URBAR); pods not edible
- 4 Bean
- 5 *Baw Ba Paw Lut* (Bean variety)
- 6 *Baw Ba Lah* (Bean variety)



The farmers are very careful about preventing forest fires and control their burning during cultivation. Traditionally, if there is an unforeseen fire on a piece of land that is ready for planting, the farmers have to wait another seven to ten years before they can use the land. With their belief system, the entire area cannot be used for cultivation during the waiting period and firewood and dry plants must not be collected from the land.

In Karen culture a "collective labour" system is practiced where different families work together and share responsibilities. Families help each other especially when it comes to labour intensive work that is hard to manage by one family. Clearing new sites for cultivation, planting and harvesting are done communally. The "collective labour system" extends also into other aspects of livelihood. The construction of a new house is done with the help of many. During labour intensive periods, villagers concentrate their efforts in the fields and do little hunting or fishing. Thus if one person goes fishing, hunting or collects forest products the profits are shared with the community. When it comes to "collective labour" all individuals are treated equally regardless of age; all are expected to participate and co-operate. Some villagers who have planted earlier than others share their yield with those that are waiting for their own crops to be ready.

The Karen Calendar

The Karen calendar is based mainly on signs from nature and does not follow the commonly recognised Gregorian calendar system. The moon cycle, behaviour of insects, birds and other animals, as well as the weather are the main factors influencing the Karen calendar. Signs from nature form the basis of the Karen agricultural schedule and also determine the timing of ceremonies and other aspects of daily life. Weather is also predicted using a combination of these natural signs. When the Karen hear the bird Toe Kwa (Blue-throated barbet) sing "Ku Klo, Ku Klo", they know that it is Tha Lay, and the time for Karen New Year. This happens around January after the harvest is finished. The farmers will use this time to choose new land for cultivation. The singing of Toe Kwa intensifies in February and March and begins to be accompanied by the Thee Thway insects. This is a signal to the farmers to begin clearing the land. If there are many Thee Thway insects making noise then the farmers know to expect rain. Their singing is a warning that rain will begin in a few weeks and that villagers are running out of time for the land to dry and be burned.

Tab 2. Schedule for cultivation

| | |
|------------------|--|
| January | Karen New Year (<i>Tha Lay</i>). Free time after harvest. Selling extra products. Daily work for extra income. Rebuild or repair houses. During the rainy season, when the Day Daw Raw Frog is heard croaking, it is a warning that heavy rain is looming and it is time to go home or prepare for rainfall. The Day |
| February | Site selection for new season. Begin clearing the land for cultivation. |
| March | Kwoh frog lets the farmers know that the sun will soon set. Clearing and drying the land. Prepare materials for building shelters in the field. |
| April | Clearing and burning the land. Building field shelters. Collection of firewood. Begin planting. Site Selection |
| May | Planting of rice and vegetables. Collection of firewood. Building field shelters. Finding the best cultivation plots can be quite challenging. Selecting a site requires both physical and spiritual considerations. Site selection is done during |
| June | Clearing the weeds from the land. |
| July | Ploughing fields for rice cultivation (flatland paddy farming). <i>Thet</i> ceremony. February. When a farmer chooses a new cultivation site he relies heavily on guidance from spirits, taboos and beliefs. Certain areas such as watersheds, high ridges and |
| August | wetlands can not be used for cultivation because it will disturb the spirits of the land. |
| September | Prepare for harvest. Used people. Make winnowing trays. System by forcing them onto rice barn land such as watersheds and wetlands: they cannot return to the right |
| October | Prepare for harvest. Weave mats. Make winnowing trays. Build cultivation sites for fear of violence. But, traditionally preferred areas contain many different species exhibiting unusually rapid growth. Villagers watch for land containing |
| November | Rice harvest. Pound rice. Conduct <i>Ther Tor Toe</i> ceremony. to many wild bananas and weeds or shrubs such as Ga Bee Choo, Toe, Toe Ga, Ter |
| December | Harvest other crops. Seed collection. Make whiskey. <i>Ther Tor Toe</i> ceremony. <i>Tha Lay</i> and <i>Kor Raw</i> because these are indicators that the area is not ideal. Bananas can grow much better and will have long complex root |

Weather is also predicted using a combination of natural signs.

- If the *Sgaw P' Nah Haw* tree is flowering then there will be rain. This is also the time to plough the fields. The Karen say that if *Sgaw P' Nah Haw* is flowering, the buffalo is crying.
- In the rainy season, if many ants enter the house, rain is predicted and if it is warm, humid and thunder is striking, mushrooms will grow.
- If a group of termites or ants cross on the road and the *Low Lweh* insect is singing, the end of the rainy season is near.
- Rain will usually come forty days after the water festival in the rainy season.
- If red ants make their nest on the top of the trees there will be flooding and if they make their nest at the bottom of the tree, there will be storms.
- If the *They Nya Ou* tree has long flowers hanging on its branches and the *Ter Kweh* tree has many fruits then there will be heavy rain and flooding.

systems that interfere with the crops. Sandy and soft soil is also not good for growing rice. In order to have a successful harvest, the soil must be dark (black), heavy and rich. The farmers will judge the soil by smell, texture and colour. Many kinds of bamboo (*Wa Glu, Wa Bway, Wa Thaw Keh*) and *Tha Thwee Mee* and *Per Da* the land is ideal for planting rice.

Seed planting strategies

For many generations, the Karen have been able to practice sustainable cultivation and maintain a great number of seed varieties. Genetic diversity allows for food security and thus must be carefully managed. Traditional practices and beliefs provide the people with the tools and the knowledge to appropriately handle and conserve seed varieties.

Estimating the best time for planting requires specific knowledge. The farmers use the colour and consistency of the ash and the soil, after burning the plot in order to decide the optimal time for planting. A very dark or red soil cannot be planted on. If the soil is white and yellow then it is becoming too late for planting. *Hor Pwee* (basil variety), a strong smelling herb is dried and then kept with the rice and the seeds in order to prevent insect infestations. Some also use pine chips for the same purpose. Seeds from pumpkin and cucumber are dried and then wrapped in cloth. For edible plants from the taro and yam families, the tops of the bulbs are cut, rubbed with ash

and then kept in a dark, dry place. Plants that are grown from root cuttings such as cassava, yam as well as the stem of seeding herbs are hung from the ceiling in a cool, dry place. The cuttings from cassava and bamboo are also tied together and kept standing in the stream to keep them alive until it is time for them to be planted.

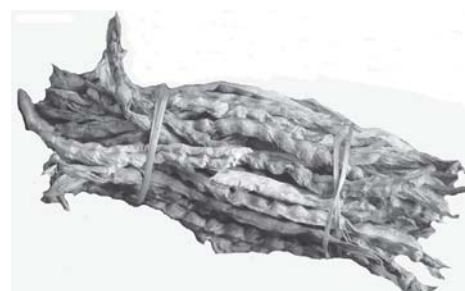
There are different beliefs about the best and worst times for planting. Planting is done at the beginning of the month because if rice is planted at the end of the month it will not produce fruit. Seeds which are planted during the time of the full moon will produce higher yields.

"If the seeds are not planted at the right time, then when we keep them insects will destroy them. If these seeds are planted too late, even if some grow, they will not grow well. It is important to know which seeds will grow at the right times".
(A Karen woman)

"Friday is the best day to plant for getting the most fruit and Saturday is a good day as well. The plants will be stronger and healthier if planted on these days. Monday and Wednesday are the worst days for planting; the plants will be weak and will not produce good yields."

Seed Collection and Storing Techniques

Seeds to be used in the following season are carefully selected. The majority are collected from October to December. The seeds must be mature, high quality samples that are collected and stored using proper techniques. When the farmers decide which plants they will collect the seeds from, the plants are marked so others will not harvest it. Runner plants (such as pumpkin, cucumber and beans) are marked by a string that is tied to the plant to show that it has been chosen. Corn is wrapped within its leaves; this also acts as a natural protection from predators.



Dry bean pods are tied together for seed storage.

The Karen store seeds using several different techniques. The seeds are never preserved with chemicals. Some are kept in a cool, dry place, packed in old cloth or kept in bamboo containers or baskets. It is very important to keep the seeds away from moisture. They are stored in the house, in the rice banks or in the old-field shelters.



Gourd,
Luffa spp.

The most serious problem farmers face today is keeping their seed stores safe from the Burmese military. In order to protect their seed banks from the Burmese soldiers, many villagers try to hide and store the rice and seeds in a shelter in the forest. The SPDC however, search out and destroy these banks and some villagers lose their stores. When using forest shelters, the seeds are also more susceptible to pest damage.

Hor Pwee (basil variety), a strong smelling herb is dried and then kept with the rice and the seeds in order to prevent insect infestations. Some villagers also use pine chips for the same purpose. Seeds from pumpkin and cucumber are dried and then wrapped in cloth. For edible plants from the taro and yam families, the top of the bulb is cut, rubbed with ash and then kept in a dark, dry place. Plants that are grown from root cuttings such as cassava and yam, as well as the stems of seeding herbs are hung from the ceiling in a cool, dry place. The cuttings from cassava and bamboo are also tied together and kept standing in the stream to keep them alive until it is time for them to be planted.

Herb seeds tend to be very small so entire branches are collected and dried. Drying the entire fruit in the sun or on a skewer hung over the fire protects the fragile seeds in their own casing; this process is used with chilies, eggplants, beans and squashes. Seeds dried over the fire are higher quality than those dried in the sun. This is due to the fact that the heat from the fire is more consistent and the smoke and soot covers and protects the seeds from insects and bacteria. Preserving the entire fruit is a more natural method of protecting the seeds. The seeds are only extracted before planting. The process of drying seeds needs to be done very carefully so that they last for the following season and produce high yields.

Rice Properties and Techniques

The staple food crop is rice. There are many different varieties of this essential crop grown in Karen State. In Ta Paw Der area, eighteen varieties of upland rice and eleven varieties of sticky rice are used. The rice varieties can be distinguished by the appearance of the plant, the grain texture (soft or hard), the time of harvest, the taste and the colour. Grain colours vary from red or black (sticky rice) to white, brown or yellow. Each variety of rice requires specific growing conditions to produce high yields. Some varieties prefer high altitudes and some prefer more humidity than others.

The rice varieties that grow better in higher elevations have harder grains and are usually brown or red. The flatland rice is softer and white.

Sticky rice is planted by every family, mainly to make whiskey which is used in special ceremonies, but also as an extra source of food. After the rice is planted in August, and in December after the harvest, the farmers will keep a handful of the rice seeds to make a ceremonial whiskey (*Bu Hse Klee* or *Bu Koh Joe*), which is shared with the community.



(*Bu Khar*)
upland rice
variety

The Karen are very careful not to mix rice varieties. Sticky rice is planted higher in the plot than the regular rice to prevent the sticky rice varieties from being mixed with the regular rice. If villagers notice seeds or plants that are different, they will remove them from the field immediately to prevent them from further mixing with other plants. In order to keep the rice varieties pure, the best plants are picked and the seeds are saved for planting in the following season. These seeds are kept separate when reaped and are then planted separately in the field until there are enough high quality rice seeds established.

Seed Exchange

In the past, every community and villager would borrow, trade or sell extra seeds to other farmers from their own community or from other villages. This system helped to prevent the loss of local seed varieties.

Over time, the focus of many farmers has changed as prices have increased and money has become more important.

Although there is still exchange between people within the community and between other villages, it has drastically decreased and as a result many rice varieties are being lost. This is having a detrimental effect on traditional farming systems.

"In 1985, when I was young I went to a place very far from my village (one day's walk) and collected betel nut from the other villagers' land because they had extra, left-over fruit. When I brought the nuts back to village, I sold 100 for only 15 Kyat. But in 2001, when I returned to the village someone was selling one betel nut for 5 Kyat. Now they only think about money and it is very expensive!" (a Karen villager currently living on the Thai-Burma border)

Tab 3. Timeframe for Seed Collection and Harvesting

| | |
|-----------|--|
| April | Start to plant seeds: yam, taro and pumpkin. |
| May | Planting of all seeds must be completed during this month. |
| June | Wait for new season's yield. At the end of June some vegetables can start to be collected such as pumpkin leaves and mustard. |
| July | Begin harvesting some vegetables: pumpkin leaves, wild vegetables and mustard. Corn can also start to be harvested at the end of the month. |
| August | Many types of vegetables are harvested. Seeds from several cucumber and bean varieties can start to be collected. |
| September | Start to collect seeds from melon, different cucumber species, chillies, tomato, eggplant and corn. |
| October | Begin rice harvest. Harvest gourds, eggplant, chillies, tomato, pumpkin, cucumber; both for food and seeds. |
| November | Collect seeds. Harvest root and tubers (for food) and some vegetables. |
| December | Finish rice harvest. Collect seeds for the next year. Harvest root and tubers for seeds. It is important at this time to focus on collecting and storing all seeds needed for the next season. |
| January | Finish collecting seeds for anything that was missed in December. Finish collecting tobacco and cotton crops. |
| February | Dry and store the seeds. |
| March | Dry and store the seeds. |



- 1. Herbs with small seeds are wrapped as a whole in *La Klue* leaves for drying.**
- 2. *Seeds of the Lu Klee* gourd drying on the wall.**

TABLE 8: Seed preservation and crop storage techniques



1 Maize dried over the fire
2 Seeds dried in the sun
3 Pumpkin in the barn
4 Cucumber stored in the barn

5 Drying seeds close to a traditional stove for the next cultivation season
6 Dried chilli garland
7 Herb drying on the wall



Pests and Diseases

Traditionally, for rotational cultivation practices the planting location was changed every year and the old land left to regenerate for seven to ten years. If the area is politically stable and security is guaranteed, the families will continue to rotate within their own plots. Currently, because of increasing land insecurities, sharing of fields is becoming more common.

Rice crop yields in rotational cultivation are highly variable. Low yields can be attributed to a variety of factors including insect pests, and rodents and other animal invaders.

When crops are infested with termites, farmers ferment bamboo shoots with lemon juice and water for three to four days in a bamboo pole. It is then sprayed onto the infected crop. In order to deal with caterpillar and slug pests, a goat is sacrificed in the field and the blood is mixed with water, the stomach and intestine contents. The solution is then spread onto the field. The blood attracts birds to the field that then help to eliminate the caterpillars. To prevent problems with rodents, traps are set in the field. Roosting posts are set up to encourage owls and other predators to inhabit the area. Scarecrows and billowing sheets are set up in the field to scare away birds and larger animals such as monkeys and wild pigs. Wind or water driven bamboo devices called Der Ka Lee, Deh Bor, Deh Bor Tee and Tee Baw, are noise machines that are set up to deter animals.

Animistic Aspects in the Karen Agricultural System

To explain crop failures, aside from easily recognizable factors like pests and diseases, the Karen draw on their animist beliefs. These explanations include phenomenon called Ku Ka Thwee, Bue Koo and Bu Keh, Ku Jute, Bue Plaw Tho and Bue Bloh. The Karen consider these to be more challenging to cope with than the "visible" problems.

Ku Ka Thwee:

The Karen believe that if water, honey, sap from a certain poisonous vine, urine or blood from the pangolin (*Yu Hor*) are spilt onto the soil, the water evaporating from the soil afterwards will kill the plants. Light rain, after the ground has been over exposed to sun, could also have the same effect. These elements will destroy the spirit of the soil and crops resulting in the rice losing moisture and dying. The Karen also believe that the process of burning and tidying the land of excess branches and debris, called *Gho Ku*, will make the land more susceptible to *Ku Ka Thwee*. In order to cure the field from the effects of *Ku Ka Thwee*, a special species of wild banana (*Ya Pla*) is planted where *Ku Ka Thwee* has occurred. This banana variety has high water content and can counteract the *Ku Ka Thwee* effects. Additionally, three short bamboo poles are placed in the ground, in the areas where farmers practiced *Gho Ku*, both as an indicator for and as protection against *Ku Ka Thwee*. The poles are put into the ground together, filled with a salty-sour solution and covered for 3 days. Moisture accumulated in the poles after this period then indicates the presence of *Ku Ka Thwee*. However, the poles are believed to clear the ground of excess steam and cultivation can continue without a problem.

Bu Koo and Bu Keh:

If affected by *Bu Koo* and *Bu Keh*, rice seedlings are weakened and could possibly die from premature planting when the ash and soil are too strong for cultivation. The leaves first develop white spots (*Bu Keh*) and then turn black (*Bu Koo*). The *Bu Koo* stage is more serious and more damaging to the seedlings than *Bu Keh*. This process can be reversed by fermenting the bark of the *Dhe Khoo Haw* tree in water for 3 days; the smell and the water will cure *Bu Koo* and *Bu Keh*.

Ku Jute:

This phenomenon is caused by late planting. Most of the ash has already been washed away by the rain, hence the soil has less fertility and the seedlings do not grow well. Burning rice husks, letting the smoke spread through the land, and then spreading the resultant ashes onto the field prevents *Ku Jute*.

Bu Plaw Tho:

This is caused by overly wet or dry conditions which are detrimental to young rice seedlings, especially during the flowering period.

Bu Bloh:

Bu Bloh occurs when rice is grown too fast on poor quality soil. The rice will not produce grains and will die. It is difficult to get any seed from plants affected by *Bue Bloh*. To prevent *Bu Bloh*, the plants are cut back before flowering to slow down the growth so that when they flower, the plants will produce seed.

TABLE 9: Animist tradition, paying respect to nature



1-4 Animist icons used for cultivation ceremonies can be found at the planting site to protect the crops. The icons are usually attached to poles or trees around the field together with food offerings for the spirits.



Community Profile: Role of women in food plant gathering

Women have very important roles in plant gathering and biodiversity preservation. It is their responsibility to collect resources from the forest, work in the fields and do the housework. As the primary house owner, generally the women have more responsibilities than the men. On a typical day, the women wake very early to begin preparing the food for the family and the animals. They pound rice in the morning, collect water, feed the animals, and then weave or collect food, either going to work in the house or on the land. They are also responsible for cooking the evening meal, collecting water and feeding the animals at night. The men generally spend the day working on the land and do not usually participate in the daily chores.

Women also have important traditional and religious responsibilities. One of them is to prepare the leaf-wrapped rice, either for the men to take to work, or for ceremonial use. They usually use leaves such as *La Klue Baw*, *Ya Baw La* (leaf from a type of banana plant) and *Per Da La*.

The responsibility of rice cultivation is shared between men and women. However, the women are responsible for sowing and planting most of the crops and for caring for the small house gardens. Additionally, the women are responsible for the selection of seeds. Women walk in the field and look for high quality fruit and mark them to prevent picking. Along with the collection of seed, women also process and store these seeds after the harvest.

Karen society is matrilineal and based on a co-operative family model. Both men and women have access to the forest, however women spend more time collecting forest products. Consequently, the women are most directly affected by changes to, and the degradation of, the forest. When vegetables and other forest products become scarce women have to go further in search of them. This causes an additional burden as they must work more, and they have less time for their other duties. The decrease in forest products limits their ability to generate the additional income which could be used to send their children to school.

Once a year during the dry season the women collect firewood. They usually collect dry wood and branches or bamboo for cooking fuel and for heat. The increased deforestation and IDP populations in some areas are making firewood gathering a difficult and time consuming task. Firewood shortages can reduce the number of meals cooked in a day and the length of time food is cooked therefore opening up the possibilities of malnutrition and food poisoning. In addition to this, it can also decrease the diversity of the food eaten. This too increases susceptibility to nutritional deficiencies and diseases. Although this is currently not a problem in the Ta Paw Der area, it could be in the future if preventative action is not taken immediately to manage the forests sustainably.



Women collecting Yam roots from the uplands field

TABLE 10: Women' role in food security



1



2



3



4



5



6

- 1 Woman collecting edible forest plants
- 2 Forest vegetables are an important part of the Karen diet
- 3 Woman collecting medicinal plants from the forest
- 4 Women have their own techniques for catching fish
- 5 Preparing Whiskey is also part of women's responsibility
- 6 Woman collecting firewood



Karen youth have daily responsibilities within the family such as fetching water and collecting firewood. After the age of ten, children go to work in the fields together with their parents. Karen children have an intimate relationship with the forest. From approximately age eight to fifteen, children spend most of their time in the forest. They fish, make small animal traps for hunting, shoot birds by sling-shot and collect fruit for their family. Most of their activities and games revolve around the forest and the use of forest products such as nuts, seeds and bamboo.

Karen children know many different kinds of forest vegetables and fruits. Fruit from the forest is eaten instead of sweets. During a children's workshop held by KESAN, the children (approximately twelve years old) were asked to collect useful plants. They each collected up to 170 different plant species that could be used for food, medicine and toys. The average number of species collected was approximately 80.

It is very important for young boys to accompany their fathers and learn traditional religious practices. The father is the head of the house and is responsible for carrying out all religious rituals. The son of a spiritual leader will inherit the position and be responsible for conducting community ceremonies.

Children learn about the natural environment by trial and error and by observation. The elders guide them when help is needed but very little knowledge is directly taught. They watch their parents closely and then mimic the adult's actions, learning traditional practices and techniques relatively independently. Unfortunately, in many areas of Karen State, parents are forced to abandon fields and become day labourers. Consequently, the children are deprived of receiving ancestral knowledge which is crucial in forming an intimate relationship with their environment.

TABLE 11: Children's relation to nature

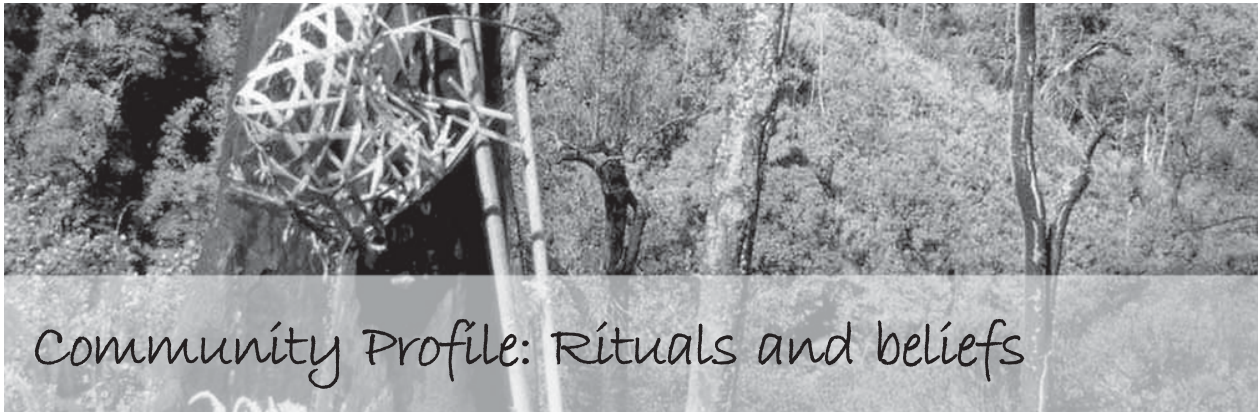


1 Common yam (*Dioscorea ssp.*) is an important part of the diet.

2 Children contribute to the family's food supply by trapping small forest animals

3 Karen children form close relationships with nature at an early age

4 Karen children gain intimate knowledge of nature through observation and their own experiences



Community Profile: Rituals and beliefs

Many Karen beliefs and rituals are related to agricultural processes, food production and the natural environment. Some wild plants prevent devils, thieves, enemies and diseases from entering the Karen's land and communities. Each cultivated species is associated with a specific set of beliefs. Annual ceremonies are held before the crops are planted and during the harvest. These practices form a part of effective resource management, which shows the deep connection between the Karen culture and their natural environment.

The Karen are facing a loss in their cultural diversity due to the destruction of the natural environment and loss of natural resources. The loss of traditions, practices and ways of life for ethnic groups is resulting in a loss of cultural identity.

Thet Ku *

Thet Ku is conducted in July to ask the spirits to take care of the land and community and to provide rich yields for the year. The ceremony is first conducted by the two community animist leaders and is then imitated by the rest of the community. For *Thet Ku*, special icons (at least five different types) are put in the field to protect the land and its crops. On the day of the ceremony no one can enter the field after sunset. On the following day only one family member can go on the land but they cannot do any work. During the *Thet Ku* ritual, a pair of chickens or a pig is brought to the land early in the morning and is sacrificed. The special procedures require accurate performance. If performed incorrectly they are stopped and the ceremony is resumed another day.

Ther Tor Toe **

Ther Tor Toe, conducted in November/December after the main rice harvest, is a special harvesting ceremony to thank the spirits for a good harvest. Some root and tuber species such as *Nweh*, *Khu* and *Lat Tha*, are believed to belong to *Toe Bhee Kha*, the spirit that takes care of the rice, and cannot be eaten until after the harvesting ceremony has taken place.

Some of the villagers do not have enough rice supply to last them for the whole year. Even after they have harvested the new crop, the Karen cannot eat the new rice with any meat (wild pig, monkey, barking deer, deer, bear, crab and scale-less fish)

until the *Ther Tor Toe* harvesting ceremonies are completed. Before eating the newly harvested rice, a handful of this grain is collected and kept separate for the *Ther Tor Toe* ceremony as an offering to the rice spirit *Toe Bhee Kha*.

Fruit and vegetables have to be cut in certain directions (i.e. lengthwise) until the head of the household conducts the *Ther Tor Toe* ceremony. If the fruit is cut the wrong way (i.e. horizontal) it is believed that the spirit's legs are being cut and it is being tortured. Vegetables and fruits are also never cooked together with meat until after the ceremony is held. Special flowers (*Paw Baw*, *Paw Gwaw* and *Paw Gwhee*) are placed above the doorframe to show that the harvest and special ceremonies have been completed. These flowers are thought to hold the spirit *Toe Bhee Kha* and are not cut except for these ceremonies.

Bue Mo Bwa

A special variety of rice called *Bue Mo Bwa* is planted close to the rice shelters in the fields. *Bue Mo Bwa* is a hardy, short stemmed, straight growing species that tastes bitter and is sometimes used in preparing yeast (*Ko Mee*) for whiskey production. It is believed to be the king of rice, taking care of the other rice varieties and other crops when it is planted in the field. Planting *Bue Mo Bwa* is thought to ensure good luck. This rice species is becoming rare and has nearly disappeared because the people are always on the move and are either unable to collect the seeds or lose them after they have been stored.

Selection of Trees for Building

The Karen are very careful about the selection of trees for building materials. *Nya Mae*, a tree with dichotomous branching, is not appropriate for housing. *Ta Oo Hse Naw* has a curved trunk and is thought to possess bad spirits. Two trees which cross and rub together are not used, nor are any trees with ant, bee or wasp nests. It is believed that using these trees will cause problems for the user and his family. *Mae Tee Plah* or crying trees have sap flowing out of the trunk and also are not cut down. Neither are *Lee Hue* trees that have three-way branching and are where eagles like to nest. Trees that are reflected by a water source are never cut. It is not only an offence to cut down any of these trees, but it is also believed to bring bad luck to the people who cut them down.



Karen animists believe that the wood of trees deformed by termites cannot be used for construction

TABLE 12: Animist tradition, paying respect to nature



1-3 The *Ther Tor Toe* ceremony is held after the main harvest in November/December. Similar to Thanksgiving, *Ther Tor Toe* involves different traditions and is an important ceremony for Karen communities.

There are similar beliefs in the use of bamboo. Bamboo is used for building walls and for flooring. When selecting bamboo to be used for the kitchen floor and the stairs, the Karen are very critical. Poles, which have had ants or other insects living in them, cannot be used. These are the most important parts of the house and high quality bamboo is necessary.

Animal ownership

The Karen are a matrilineal society. The animals (i.e. chickens, pigs and goats) belong to the mother and she is responsible for feeding them. If the mother dies then the animals are killed. After three to four months the family will get new animals and they will belong to the father. When the daughter or son is married, they must have their own. This applies even if they continue to live in same house as their parents. They have separate ownership and the animals are even housed separately. This is important for Animist ceremonies where each family must have their own animals.

PWO POE DAY POR

When a baby is born, the umbilical cord is taken to the forest in a bamboo container and attached to a special, carefully selected, strong and healthy *The Mae* tree. After securing the container to the tree it is left for three days and then either buried at the base of the tree or left on it. In Ta Paw Der area, the umbilical cord is left attached to the tree. But in other districts the Karen will plant a new tree and bury the umbilical cord underneath it when a baby is born.

Tha Lay

Tha Lay (meaning "the first month" in Karen) is the Karen New Year which takes place in December or January depending on the Karen calendar. Most of the farmers have finished their harvesting by this period, so they spend their time hunting for rats, birds and other animals from the forest. The women also have time to go net fishing and frog collecting. Some Karen use this time to go to Papun city to sell their extra crops for income or to find daily work. During this period, houses are repaired and rebuilt and the women begin the preparations for weaving. This month is a common time for weddings.

Funerals

Funerals take three days and include many different ceremonies. On the last day the ashes of the cremated are sent to a special area in the forest reserved for the deceased. In this area hunting, gathering and cultivation are prohibited. It is believed

to be a village for the dead people where the souls continue to live. When the ashes of the dead are taken to this forest their belongings, small carved icons and offerings of rice and whiskey are also brought. If there are deaths during the harvest season, the bodies are cremated and kept in a special bamboo basket urn until harvesting has finished. In December, also called *La Plue* which means "the month of the dead", a special collective mourning ceremony (*Hu Plue*) is held for all the people who have died during that period and the ashes are taken to the sacred forest.

During the farming season, when the villagers are involved in heavy labour, (such as clearing the land or planting) if someone dies they will wait until the farmers have finished clearing the land before holding the official three-day *Hu Plue* ceremony. Funerals involve the entire community and may include people from nearby villages.

The Clearing and Planting Process

Many taboos appear in Karen culture and are linked to activities and traditional practices. Before clearing the land for planting, one person (either the father or the son) has to clear a small piece of land and bring ceremonial flowers (*Paw Baw*, *Paw Gwaw* and *Paw Gwhee*) to the cleared area. Four trees are notched in the North, South, East and West points of the land and ceremonial flowers are hung from these notches. The flowers are a sign to show other people that the land belongs to the family and that it will be used for cultivation. Before the land is cleared, they collect fish (*Nya Plar*), which is taken to the new land to eat. *Nya Plar* (Mountain Carp) is a symbol of strength and health. The eating of *Nya Plar* ensures the health and strength of the land.

The person who clears the small area is restricted to a certain diet to ensure the success of the planting. They cannot eat animals with four legs, or crab, shrimp, scale-less fish (catfish) and frog on that day. The Karen's Animist beliefs dictate that certain types of foods carry bad omens at this time. Wild pig and barking deer can cause serious damage to the crops, so these are not eaten. Crabs do not walk in straight lines, while frogs and shrimp move in a jumpy manner: The Karen believe that eating these creatures will transfer these characteristics to them and their work. As a result, cultivation will not go smoothly and they will not achieve their goals. If scale-less fish are consumed it is believed that the harvest could be lost or will be incomplete due to the fact that the fish are seen to be deficient.

On the following day, provided no one in the family has had a bad dream the previous night, the Karen spends half the day clearing the forest off the cultivation land. On the day that they begin the clearing ceremony, if anyone in the family sees a snake

cross their path, sees the barking deer or hears it call, "go-go", or sees and/or hears the *Toe Da Bwaw* bird on the way to the site, it is a bad omen. The clearing process is then stopped for the day and the Karen will try again the following day. It is believed that if the clearing process is continued on that day then the season will be problematic. During the time when they are clearing the land if any accident happens (i.e. they see animals die on the land or if people have an accident), they stop clearing and abandon the land. It is believed to be a sign that the spirits are not happy and do not want them to work on that area of land.

Before the burning and planting stages if a snake, barking deer or *Toe Da Bwaw* bird is seen or heard then the activities are stopped and postponed until the following day. If they have already begun planting, they continue to plant the seed but the father will stop planting and will keep some seed which he will plant the next day so that the planting is not completely finished on that day. If they continue and finish the planting, the spirit of the land will be unhappy and leave.

If cucumber is eaten late at night, a small piece is hung from the ceiling above the fire. The Karen believe that if they do not do this, then many big animals (barking deer, wild pig, etc.) will come to their land and destroy their crop. The cucumber is thought to represent pig because both are large and fat.

Land that is never used

Day Mu Ber: This is land on a hill, between two tributaries of a river where the streams join the mouth of the river. Evil spirits live on this land and it cannot be used for planting.

Ta Day Doe: This area is in the valley between two mountains. It is never used for cultivation or for villages because it is believed to house evil spirits.

Du Mu Ga Mae (Widow land): When the husband or wife of a couple dies during the time of cultivation, then the land becomes *Du Mu Ga Mae*. This land can be cultivated, however not everyone is able to use it. Only widows and widowers have permission to use this land now.

Du Pu Tha Kwa: Only single males can plant on this land, which houses evil spirits, because they are considered stronger than families or females.

Ta Na Dee Kee: This is a piece of land that is at the bottom of a mountain but is divided from the mountain by a river.

Ker Wor Hee

If a snake or *Kwi* (small lizard) enters the house, it is believed that the reptiles will bring evil spirits to their home. In order to protect themselves, the Karen conduct the *Ker Wor Hee* ceremony. They weave a winnowing tray and collect grass, seven kinds of fruit, seven handfuls of rice and one bottle of whiskey. These are all put on the tray and offered to the spirit to send it away. They will sweep the sides of the house with the collected grass and then it is thrown away to a place where no one goes.

If wild animals enter the village it is also thought to be a bad omen caused by evil spirits. To protect the village the entire community joins together to conduct *Ker Wor Hee* and each family contributes to the offerings for the spirits.



Other Beliefs

If the bird *Ku Wah* (a Bird of Prey) comes close to the house or within the village grounds and makes a loud squawk, the villagers know that someone has died or a crime has occurred. They have to find out what has happened and pray to cleanse their village.

It is a bad sign to see a falling star. If someone sees a falling star, they cannot tell anybody else because if they do their lives will be shortened.

If tigers come into, or close to, the village it is a warning from the spirits that there will be some sort of crime in the village.

If a *Toe Be Bay* (kind of bird) calls and flies over your house or a butterfly flies into the house and stays there a long time, a guest or a relative from far away will come and visit you.

An earthquake is a sign that the spirits are upset. The land is not pure and the spirits are warning the villagers to beware. In some areas after an earthquake, the people must wash their hair and slick it with oil. Crops will not produce well if there is an earthquake.

If a woodpecker squawks and flies over the house, people in that house will become sick and could die.

If a pig or a buffalo turns water on the road into mud, there will be adultery committed in the village.

Karen Animists believe that thunder has its own God and when thunder strikes, it is God striking with a sharp point like an axe. When the fields are struck, the Karen make offerings to the spirit and feed it chicken and whiskey. Some believe that if a tree on their land is struck and split from the top to the bottom, then their land is lucky and they will have good crop yields.

Rainbows usually appear in the east and it is a bad sign if one appears in the west or if it is not a normal shape. If the rainbow is not normal then the villagers will face problems and someone will die unexpectedly. If two rainbows cross each other the Karen believe that the country will be in trouble and the political system will change. For the farmers, a rainbow means that the hot season will begin.

If a rooster or hen crows or squawks at dusk then it is not a good sign for the family and someone will get sick or will die.

If gibbons are screaming in the afternoon, then someone has died in the village. The Karen feel that primates can see the spirit of dead people and their screaming indicates their shock.

If the area is suffering from drought, the Karen elders will take their sharpening stone and put it in water. They pray to the weather spirits and tell them to make this stone dry or else if the spirits cannot, then to bring rain so that their crops and rice will grow well. If the rains are heavy and they have problems with flooding, then the elder will take the sharpening stone and a wooden rice utensil and put them in a bamboo basket placed on a stake in the field or they put the basket over the stove to dry the materials. Then they pray to the weather spirits and give them an ultimatum; make it rain so hard that the stones turn rotten and the wooden utensils grow back into trees again, or if this is impossible then you must lesson the rain and cease the flooding.

The Animistic Karen believe very strongly in these different rituals and taboos and feel it is very important to follow and believe them. Their future depends on it.

If the *Kho Kweh* bird (Trogon species) squawks at night, the village will be in trouble. If the call sounds like a mouse squeaking, then they will have a problem with rodent infestations and damage in their rice fields. If the call sounds like a pig, then wild pigs will invade the fields and eat all the rice.



Thoughts and concerns for the future

"Rotational farming has been done for many generations and we still have forest. The Karen have the knowledge to take care of their rivers, the forest and the environment. If there was no civil war we could have a permanent village and wouldn't have to move to other places. We would be happy with our own land and would be able to lead sustainable lives. There would be no need to keep cutting the forest for cultivation. When you cultivate in new areas of forest it is difficult to tell the proper times for planting and difficult to read the land. We cannot properly rotate on the land. We not only grow rice but we have to grow other vegetable crops to make curry for our meals, which is a problem because there is not enough land. If the civil war continues, the community cannot develop their village well. If there was no war and displacement, we would be able to maintain our traditions and live in the forest and on the land sustainably." (Karen villager)

When asked about the future of their forest resources most Karen villagers thought that the Karen would be able to use the forest in a sustainable way if the fighting stopped and they were able to practice their traditional cultivation methods. Most villagers are discouraged and have lost hope, feeling that nothing can be done until the end of the war. This fatalistic view among the villagers makes it difficult to make changes.

Having a village that is a politically secure and permanent settlement is of vital importance. If the community is not under continual threat of military attacks and disruption then they can live peaceful lives in a healthy environment. The instability of the village prevents the implementation of long-term projects despite an awareness of the need for such things. "If you cannot set up a stable village, then you cannot develop projects to help protect the forests and environment" said one local Karen authority. For all Karen, as a group living in a permanent conflict area, survival is the highest priority. Protecting their and their families' lives is a larger concern than long term management of natural resources.

The community acknowledged that the current war creates a need for more knowledge regarding sustainable forest management. They want and need leaders to take responsibility for formulating and enforcing rules to conserve their resources. As with

all such initiatives it is essential that the entire community is involved throughout the entire process.

The people with experience need to share their knowledge with others. Furthermore, the policy makers and those with power must take responsibility and set examples for the villagers by working closely with the people to conserve their environment and its diversity.

Conclusions

It is evident that the Karen have successful traditional methods for managing natural resources and preserving biodiversity. These methods are directly linked to agricultural practices and are deeply rooted in Karen culture. It can be concluded from this research that the longstanding civil war is having a great effect on the Karen's traditional livelihood and is preventing them from using their environment in a sustainable manner.

Ta Paw Der Village is just one example of how the civil war has caused a disruption in traditional practices, resulting in severe environmental degradation. In this area, the villagers have been forced to encroach into pristine areas of forest-land and abandon customary agriculture practices. This in turn is resulting in a loss of biodiversity of both cultivated and collected plants species, thereby threatening food security. The local people are aware of the need for a change in environmental management, however the political instability prevents this and the villagers concentrate on daily survival instead of the long-term management of their natural resources.

References

- BBC. September 2002. *Internally Displaced People and Relocation Sites in Eastern Burma*. Thailand.
- CIA. July 2003. The World Factbook. [viewed March 2004]:
www.cia.gov/cia/publications/factbook/geos/bm.html
- Clarke, J.E. 1999. *Biodiversity and Protected Areas-Myanmar. Regional Environmental Technical Assistance 5771-Poverty Reduction and Environmental Management in Remote Greater Mekong Region (GMS) Watersheds Project (Phase I)*.
- Committee for Internally Displaced Karen People (CIDKP). 2000. *Karen IDPs Report*. Friedrich Naumann Foundation, Nopburee Press, Chiang Mai Thailand.
- Eberhardt, K. August 2002. Myanmar Country Review. MMSEA Conference, Centre for Biodiversity and Indigenous Knowledge, China.
- Forest Department Myanmar. 1991. *Forest Resources of Myanmar, Conservation and Management*. Forest Department Myanmar, Yangon, Myanmar.
- Global IDP Project. January 2004. *Global IDP Project training package on the UN Guiding Principles on Internally displaced Persons*. [viewed June 2004]:
http://www.idpproject.org/idp_guided_tour.htm
- Global IDP Database. 2002. [viewed March 2004]:
www.db.idpproject.org/Sites/idpSurvey.nsf/%28wViewCountries%29/EC122D06BCE6C338C12567B00047FB21
- Ministry of Information. 2002. *Myanmar Facts and Figures*. Union of Myanmar, Printing and Publishing Enterprise, Myanmar.
- Burmese Government Site (SPDC). 2000. *Environmental Situation in Myanmar*. [viewed March 2004]: www.myanmar.com/environment/A.htm
- Nationmaster.com. 2004. *Burma Profile: Environment*. [viewed June 2004]:
<http://www.nationmaster.com/country/bm/Environment>
- Singaporean Karen Seminar. 2003. *Rebuilding Our Nation*.
- The World Bank Group. 2002. Myanmar. [viewed June 2004]:
<http://devdata.worldbank.org/external/CPProfile.asp?CCODE=MMR&PTYPE=CP>
- UNHCR. January 2004. Map of Myanmar-Thailand Border. UNHCR CCSDPT, Thailand [viewed September 2004]:
<http://www.unhcr.ch/cgbin/tegis/vtx/home/>

Glossary

Animals

| | |
|---|--|
| <p>Day Baw Kaw ဒုံဘီခိန်</p> | <p>When the <i>Day Baw Kaw</i> frog is croaking, it signals a warning that heavy rain is approaching.</p> |
| <p>Day Kwoh ဒုံကွိုင်</p> | <p>The call of the <i>Day Kwoh</i> frog notifies the farmers that the sun will soon set.</p> |
| <p>Kho Kweh (Toe Da Bwaw) ယိယန်</p> | <p>It is considered a bad omen to hear this bird (type of Trogon) at night. The <i>Kho Kweh</i>'s calls have different meanings.</p> |
| <p>Ku Wah ကူဝါ</p> | <p>A Bird of Prey, when its call is heard at night, the villagers know that someone has died or a crime has occurred in the village.</p> |
| <p>Kwi ခွိုင်</p> | <p>When the small lizards enter the house, they are thought to bring evil spirits into the home and the <i>Ker Wor Hee</i> ceremony is conducted.</p> |
| <p>Low Lweh လိန်လွိုင်</p> | <p>The singing of the <i>Low Lweh</i> indicates the end of the rainy season.</p> |
| <p>Nya Plar ညာ်ပျာ</p> | <p>The Mountain Carp is eaten before the land is cleared because of its symbolism of strength and health.</p> |
| <p>Thee Thway သိန်သွေ</p> | <p>The singing of the <i>Thee Thway</i> insect tells farmers that it is time to find a plot of land and begin clearing. If there are many <i>Thee Thway</i> insects making noise then the farmers know to expect rain.</p> |
| <p>Toe Be Bay ထိန်ဘိန်ဘု</p> | <p>If this small bird calls and flies over the house, the Karen believe test from far away will be coming to visit.</p> |
| <p>Toe Da Bwaw (Kho Kweh) ထိန်တပို</p> | <p>It is considered a bad omen to see or hear this bird (type of Trogon) during the clearing and planting processes.</p> |
| <p>Toe Kawk ထိန်ကိး</p> | <p>Great Hornbill</p> |
| <p>Toe Kay ထိန်ခွ</p> | <p>Wreathed Hornbill</p> |
| <p>Toe Kwa ထိန်ကွါ</p> | <p>The call of the Blue-throated Barbet indicates good weather, the end of harvest and time for the Karen New Year (<i>Tha Lay</i>).</p> |
| <p>Toe Pwa ထိန်ပွန်</p> | <p>Peacock</p> |
| <p>Y'Hor ယါဟိန်</p> | <p>Pangolin</p> |

Ceremonies and animistic beliefs

| | |
|---------------------------------------|---|
| Bu Keh ဘုယဲး | The first stage of a rice disease in which leaves develop white spots from premature planting. This could eventually lead to <i>Bu Koo</i> a more serious stage of the rice disease. |
| Bu Koo ဘုယူ | <i>Bu Koo</i> develops after <i>Bu Keh</i> when the rice leaves turn black and the plant may eventually die. This occurs from premature planting of the rice. |
| Bue Bloh ဘုဘျို | <i>Bue Bloh</i> occurs when the rice is grown too fast and with high yeilds on poor quality soil. The plants do not produce viable seed. |
| Bu Plaw Tho ဘုပျိုက်သိပ် | <i>Bu Plaw Tho</i> occurs from very wet conditions and affects the flowering stages of the rice. |
| Day Mu Ber နှံ့မှ်ဘာ | Land traditionally not used for cultivation. <i>Day Mu Ber</i> is an area on a hill between two tributaries of a river where the streams join the mouth of the river. |
| Du Mu Ga Mae နှုမ့်ကဲ | <i>Du Mu Ga Mae</i> is 'widow land' or the cultivation land of a couple where one spouse has died. Its use is restricted for widows only. |
| Du Pu Tha Kwa နှုမ့်သိပ်ခွါ | Only single males (The strongest) are allowed to use this land for cultivation as it is inhabited with evil spirits. |
| Ku Ka Thwee ခူးကသွံ့ | An Animistic belief, <i>Ku Ka Thwee</i> results from water evaporation (steam) on the land due to either various liquids being spilt on the soil (i.e. honey) or to heat which kills the crops. |
| Ku Jute ခူးကျူး | <i>Ku Jute</i> is caused by late planting and the rice seedlings do not grow well because of poor soil fertility. |
| La Ku Ki Sue လါခူးကိ်စု | An animistic ceremony held in August after the <i>Thet Ku</i> ceremony, which involves tying string on the wrists and calling to the spirits. |
| La Plue လါပျူ | December or the "Month of the Dead". This month is the traditional month for the <i>Hu Plue</i> ceremonies. |
| Hu Plue ဟူပျူ | Traditional communal mourning ceremony held for people who died during the working seasons. |
| Ker Wor Hee ကဝီဟံ့ | A ceremony that is done to protect the home or village from evil spirits; specifically when a snake or small lizard enters the home. |

| | |
|--|--|
| Pwo Poe Day Por ပိုင်ပိုင်ဒိုင်ပိုင် | Ritual conducted after a baby is born that involves the burial, or attachment to the <i>Mae</i> tree, of the umbilical cord. |
| Ta Day Doe တင်ဒိုင် | This area is in the valley between two mountains and is never used for cultivation or for villages because it is thought to house evil spirits. |
| Tha Lay သလှ | January or the first month of the Karen year. New Year's celebrations are held on the first of this month. |
| Ta Na Dee Kee တင်နဲဒိုင် | This is a piece of land that is at the bottom of a mountain but is divided from the mountain by a river. <i>Ta Na Dee Kee</i> is not used for cultivation as it is thought to hold evil spirits. |
| Ther Tor Toe သထီတိုင် | A ceremony held in November/December after the main rice harvest. |
| Thet Ku သဲးခုး | A ceremony, held in July, to thank the spirits for taking care of the land and ask them to take care of it in the future. |
| Toe Bee Kah ထိုင်ဘဲယာ | Spirit who takes care of the rice and the land. |

Clothing

| | |
|---|--|
| Ko Per Tha Doe ခိုင်ဖျာသတီ | Red or green cloth worn tied around a man's head. |
| Ko Per Ghee ခိုင်ဖျာကိုင် | White, black, blue and green cloth worn tied around a man's head. |
| Nee Ghee and Nee Kok နီကိုင်, နီယီး | Traditional cotton sarong worn by married Karen women with the <i>Seh Mo Thu</i> Karen shirt. |
| Seh Mo Thu ဆုမိသူ | Traditional black cotton shirt featuring various embroidered flowers and decals worn by married Karen women. |
| Seh Mo Wah ဆုမိဝါ | Traditional long white cotton dress worn by unmarried Karen women and girls. |
| Seh Pah Gwah ဆုပါကွိုင် | Traditional red and white cotton shirt worn by Karen boys and men. |
| Seh Pah Kaw ဆုပါဂီ | Traditional red cotton shirt worn by Karen men. |

| | |
|--|--|
| Baw Gu ပိကူ | Traditional instrument made from bamboo which is a variation of the xylophone and used during wedding ceremonies. |
| Bu Hse Klee ဘုဆဲးချုံ | Ceremonial whiskey made in August after planting the rice. |
| Bu Koh Joe ဘုခိုင်ကို | Ceremonial whiskey made in December after the main rice harvest. |
| Deh Bor and Deh Bor Tee ဖဲးဘီး, ဖဲးဘီးထံ | Bamboo instrument used to deter animals from the fields. |
| Der Ka Lee ဒါကလံ | Bamboo instrument used to deter animals from the fields. |
| D’Kree တယံ | Traditional mouth instrument made from bamboo. |
| Go Khu ဂိုနူး | The process of burning and tidying the land of excess branches and debris after the original burning and clearing of the cultivation site. |
| Ko Mee ကိုမံ | Yeast derived from <i>Bue Mo Bwa</i> rice and used to make whiskey. |
| Lee Hue လိဟူ | Tree with three-way branching (traditionally not used for building). |
| Mae Tee Plah မဲထံပျှံ | Tree which is “crying” or has sap flowing from the trunk (traditionally not used for building). |
| Nya Mae ညှိမဲ | Tree with dichotomous branching (traditionally not used for building). |
| Ta Oo Hse Naw တၢအူးဆွဲနီ | Tree with a curved trunk (traditionally not used for building). |
| Tee Baw ထံပိ | Bamboo instrument used to deter animals from the fields. |
| Thi သံ | Land left to regenerate after harvesting (fallow land) and used as a seed bank for some fruits and vegetables. |
| Day Bu Noe ဒိုင်ဘူးနီ | The village closest to Ta Paw Der Village that has a hospital. |
| Ger Wa ကဝါ | The <i>Ger Wa</i> , or the <i>Loi</i> as they are known in Thailand, are a very old ethnic group who have many links to the Karen. The <i>Loi</i> are well known for art and pottery skills and many of their relics have been found and used to map their migration route from Burma to Thailand. |

Ta Paw Der

တၢ်ဖိဒါ

Village researched in this report in Lu Thaw Township, Mu Traw District, Karen State, Burma.

Trees and Plants

Bue Mo Bwa

ဘုမိၣ်ပှၢ်

The "King of the Rice"; a strong, hardy variety.

Chaw Po Gway

ဆိဖိကွၢ်

Leaves from this plant (*Eupratorium odoratum L.*) are used to treat cuts and minor wounds.

Dhe Khoo Haw

တရူးဟီၣ်

Tree in which the bark is used to treat the rice diseases *Bu Koo* and *Bu Keh*.

Ga Bee Choo

ကၢ်ဘံဆူ

A variety of fern with a complex root system. If too many of these plants are in the cultivation site, the land will not produce high rice yields.

Ghray Tee

ဂံၢ်ထံ

The bark from the stems of the *Ghray Tee* tree (*Salix tetrasperma Roxb.*) is used to treat toothaches.

Hor Pwee

ဟီၣ်ပှၢ်

A basil variety (*Elsholtzia incise Bth.*) which is dried and used to protect rice and seeds from insect predators.

Khu

ခုၣ်

Taro (*Colocasia esculenta L.*) that is not eaten until after the *Ther Tor Toe* harvesting ceremony had been completed.

K'ner Ko

ကနၢ်ခိၣ်

Forest type found in Northern Karen State: tropical evergreen rainforest.

Kor Baw

ယိးဘိ

If there are many types of this tree growing in the area, it is an indicator that the land will not be productive and the area will not be used for cultivation.

K'Yeh

ကယဲၤ

A type of palm (Palmeaceae: *Caryota spp.*) that is used as a food source.

La Klue Baw

လၢ်ချုၣ်ဘိ

The leaves from the *La Klue Baw* plant are used for packing rice and used in ritual ceremonies.

Lat Tha

လးသၢ်

A type of root that is not eaten until after the *Ther Tor Toe* harvesting ceremony has been completed.

Noe , Naw

နိ, နီ

The bark and wood from these *Alstonia* varieties are used to treat malaria.

Nweh

နဲၣ်

The yam (*Dioscorea spp.*) is not eaten until after the *Ther Tor Toe* harvesting ceremony has been completed.

Nya Bo Jaw

ညၢ်ပိၣ်စိၤ

The bark from *Picrasma javanica Bl.* is used to treat malaria.

| | |
|--|---|
| Paw Gwaw and Paw Baw ဖိဂ်ဖိဘိ | Flower species used for ceremonial purposes. |
| Paw Gwhee ဖိဂ် | Plant used for ceremonial purposes. |
| Per Da / Per Da La ပဒး, ပဒးလၢ် | The leaves from the <i>Per Da</i> tree are used for packing rice and used in ritual ceremonies. If there are many of these trees in an area, then the land will produce high rice yields. |
| Por Du ပိၣ်ဒုၣ် | A root from the Zingberaceae (ginger) family. |
| Sgaw P'Nah Haw စၢ်ပနၢ်ဟိၣ် | Flowering of the <i>Sgaw P'Nah Haw</i> tree indicates the start of the rainy season and the start of lowland rice paddy cultivation. |
| Ter Kweh တကွဲၤ | When the <i>Ter Kweh</i> tree bears many fruit, it indicates that there will be heavy rains and flooding. |
| Ter Ner တၢ်နၢ် | If there are many <i>Ter Ner</i> trees growing in an area, it is an indicator that the land will not produce high yields and so the area will not be used for cultivation. |
| Tha Ko Kwee သၢ်ကိၢ်ကွံ | <i>Garcinia sp.</i> traditionally used to treat diarrhoea. |
| Tha Thwee Mee သၢ်သွံမံၤ | If there are many <i>Tha Thwee Mee</i> trees in an area, then the land will be productive for growing rice. |
| The Mae သမ့ၤ | A strong tree that has a special role in the <i>Pwa Poe Day Por</i> ceremony after a baby is born. |
| They Nya Ou သ့ၣ်ညၢ်အုၣ် | The long flowers of the <i>They Nya Ou</i> tree indicate that the rainy season will have heavy rains and flooding. |
| Toe ထီ | A variety of fern with a complex root system. If too many plants are in the cultivation site, the land will not produce high rice yields. |
| Toe Ga ထီကၢ် | A variety of fern with a complex root system. If too many plants are in the cultivation site, the land will not produce high rice yields. |
| Wa Bway ဝၢ်ဘွဲ | Many <i>Wa Bway</i> bamboos in an area show farmers that the land is good for planting rice. This fast growing variety grows in lowland areas. |
| Wa Glu ဝၢ်ကျၢ် | Many <i>Wa Glu</i> bamboos in an area indicate that the land is good for planting. This fat variety grows together in clumps. |

Wa Thaw Keh

ဝန်သီယံ

Many *Wa Thaw Keh* bamboos in an area indicate that the land is good for planting rice. This fast growing variety grows in clumps and at high elevations.

Ya Baw La

ယာဘီလန်

The *Ya Baw La* (Family: Musaceae) banana leaves are used for packing rice and are used in ritual ceremonies.

Ya Pla

ယာပျာ

A wild banana species with high water content. It is planted in fields where *Ku Ka Thwee* has occurred.



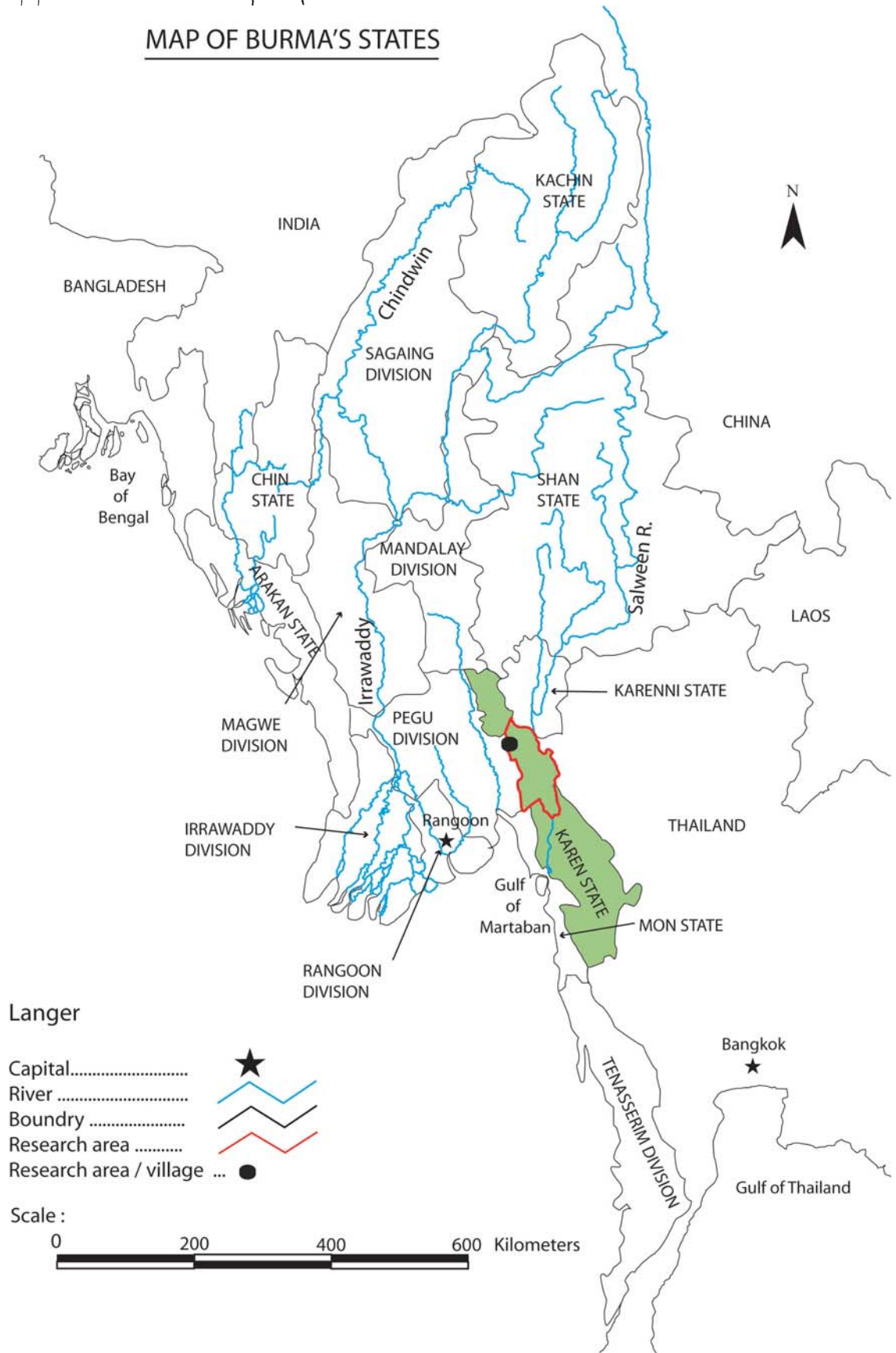
Ya Pla (Karen name)



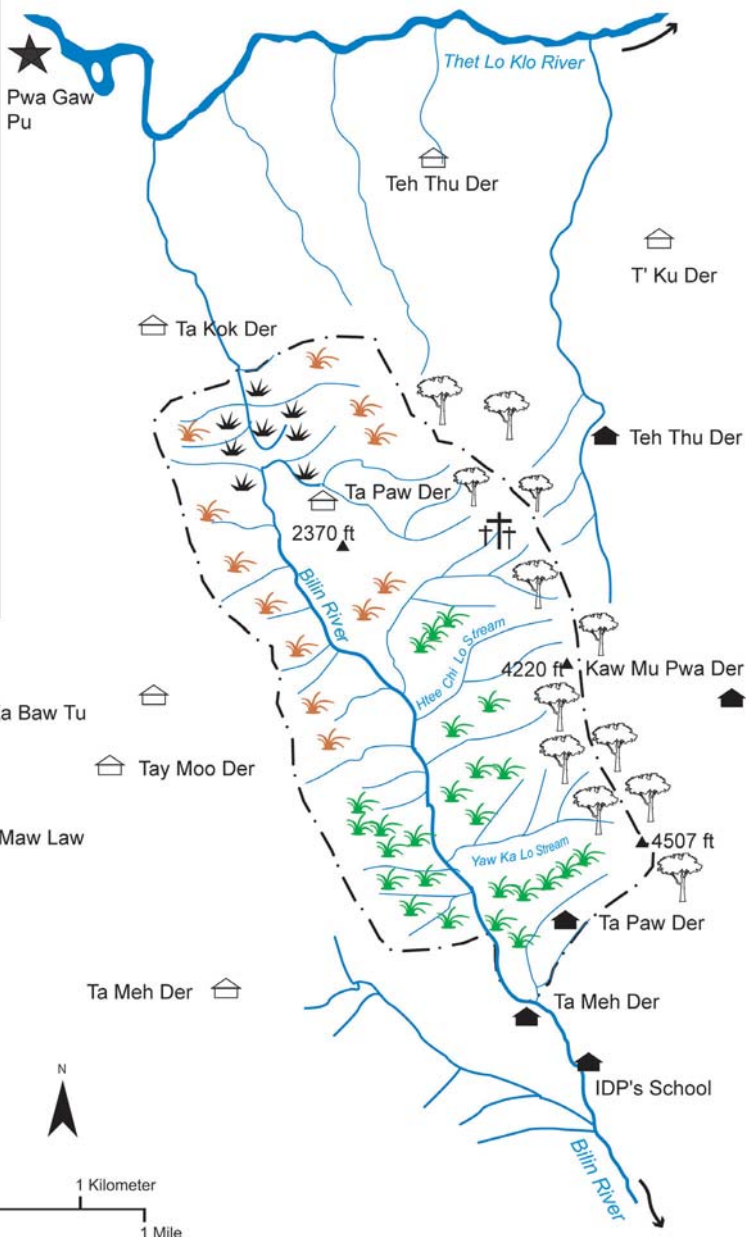
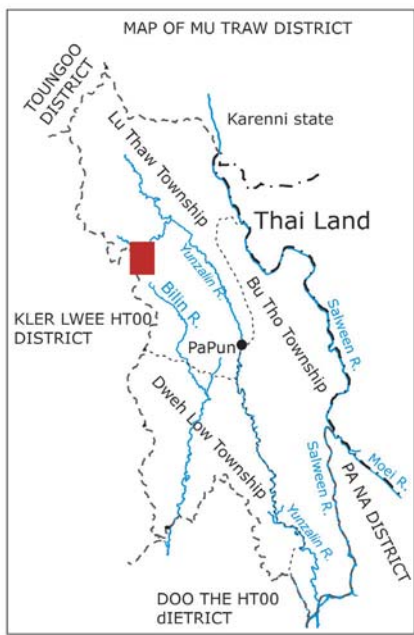
K'Yeh (Karen name)

Appendix 1: Map of Karen State, Burma

MAP OF BURMA'S STATES



Appendix 2: Map of Ta Paw Der Village



| KEY | |
|-----------------------------|-----------|
| Village | ▲ |
| Abandoned Village | □ |
| SPDC Army Camp | ★ |
| Village Boundary | - · - · - |
| River/Stream | ~ |
| New Fallow Land | 🌱 |
| Old Fallow Land | 🌾 |
| Abandoned Paddy Field | 🌾 |
| Protected Forest | 🌳 |
| Sacred Burial Ground.... | ⚰ |
| Elevation..... | ▲ |

© KESAN, June 2004

Appendix 3: Uplands Rotational Crops

| Karen Name | Local Name | Engl. Common Name | Species Variety | Family | Scientific name |
|----------------|-------------------|----------------------------|-----------------|----------------------------|---|
| ခုန် | Khu | Taro | 15 | Araceae | <i>Colocasia esculenta (L.)</i> |
| ညါသူးဖိ (ညါဖိ) | Nya Thu Poe | Marijuana | 2 | Cannabidaceae | <i>Cannabis spp.</i> |
| ဟိန်တင် | Hor Der | Para cress | 2 | Compositae | <i>Spilanthes paniculata Wall. ex DC.</i> |
| နွဲဖိဟိန် | Nweh Poe Hor | Sweet potato | 3 | Convolvulaceae | <i>Ipomoea batatas Lamk</i> |
| လှိုင်သုန် | Lu Tha | Wax gourd | 14 | Curcubitaceae | <i>Benincasa hispida</i> |
| လှိုင်ခွ | Lu Kay | Pumpkin | 7 | Curcubitaceae | <i>Cucurbita maxima Duch.</i> |
| ခံမုန်သုန် | Dee Mu Tha | Musk Melon | 6 | Curcubitaceae | <i>Cucumis melo</i> |
| ဒံသုန် | Dee Tha | Cucumber | 14 | Cucurbitaceae | <i>Cucumis sativus L.</i> |
| ဒးသုန် | Da Tha | Bottle gourd | 6 | Cucurbitaceae | <i>Legenaria siceraria (Mol.) Stande</i> |
| တုလုတကုသုန် | Tay Lay T'Kay Tha | Gourd | 4 | Curcubitaceae | <i>Luffa spp.</i> |
| တကီသုန် | T'Ko Tha | Luffa/Sponge gourd | 4 | Curcubitaceae | <i>Luffa cylindrica</i> |
| သီခါသုန် | Thaw Ka Tha | Bitter gourd | 2 | Curcubitaceae | <i>Morordica charantia L.</i> |
| သဘင်ဒီး | T' Ba Dawt | Mustard | 8 | Cruciferae | <i>Brassica nigra G. Don</i> |
| နွဲ | Nweh | Common yam | 4 | Dioscoreaceae | <i>Dioscorea spp.</i> |
| နွဲသုန် | Nweh Thay | Tapioca/cassava | 4 | Euphorbiaceae | <i>Manihot esculenta Crantz</i> |
| ဟိန်ဝါတဝါ | Haw Wor T'Poh | Lemon grass | 1 | Graminaceae | <i>Cymbopogon citratus (DC.) Stapf</i> |
| ဘင် | Ber | Job's Tears | 1 | Graminaceae | <i>Coix lachryma-jobi</i> |
| ပု | Bpeh | Millet | 2 | Graminaceae | <i>Echinochloa spp.</i> |
| သွံ | Thwee | Millet | 3 | Graminaceae | <i>Panicum miuaceum</i> |
| ဘုခွ | Bu Kay | Corn, Maize | 11 | Graminaceae | <i>Zea Mays L.</i> |
| ဟိန်ဖုံ | Haw Pweh | Herb | 2 | Labiatae | <i>Elsholtzia incisa Bth.</i> |
| ဟိန်ဝါသု | Haw Wor Threh | Basil | 1 | Labiatae | <i>Ocimum canum Sims.</i> |
| ကျွန်ဘုန် | Klay Bu | Pidgeon pea | 1 | Leguminosaceae | <i>Cajanus cajan</i> |
| ထီနီ | Taw Nor | Soya bean | 1 | Leguminosaceae | <i>Glycine max (L.) Merr.</i> |
| ပထီး | P'Tot | Yard long bean | 9 | Leguminosaceae | <i>Vigna sinesis</i> |
| ယင်ဖါဆူး | Keh Pa Chu | Sword Jack bean/Sword bean | 2 | Leguminosae-Papilionadeae | <i>Canavalia gladiata Dc.</i> |
| ဘီဘုန် | Baw Ba | Broad bean | 10 | Leguminosae-Papilionadeae | <i>Lablab purpureus (L.) Sweet ssp. purpureus</i> |
| ဘီဘုန်ခိန်တီ | Baw Ba Ko Taw | Yam bean | 1 | Leguminosae/Papilionoideae | <i>Pachyrhizus erosus URBAR</i> |
| ဘီဘုန်မကံး | Baw Ba Mer Kee | Winged bean | 2 | Leguminosae-Papilionadeae | <i>Psophocarpus tetragonolobus D.C.</i> |
| တကျါ | T'Kler | Chinese Chives | 2 | Liliaeaceae | <i>Allium chinense</i> |
| ကျိန်နီ | Klaw Ner | Ladyfingers/Okra | 1 | Malvaceae | <i>Abelmoscus esculentus (L.) Moench</i> |

Appendix 3: uplands Rotational Crops

| Karen Name | Local Name | Engl. Common Name | Species Variety | Family | Scientific name |
|-----------------------|---------------|-------------------|-----------------|---------------|--------------------------------------|
| ခဲ | Beh | Cotton | 3 | Malvaceae | <i>Gossypium spp.</i> |
| ခဲဆံ | Beh Hsie | Roselle | 3 | Malvaceae | <i>Hibiscus sabdariffa</i> |
| နံ့သိ | Nay Thow | Sesame | 2 | Pedaliaceae | <i>Sesamum indicum Linn.</i> |
| တကီသုန် | T'Kaw Tha | Eggplant | 9 | Solanaceae | <i>Solanum spp.</i> |
| မိဂံသုန်, မိဟဲသုန် | Mo Hey Tha | Chilli | 8 | Solanaceae | <i>Capsicum frutescens L.</i> |
| တကီဆံ (ဆံပိပြဲ) | T'Kaw Hsie | Tomato | 4 | Solanaceae | <i>Lycopersicon esculentum mill.</i> |
| ညါသူး | Nya Thut | Tobacco | 2 | Solanaceae | <i>Nicotiana tabacum L.</i> |
| ဟုပိုင် | Hu Pwa | Coriander | 1 | Umbelliferae | <i>Coriandrum sativum L.</i> |
| တယီ | D'Yaw | Turmeric | 5 | Zingiberaceae | <i>Curcuma domestics Valetton</i> |
| တဆူ | D'Aye | Ginger | 2 | Zingiberaceae | <i>Zingiber officinale Rosc.</i> |

Appendix 4: Common Garden Plants*

| Karen Name | Local Name | Engl. Common Name | Species Variety | Family | Scientific name |
|--------------|----------------------|-------------------|-----------------|---------------|--|
| တယီဆံ | T'Kaw Hsee | Marian plum | 1 | Anacardiaceae | <i>Bovea macrophylla</i> |
| တခီး | T'Kawk | Mango | 3 | Anacardiaceae | <i>Mangifera indica L.</i> |
| နဲး | Neh | Pineapple | 2 | Bromeliaceae | <i>Ananas comosus (L.) Merr.</i> |
| တကွံသုန် | T'Kwee Thay | Papaya | 2 | Caricaceae | <i>Carica papaya L.</i> |
| ကထံ | K'Htee | Sugar cane | 7 | Gramineae | <i>Saccharum officinarum L.</i> |
| ပနွဲသုန် | P'Nweh | Jackfruit | 2 | Moraceae | <i>Artocarpus altilis</i> |
| တကွံ | T'Kwee | Banana | 11 | Musaceae | <i>Musa spp.</i> |
| သုန်ဝါလီ | Thay Wah Law | Guava | 1 | Myrtaceae | <i>Psidium guajava L.</i> |
| ပနီကျဲဘိခိန် | P'Naw Kleh Boe Ko | Lemon | 1 | Rutaceae | <i>Citrus spp.</i> |
| တယုန်သုန် | T'Kray | Orange | 1 | Rutaceae | <i>Citrus spp.</i> |
| ပနီကျဲ | P'Naw Kleh | Lime | 2 | Rutaceae | <i>Citrus aurantiifolia (Christm.) Swingle</i> |
| သးဟီ | Tha Haw | Grapefruit (sour) | 1 | Rutaceae | <i>Citrus grandis</i> |
| မးဆီ | Ma Oh | Pomello | 1 | Rutaceae | <i>Citrus maxima (Burm.) Merr.</i> |

* Indentifiable in English

Appendix 5: Traditional Medicinal Plants *

| Karen Name | Local Name | Engl. Common Name | Family | Scientific name |
|--------------------------|---------------------------------|-----------------------------|--------------------------------|--|
| ကျိုလိဒ်ဒါ | <i>Jaw Law Didoe</i> | Blue trumpet vine | Acanthaceae | <i>Thunbergia laurifolia</i> Lindl. |
| နို့ | <i>Noe</i> | Milky pine/ Devil's tree | Apocynaceae | <i>Alstonia rostrata</i> Fischer / <i>Alstonia scholaris</i> (L.) R. Br. var. <i>scholaris</i> |
| ဒီးကုန် | <i>Doga</i> | Wooden butterfly seed | Bigoniaceae | <i>Oroxylum indicum</i> (L.) Kurz |
| သုန်ကော်စု | <i>Thei Ka Sue</i> | Javanese elder | Caprifoliaceae | <i>Sambucus javanica</i> Reinw. ex. Bl. ssp. <i>javanica</i> |
| နီၣ်နာသံ | <i>Naw Na Thee</i> | Billy goat weed | Compositae | <i>Ageratum conyzoides</i> L. |
| ဖိပုၣ် | <i>Paw Baga</i> | Wild heliotrope | Compositae | <i>Blumea balsamifera</i> (L.) DC. |
| ဆံးဖိကွၢ်သူ | <i>Chaw Po Kway Thoo</i> | Crofton weed | Compositae | <i>Eupatorium adenophorum</i> Spreng. |
| ဆံးဖိကွၢ် | <i>Chaw Po Gway</i> | Siam weed | Compositae | <i>Eupatorium odoratum</i> L. |
| ဟိၣ်တၢ် | <i>Hod Der</i> | Paracress | Compositae | <i>Spilanthes paniculata</i> Wall. ex DC. |
| သုန်ဒီးဒုန် | <i>Tha Kaw Doo</i> | Bignay | Euphorbiaceae | <i>Antidesma bunius</i> (L.) Spreng. var. <i>bunius</i> |
| ကသံၣ်ဂီၤဖိ | <i>Ga Thee Gaw Poe</i> | | Euphorbiaceae | <i>Breynia retusa</i> (Denn.) Alst |
| မုၢ်ဒိၣ်ပုၣ် | <i>Mae HKo Pla</i> | White berry bush | Euphorbiaceae | <i>Fluggea virosa</i> (Roxb. ex. Willd.) Voigt |
| သုန်ကီၢ်ကွၢ် | <i>Tha Ko Kwee</i> | Garcinia | Guttiferae | <i>Garcinia</i> sp. |
| ဟိၣ်သူ | <i>Kyaw Bu</i> | Horse chestnut | Hippocastanaceae | <i>Aesculus assamica</i> Griff. |
| ဟိၣ်ပွဲ | <i>Hor Pwee</i> | | Labiatae | <i>Elsholtzia incisa</i> Bth. |
| မိၣ်မိၤ | <i>Maw Moe</i> | | Lauraceae | <i>Alseodaphne henryii</i> (King ex Hk. f.) Kosterm. |
| ကီးလၢ် | <i>Kaw Lei</i> | Cinnamon | Lauraceae | <i>Cinnamomum iners</i> Reinw. ex B1 |
| နီၣ်မံခ | <i>Naw Mee Kay</i> | Sleeping grass | Leguminosae, Mimosoideae | <i>Mimosa pudica</i> L. var. <i>unijuga</i> (Duch. & Walp.) Griseb. |
| ဂီၤဂီၤ(နီၣ် ကွၢ်ဆံၣ်) | <i>Go Gaw / Naw Jah Bee</i> | | Leguminosae, Papilionoideae | <i>Desmodium triquetrum</i> (L.) DC. ssp. <i>triquetrum</i> |
| ဘိဘၣ် | <i>Baw Ba</i> | Hyacinth bean | Leguminosae, Papilionoideae | <i>Lablab purpureus</i> (L.) Sweet ssp. <i>purpureus</i> |
| ဆွၣ်ကနီၣ် | <i>Chwei Ga Nee</i> | | Myrsinaceae | <i>Maesa permollis</i> Kurz |
| သုန်ထီလၢ် | <i>Thei Taw La</i> | | Myristicaceae | <i>Knema lenta</i> Warb. |
| ကသံၣ်ချး | <i>Ga Thee Kla</i> | | Rubiaceae | <i>Psychotria winitii</i> Craib |
| ဂံၢ်ထံ | <i>Ghray Tee</i> | Indian willow | Salicaceae | <i>Salix tetrasperma</i> Roxb. |
| သုန်ဝါခိၣ် | <i>Thei Wa Kho</i> | | Sapindaceae | <i>Lepisanthes tetraphylla</i> (Vahl) Radlk. |
| ကံကူၢ်ခိ | <i>Gi Gu Koe</i> | Climbing fern | Schizaeaceae | <i>Lygodium flexuosum</i> (L.) Sw. |
| နီၣ်ခူရ | <i>Naw Kay Ray</i> | Liquorice weed | Scrophulariaceae | <i>Scoparia dulcis</i> L. |
| ညးပိၣ်ကွၢ် | <i>Nya Por Jaw</i> | | Simaroubaceae | <i>Picrasma javanica</i> Bl. |

* Indentifiable in English

Appendix 6: Detailed Information of Medicinal Plants

1. Family: Acanthaceae

Botanical Name: *Thunbergia laurifolia* Lindl.

District: Mu Traw

Location: Very close to small streams, moist areas

Elevation: ~2010m

Notes (short description of the plant, size, colour of fruit and flowers): Woody climber, stem hollow, up to 3cm in diameter, flower is bluish/white with sweet nectar, leaves are green and 12cm long.

Local Name: *Jaw Law Didoe* (ကျီလိဒိုဒေါ)

Use: Nectar eaten by children, used to treat toothaches, coughing, irritation of eyes by dust or other small particles.

Parts of the plants used: Nectar, root, stem, sap inside stem

Preparation: For the treatment of toothache, the root is boiled; tea is kept in mouth for a while and then spat out. The irritated eye is rinsed with the sap from the stem.

Mixed with/Dosage: /

Remark: In case there is no drinking water available the water inside the stem can be drunk.

Name of informant/position: Pa Gaye Moo, age: 50, villager

2. Family: Apocynaceae

Botanical Name: *Alstonia rostrata* Fischer/ *Alstonia scholaris* (L.) R. Br. var. *scholaris*

District: Mu Traw

Location: Open areas close to river and close to upland rotation fields

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Tree, 3-4 common leaves (leaflets), white flowers with long green pods for fruit.

Local Name: *Noe* (နွေ)

Use: Malaria

Parts of the plants used: Bark, wood

Preparation: The bark/wood is boiled with 3 cups of water until only 1 cup is left and then drunk.

Mixed with/Dosage: Mixed with bark and wood of *Picrasma javanica*.

Remark: /

Name of informant/position: Pitatho/Naw Mu Wah, age: 57, villager

3. Family: Bigoniaceae

Botanical Name: *Oroxylum indicum* (L.) Kurz

District: Mu Traw

Location: Flat areas close to the river

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Small tree, yellow flower, long and flat fruits.

Local Name: *Doga* (ဒိုးကန်)

Use: For treatment of wounds

Appendix 6: Detailed Information of Medicinal Plants

Parts of the plants used: Bark from the stem

Preparation: Prepared as a tea

Mixed with/Dosage: Mixed with turmeric root, all parts of *Scoparia dulcis*, roots of *Bo Kwe Ko*, Zingiberaceae and *Solanum torvum* (*Ta Kaw Ka La*). All ingredients boiled together give a spicy tea.

Remark: Plant cannot be found in neighbouring Thailand.

Name of informant/position: Pitathoo/Naw Mu Wah, age: 57, villager

4. **Family:** Caprifoliaceae

Botanical Name: *Sambucus javanica* Reinw. ex Bl. ssp. *javanica*

District: Mu Traw

Location: Open areas beside streams

Elevation: ~1044m

Notes (short description of the plant, size, colour of fruit and flowers): Soft green leaves, small white flowers, fruits small and black when ripe.

Local Name: *Thei Ka Sue* (သွန်တီစု)

Use: Treatment of bruises, mending of broken bones

Parts of the plants used: Leaves

Preparation: Leaves are heated over the fire and then wrapped around the bruise. When the leaves have cooled they are removed. This process has to be repeated several times. For broken bones, leaves are pounded together with *Paw Baga* (*Blumea balsamifera*) and turmeric and then the paste is applied to the injury and fixed with a bandage or the leaves of the plants same as the treatment for bruising.

Mixed with/Dosage: turmeric, *Blumea balsamifera*

Remark: /

Name of informant/position: Maw Say Thoo, age: 35, villager

5. **Family:** Compositae

Botanical Name: *Ageratum conyzoides* L.

District: Mu Traw

Location: Open areas inside the village, close to homes

Elevation: ~1044m

Notes (short description of the plant, size, colour of fruit and flowers): Plant is 30cm-1m tall, flowers are terminal, similar to *E. Odoratum*.

Local Name: *Nor Na Thee* (နီၼ်နီၼ်သံ)

Use: Used to stop the bleeding of small wounds, treatment of boils

Parts of the plants used: Leaves and sap

Preparation: Sap is applied to the wound and covered with the leaf. For treatment of boils, the leaf is heated over the fire, squeezed and put on the boil.

Mixed with/Dosage: /

Remark: /

Name of informant/position: Pamllar, age: 50, villager

Appendix 6: Detailed Information of Medicinal Plants

6. Family: Compositae

Botanical Name: *Blumea balsamifera* (L.) DC.

District: Mu Traw

Location: Close to the river, fallow field

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Pioneer plant, 2m high, flowers in small clusters and leaf surface is sticky.

Local Name: *Paw Baga* (ပိတ်)

Use: Used to treat colds/coughing, bruises and swelling

Parts of the plants used: Young leaves and roots

Preparation: Juice of the leaves is squeezed out, mixed with salt and drunk. Leaves are heated over the fire then wrapped around the wound, or plant parts are boiled with fresh turmeric and *Sambucus javanica* ssp. *javanica*, and the tea is used to clean the wound. The leaves can also be used as a bandage.

Mixed with/Dosage: Salt, turmeric, *Sambucus javanica* ssp. *javanica*

Remark: /

Name of informant/position: Pa Gaye Moo, age: 50, villager

7. Family: Compositae

Botanical Name: *Eupatorium adeophorum* Spreng.

District: Mu Traw

Location: Open areas inside the village

Elevation: ~972m

Notes (short description of the plant, size, colour of fruit and flowers): Very competitive plant, leaves are blackish, mostly vegetative dispersal, flowers very rare.

Local Name: *Chaw Poe Gway Thoo* (ဆုဖိကူ)

Use: Treatment of fatigue, physical weakness

Parts of the plants used: Leaves and stems

Preparation: Prepared as a tea.

Mixed with/Dosage: palm sugar

Remark: /

Name of informant/position: Maw She Thoo, age: 35, villager

8. Family: Compositae

Botanical Name: *Eupatorium odoratum* L.

District: Mu Traw

Location: Inside the village, close to homes

Elevation: ~975m

Notes (short description of the plant, size, colour of fruit and flowers): Plants are 1.5-2m tall, leaves are green and hairy, flowers are white, the stem is green and soft inside, and the seeds are long and black.

Local Name: *Chaw Poe Gway* (ဆုဖိကူ)

Use: Used to stop the bleeding of open wounds and stop bleeding of the nose

Parts of the plants used: Leaves

Appendix 6: Detailed Information of Medicinal Plants

Preparation: Leaves are squeezed and the juice and leaves are applied to the wound or inside the nostril.

Mixed with/Dosage: /

Remark: /

Name of informant/position: Maw Say Thoo, age: 35, villager

9. Family: Compositae

Botanical Name: *Spilanthes paniculata* Wall. ex DC.

District: Mu Traw

Location: Open areas in upland rotational farming field

Elevation: ~975m

Notes (short description of the plant, size, colour of fruit and flowers): Cultivated plant of the Karen, stem is initially green later turning yellow; leaves are green, numerous flowers in the head, seeds are small and black.

Local Name: *Hod Der* (ဟိုဒ်တၢ်)

Use: Toothaches, food source (raw or boiled, by itself or with other vegetables)

Parts of the plants used: Entire plant

Preparation: Prepared as a tea using the entire plant. Water is boiled until 1/3 of liquid is left and the mouth is rinsed.

Mixed with/Dosage: /

Remark: It is planted with rice as part of the mixed cropping system. Seeds of the plants are attached to a long bamboo stick used to dig holes for the rice seeds. During the process of rice planting the seeds are dispersed in the rice field.

Name of informant/position: Maw Say Thoo, age: 35, villager

10. Family: Euphorbiaceae

Botanical Name: *Antidesma bunius* (L.) Spreng. var. *bunius*

District: Mu Traw

Location: In valleys close to small creeks, shady areas

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Canopy tree, upper side of leaves green and lower side white, peel of fruit is brown, while the flesh is red with yellow seeds.

Local Name: *Tha Kaw Doo* (သံခီဒူ)

Use: Treatment of mouth ulcer

Parts of the plants used: Sap of the tree

Preparation: Sap of the tree applied directly on wound.

Mixed with/Dosage: /

Remark: /

Name of informant/position: Pitathoo/Naw Moo Wah, age: 57, villager

11. Family: Euphorbiaceae

Botanical Name: *Breynia retusa* (Denn.) Alst.

District: Mu Traw

Appendix 6: Detailed Information of Medicinal Plants

Location: Open forest areas

Elevation: ~1044m

Notes (short description of the plant, size, colour of fruit and flowers): Woody plant about 1.3m tall, young leaves are red, flowers are red and fruit is green and flat.

Local Name: *Ga Thee Gaw Poe* (ကသံဉ်ဂီဖိ)

Use: To treat diarrhoea

Parts of the plants used: Roots

Preparation: Root is boiled with water until only 1/3 of the liquid is left. Tea is drunk at least 3 times per day.

Mixed with/Dosage: Root of *Fluggea virosa*, *Euphorbiaceae*

Remark: /

Name of informant/position: Pamelar, age: 50, villager

12. Family: Euphorbiaceae

Botanical Name: *Fluggea virosa* (Roxb. ex Willd.)

District: Mu Traw

Location: open, dry flat area

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Small bush, fruit are found along the stems, unripe fruit is green/yellow while ripe fruit is white, sweet and commonly consumed by birds.

Local Name: *Mae Kho Bla* (မုးခိဉ်ပွဲ)

Use: Diarrhoea and for women 3 days after giving birth

Parts of the plants used: Root and leaves

Preparation: 1. Root is boiled and drank as a tea. 2. The leaves are boiled and used as a bath mixed with 7 other kinds of plants (For example: turmeric, *Blumea balsamifera*, *Mimosa pudica* var. *unijuga*, *The Ka*, *Scoparia dulcis*).

Mixed with/Dosage: Palm sugar added to tea

Remark: Tea is first used to do an herbal sauna and then later used for a bath

Name of informant/position: Pa Gaye Moo, age: 50, villager

13. Family: Guttiferae

Botanical Name: *Garcinia* sp.

District: Mu Traw

Location: Close to the river

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): More than 15m high, leaves, flowers and fruit are sour. Fruit are 10cm in diameter, red, fruit flesh is sour and leaves are up to 23cm.

Local Name: *Tha Ko Kwee* (သံဉ်ကိကွဲ)

Use: Diarrhoea, constipation, insect repellent, nausea, food (young leaves)

Parts of the plants used: Leaves and fruit

Preparation: 1. Fruit is boiled and tea is drunk (depending on which disease is being treated, there are different ways to prepare). 2. Fruit and bamboo shoots are soaked in

Appendix 6: Detailed Information of Medicinal Plants

water and left to ferment for 3 days, applied to the field to act as an insect repellent. 3. Young leaves can be cooked as soup.

Mixed with/Dosage: Salt, palm sugar

Remark: Insect repellent used in rice fields, fruits are dried and stored for the rest of the year.

Name of informant/position: Pa Gaye Moo, age: 50, villager

14. Family: Hippocastanaceae

Botanical Name: *Aesculus assamica* Griff.

District: Mu Traw

Location: Close to stream

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Up to 30m tall, compound leaf with 4-6 leaflets 2-10 cm in length, inflorescence of flower is 18-35cm, single, small white flowers, 2-4 fruit per inflorescence, round and big.

Local Name: *Kyaw Bu* (ကျီးဘူ)

Use: Used to treat swelling

Parts of the plants used: Peel of the fruit

Preparation: Ground into a paste and applied on the swelling.

Mixed with/Dosage: Fruit of pine trees (also ground)

Remark: When leaves are ground and added to the water of small streams, could cause toxicity and death of fish in the stream.

Name of informant/position: Pa Gaye Moo, age: 50, villager

15. Family: Labiatae

Botanical Name: *Elsholtzia incise* Bth.

District: Mu Traw

Location: In upland rotational fields

Elevation: ~995m

Notes (short description of the plant, size, colour of fruit and flowers): Plant is up to 1m tall, there are two varieties: one with a green stem and the other with a reddish stem, both have white /green flowers.

Local Name: *Hor Pwee* (ဟိုဝှီ)

Use: Post harvest treatment of rice: used as insect repellent in the rice barn

Parts of the plants used: Entire plant except for the roots

Preparation: Dried plants are put with the stored rice and seeds in the rice barn.

Mixed with/Dosage: /

Remark: The heartwood of pine trees could be used for the same purpose.

Name of informant/position: Baw Glo, age: 35, villager

16. Family: Lauraceae

Botanical Name: *Alseodaphne henryii* (King. ex Hk. f.) Kosterm.

District: Mu Traw

Location: Sloped area near the stream

Elevation: ~1020m

Appendix 6: Detailed Information of Medicinal Plants

Notes (short description of the plant, size, colour of fruit and flowers): Large green leaves, brown bark and white flower.

Local Name: *Maw Moe* (မော့မော့)

Use: For strengthening the body after an accident (tonic), treatment of wounds

Parts of the plants used: Roots, leaves, bark

Preparation: 1. The roots are boiled and the tea drunk as a tonic. 2. Leaves used together with other medicinal plants and prepared as a tea.

Mixed with/Dosage: For treatment of wounds: leaves of plant *Blumea balsamifera*, bark or stem of *Oroxylum indicum*, root of Zingiber spec.

Remark: /

Name of informant/position: Pitathoo/Naw Mu Wah, age: 57, villager

17. Family: Lauraceae

Botanical Name: *Cinnamomum iners* Reinw. ex Bl.

District: Mu Traw

Location: Slope area, forest close to the stream

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Canopy tree, mature leaves are glossy green and long, young leaves are yellow and red, bark is brown.

Local Name: *Kaw Lei* (ကိုးလှိုင်)

Use: Used against fever, treatment of wounds

Parts of the plants used: Roots

Preparation: Ground using a stone or pestle, paste is mixed with water from washed rice and then drank.

Mixed with/Dosage: *Ea Ka Rhe*, *Pobula* (kind of water lily), *Thinaue* (tree)

Remark: /

Name of informant/position: Pitathoo/Naw Mu Wah, age: 57, villager

18. Family: Leguminosae, Mimosoideae

Botanical Name: *Mimosa pudica* L. var. *unijuga* (Duch. & Walp.) Griseb.

District: Mu Traw

Location: Open, dry flat areas

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): 1m tall, stem is green or reddish, leaves fold if touched, flowers are pink/white.

Local Name: *Nor Mee Keh* (နီမီခဲ)

Use: Urinary and kidney problems

Parts of the plants used: All parts

Preparation: Boiled with water until the amount of water is reduced to 1/3, drank as often per day as possible.

Mixed with/Dosage: Palm sugar

Remark: /

Name of informant/position: Pa Gaye Moo, age: 50, villager

Appendix 6: Detailed Information of Medicinal Plants

19. Family: Leguminosae, Papilionoideae

Botanical Name: *Desmodium triquetrum* (L.) DC. ssp. *triquetrum*

District: Mu Traw

Location: Fallow land of upland rotational fields

Elevation: ~975m

Notes (short description of the plant, size, colour of fruit and flowers): Leaves are 10cm long, green and sometimes reddish, stems are triangular, the flowers are blue and the fruit are flat and long (3-5cm), easily broken and stick to the trousers, a wild plant.

Local Name: *Go Gaw / Naw Jah Bee* (ဂိုဂေါ, နီၣ်ကီၣ်းဘံၣ်)

Use: For treating abnormal urine, drank as tea

Parts of the plants used: Entire plant

Preparation: Entire plant is boiled with water until 1/3 of liquid remains and then drank.

Mixed with/Dosage: Palm sugar

Remark: Tea is red in colour

Name of informant/position: Maw Say Thoo, age: 35, villager

20. Family: Leguminosae, Papilionoideae

Botanical Name: *Lablab purpureus* (L.) Sweet ssp. *purpureus*

District: Mu Traw

Location: Home gardens

Elevation: ~1044m

Notes (short description of the plant, size, colour of fruit and flowers): Leaves are green and fruits are bluish-green beans.

Local Name: *Baw Ba* (ဘီဘာ)

Use: To treat skin irritation caused by the plant *Thu Ga Mae*.

Parts of the plants used: Leaves and fruit

Preparation: Plant parts are squeezed and the juice is applied to the wound.

Mixed with/Dosage: /

Remark: A cultivated plant of the Karen, often grown in upland fields or in home gardens, many different varieties of the beans; all of them can be used for the same purpose.

Name of informant/position: Maw Say Thoo, age: 35, farmer

21. Family: Myrsinaceae

Botanical Name: *Maesa permollis* Kurz

District: Mu Traw

Location: Shady areas under large trees near a stream

Elevation: ~1044m

Notes (short description of the plant, size, colour of fruit and flowers): Plants are up to 2m tall, flowers are white.

Local Name: *Chuey Ga Nee* (ဆွဲၣ်ကနီၣ်)

Use: Treatment of burns

Parts of the plants used: Leaves

Preparation: Leaves are squeezed and the juice is applied to the burn.

Mixed with/Dosage: /

Appendix 6: Detailed Information of Medicinal Plants

Remark: The plant likes moist locations

Name of informant/position: Maw Say Thoo, age: 35, villager

22. Family: Myrtilaceae

Botanical Name: *Kema lenta* Warb.

District: Mu Traw

Location: Very close to small streams

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Female plant, canopy tree up to 60m tall, leaves are 20-60cm in length, flower is small, yellow and tree sap is red.

Local Name: *Thei Taw La* (သုန်ထီလှိုင်)

Use: Treatment of mouth ulcer

Parts of the plants used: Tree sap

Preparation: Sap of the tree is applied directly onto the wounds in the mouth.

Mixed with/Dosage: /

Remark: /

Name of informant/position: Pa Gaye Moo, age: 50, villager

23. Family: Rubiaceae

Botanical Name: *Psychotria winitii* Craib.

District: Mu Traw

Location: Edge of the forest, close to the village, moist places

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Small plant, up to 4 feet height, green leaves, white flower, unripe fruit are green and turn red when ripe.

Local Name: *Ga The Kla* (ကသိန်ချး) (*Ga The* = medicine)

Use: Treatment for breastfed children with stomach-ache and diarrhoea (caused by consumption of wrong food by mother).

Parts of the plants used: All parts

Preparation: Plant is boiled and drank as tea or used as a bath.

Mixed with/Dosage: Can either be taken 3 times per day pure or with some salt/sugar to compensate the bitter taste.

Remark: /

Name of informant/position: Pitathoo/Naw Moo Wah, age: 57, villager

24. Family: Salicaceae

Botanical Name: *Salix tetrasperma* Roxb.

District: Mu Traw

Location: In the forest close to the river

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Plant is about 46m high, leaves are green on upper side and white on the lower side, inflorescence is up to 15cm long and the flower greenish/whitish

Appendix 6: Detailed Information of Medicinal Plants

Local Name: Ghray Tee (ဂ်ရဲတီ)

Use: Tooth ache

Parts of the plants used: Bark of the stem

Preparation: Bark is boiled into a tea. The tea is kept in the mouth for a while and then spat out.

Mixed with/Dosage: Either used pure or mixed with all parts of *Spilanthes paniculata*.

Remark: /

Name of informant/position: Pa Gaye Moo, age: 50, villager

25. Family: Sapindaceae

Botanical Name: *Lepisanthes tetraphylla* (Vahl) Radlk.

District: Mu Traw

Location: Upland rotational fields, dry, sloped areas

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): 3-4 common leaves (leaflets) found in clusters, white flowers grow in cluster with long green pod for fruit.

Local Name: *Thei Wah Kho* (ထွဲဖါခိန်)

Use: Strengthening the body after an accident, inner injuries

Parts of the plants used: Root

Preparation: 1. Root is boiled with water until only 1/3 of the liquid is left. 2. The root is grated/ground and then mixed with water from washed the rice and palm sugar.

Mixed with/Dosage: Either used pure or mixed with *Pobula* (kind of water lily) and *Thinaue* (tree)

Remark: /

Name of informant/position: Pa Gaye Moo, age: 50, villager

26. Family: Schizaeaceae

Botanical Name: *Lygodium flexuosum* (L.) Sw.

District: Mu Traw

Elevation: 1105m

Location: In forest close to the village

Notes (short description of the plant, size, colour of fruit and flowers): Very common vine, stems are thin but durable, leaves are composed of 5-7 leaflets, no flower and fruits observed, if there is nothing to climb, plant creeps on the ground.

Local Name: *Gi Gu Koe* (ဂိဂူခိ)

Use: Used to stop bleeding of open wounds, stop bleeding of the nose

Parts of the plants used: Leaves

Preparation: Leaf is squeezed and sap and leaf is applied to the wound or inside the nostril.

Mixed with/Dosage: /

Remark: /

Name of informant/position: Pithatoo, age: 57, villager Date: 07/12/02

27. Family: Scrophulariaceae

Appendix 6: Detailed Information of Medicinal Plants

Botanical Name: *Scoparia dulcis* L.

District: Mu Traw

Location: Open areas inside the village; prefer the same areas as *E. odoratum*

Elevation: ~1105m

Notes (short description of the plant, size, colour of fruit and flowers): Plant up to 46cm tall, leaves, flowers and fruit are small, fruit is green, flowers and fruit cluster at the leaf base, plant sap has a strong smell.

Local Name: *Nor Kay Ray* (နိုင်းခွေ)

Use: To treat colds and coughing

Parts of the plants used: Leaves and all young parts of the plant

Preparation: Plant is squeezed and spoonful of sap is consumed.

Mixed with/Dosage: Young leaves of *Blumea balsamifera* (L.) DC., Compositae, salt, honey, sugar, water from washed rice, turmeric.

Remark: /

Name of informant/position: Pitathoo/Naw Mu Wah, age: 57, villager

28. Family: Simaroubaceae

Botanical Name: *Picrasma javanica* Bl.

District: Mu Traw

Location: Close to the river

Elevation: ~1020m

Notes (short description of the plant, size, colour of fruit and flowers): Mature leaves are green and the young leaves are reddish, flowers are small and white, fruit is black when ripe and the bark is dark green with white spots.

Local Name: *Nya Bo Jaw* (ညှပ်ပိတ်ခွေ)

Use: Feeling of physical weakness, malaria, spleen disease (spleen swollen and moved under the stomach).

Parts of the plants used: Preferably the bark is used but it is also possible to use the wood.

Preparation: Bark is boiled by itself or with other plants and then drank as a tea as often as possible (at least three times per day).

Mixed with/Dosage: *Naw* (plant similar to *Alstonia rostrata* Fischer, Apocynaceae), *Nya Li Ko* (kind of bush).

Remark: Tea is also mixed with sugar, salt, or honey to improve the taste.

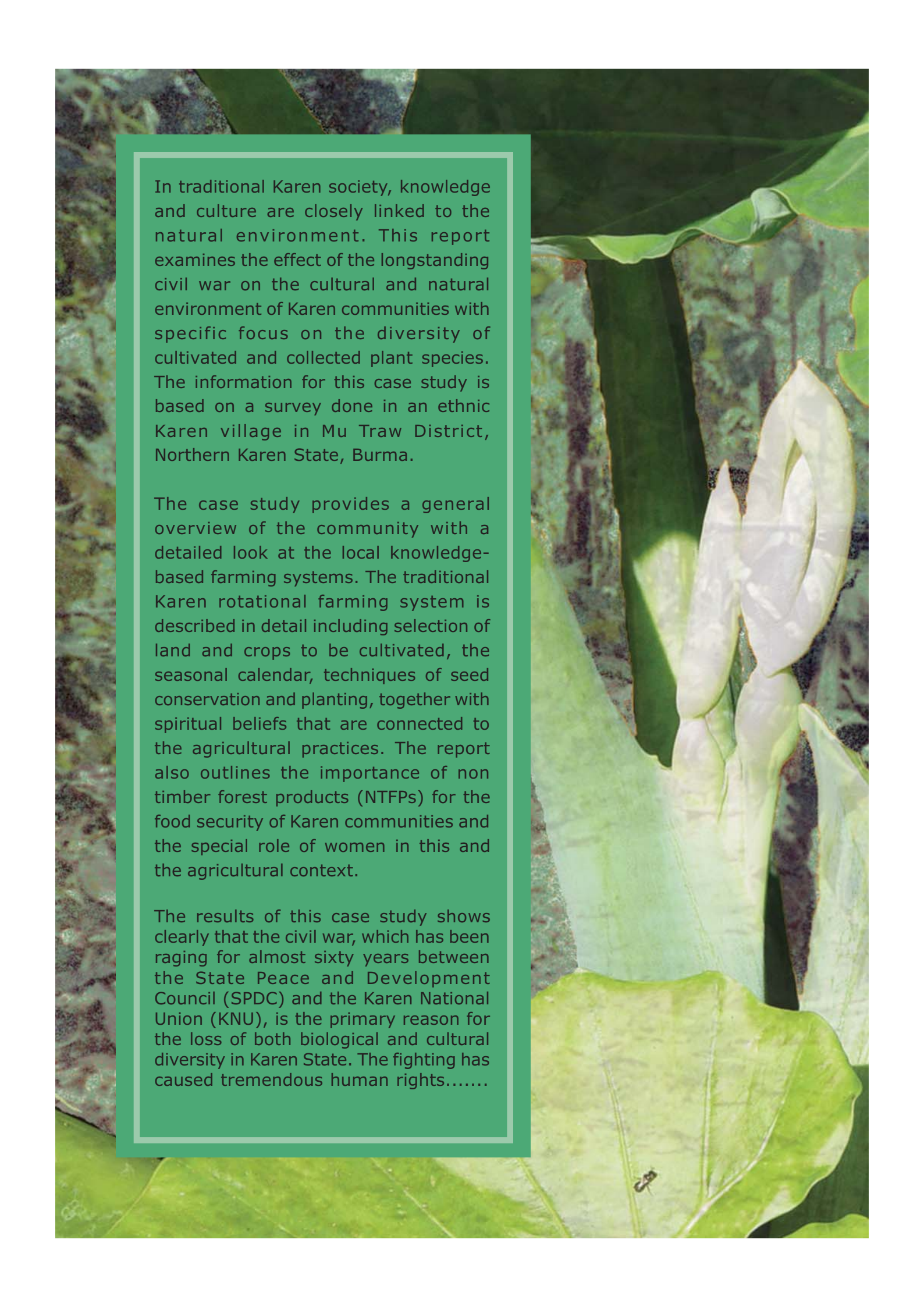
Name of informant/position: Pitathoo /Naw Mu Wah, age: 57, villager

Appendix 7: Rice varieties and their Current Status

| No | Karen Name | Characteristics | Status | Comments |
|----|-----------------------------|---|-------------|---|
| 1 | <i>Bu Mo Pwa</i> | Bitter taste, sturdy, short stem, hard leaves, short grain. | Almost lost | Variety has been almost lost because of civil war. Forced to flee, seeds must be left behind. |
| 2 | <i>Bu Tho Poe</i> | Hard grain (yellow shell, white inside) | Ample | It can be planted both on highlands and flatlands. |
| 3 | <i>Bu Taw Poe</i> | Hard grain (yellow shell, white inside) | Less | It is a harder grain and is not commonly planted. |
| 4 | <i>Bu Thee Lah</i> | Hard grain (yellow shell, white inside) | Ample | It can be planted both on highlands and flatlands. |
| 5 | <i>Bu Mo Ki (Bu Kha)</i> | Soft grain (mixed red shell, white inside) | Ample | |
| 6 | <i>Bu Baw (Yellow rice)</i> | Soft grain (red shell, white inside) | Less | |
| 7 | <i>Bu Taw Mu</i> | Hard grain (brown shell, white inside) | Ample | |
| 8 | <i>Bu Poe Pree</i> | Hard, small grain, tall plant (yellow shell, white inside). | Less | |
| 9 | <i>Bu K' Chaw Mae</i> | Soft, small grain, tall plant (yellow shell, white inside) | Lost | It cannot be planted on the high and hard land, thus with forced relocations and fleeing variety has been lost. |
| 10 | <i>Bu Taw Plit</i> | Hard grain (yellow shell, white inside) | Less | |
| 11 | <i>Bu Tho Gaw Tha</i> | Hard grain (yellow shell, red inside) | Lost | Unpalatable, thus not planted often. |
| 12 | <i>Bu Pu (Short Stm)</i> | Soft grain, short stems (red shell, white inside). | Lost | Unpalatable, thus not planted. |
| 13 | <i>Bu Wah Poe</i> | Soft grain (yellow shell, white inside) | Lost | Variety has been lost because of civil war. Forced to flee, variety must be left behind. |
| 14 | <i>Bu Pu Chraw La</i> | Soft grain (red shell, white inside) | Lost | It can be planted in the lowlands, but not the highlands. Unable to practice lowland farming because of civil war thus variety has been lost. |
| 15 | <i>Bu Taw La</i> | Hard grain, tall plant (yellow shell, white inside) | Less | It can be planted in the lowlands but not the highlands. Unable to practice lowland farming because of civil war, thus variety has been lost. |
| 16 | <i>Bu Kee Meh</i> | Hard, small grain (yellow shell, white inside). | Lost | |
| 17 | <i>Bu Choe</i> | Soft grain (yellow shell, white inside) | Less | |
| 18 | <i>Bu Taw Meh</i> | Hard grain, tall plant (yellow shell, white inside). | Less | |

Appendix 8: Sticky Rice Varieties

| No. | Karen name | Characteristics | Status | Comments |
|-----|---|--|--------|---|
| 1 | <i>P' Ee Thu Bay</i> (Black Sticky rice) | Soft grain (black shell, white inside) with green leaves and black and green stem. | Less | |
| 2 | <i>P' Ee Thu That</i> | Soft grain (black shell, black inside) with black leaves and stem. | Less | This variety can be planted both in the highlands and lowlands. |
| 3 | <i>P' Ee Shraw Paw</i> | Soft grain (red shell, white inside) | Ample | |
| 4 | <i>P' Ee Law Ou</i> | Soft grain (brown shell, white inside) | Ample | |
| 5 | <i>P' Ee Yew Meh</i> | Soft, small grain (red shell, white inside) with tall stems. | Less | |
| 6 | <i>P' Ee Kaw Reh</i> | Soft grain (red shell, white inside) | Lost | Variety has been lost because of civil war. Forced to flee, the villagers must leave their rice behind. |
| 7 | <i>P' Ee Baw</i> | Soft grain (red shell, white inside) | Less | |
| 8 | <i>P' Ee Thay</i> | Hard grain (brown shell, white inside) | Less | |
| 9 | <i>P' Ee Ki Kway</i> | Soft grain (mixed coloured shell, white inside) | Ample | |
| 10 | <i>P' Ee Gaw Poe</i> | Hard grain (red shell, red inside) | Less | |
| 11 | <i>P' Ee Nyah Peh</i> | Soft grain (brown shell, white inside), grain has a tail | Lost | Variety has been lost because of civil war. Forced to flee, variety must be left behind. |



In traditional Karen society, knowledge and culture are closely linked to the natural environment. This report examines the effect of the longstanding civil war on the cultural and natural environment of Karen communities with specific focus on the diversity of cultivated and collected plant species. The information for this case study is based on a survey done in an ethnic Karen village in Mu Traw District, Northern Karen State, Burma.

The case study provides a general overview of the community with a detailed look at the local knowledge-based farming systems. The traditional Karen rotational farming system is described in detail including selection of land and crops to be cultivated, the seasonal calendar, techniques of seed conservation and planting, together with spiritual beliefs that are connected to the agricultural practices. The report also outlines the importance of non timber forest products (NTFPs) for the food security of Karen communities and the special role of women in this and the agricultural context.

The results of this case study shows clearly that the civil war, which has been raging for almost sixty years between the State Peace and Development Council (SPDC) and the Karen National Union (KNU), is the primary reason for the loss of both biological and cultural diversity in Karen State. The fighting has caused tremendous human rights.....