Abundance of **Parlain** Natural Resources and Communities

Parlain Study by its community
June 2015

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Foreword by the Abbot of Andin Monastery

The report on the Abundance of Parlain Natural Resources and Communities is considered to produce after a plan of foreign direct investment, coal power plant, reached to Andin village, Ye Township unexpectedly. In April 2014, the indigenous Mon people have felt a serious concerns and unsafe, when they knew a Thailand registered "Toyo-Thai Company", planned to construct a 1280 MW electricity produced coal power plant, which will impact to their main livelihood relying on the natural resources, especially paddy cultivation, betel-nut plantation, and fishing.

The main objectives of data collection by the local villagers are, firstly, the villagers in 6 villages of Parlain area, want to know the values of their natural resources and communities, for example they knew the existing of ocean dolphins and diversity of crab species, rare tree species in mangrove forest, herbal specie, and 15 types of plants supporting food production, etc.), and secondly, they can share information of how rich of the natural resources of proper ecosystem in their communities to other communities with concrete information.

In order to complete this report, I acknowledge that all community youths have tried hard to collect data without tiredness. This report describes the values of Parlain region – the rich natural resources and ecosystem. The local villagers can find how rich of their communities. Accordingly to Buddha, it is a noble thing that you find out the truth in one-self.

The indigenous Mon people live in the villages along mountain range of Parlain, have a main livelihood of traditional gardening. Andin village, a village in Parlian region, was established about 117 years ago. The local people live in their traditional way for over 10 decades with sufficient foods. We, the village elders and the community leaders, have strong intention that they do not want to leave bad environment of air, water and ground because of the impacts by coal power plant, to their next generations. With a purpose to protect our resources, livelihoods, religion, traditions and culture, the venerable Buddhist monks from 6 villages have led this survey with cooperation of village leaders, youth leaders and villagers.

We are proud of completing the report amid concerns of coming worst conditions to the communities (due to coal power plant). We appreciate and have gratitude to a Thai environmental NGO, TERRA (Towards Ecological Recovery and Regional Alliance) for provide varieties of training on data collection survey and HURFOM (Human Rights Foundation of Monland) for bringing TERRA to our communities.

In order to have this report came out, we express thankfulness to TERRA staff and Mr. Somporn for giving their time and their energy instructing the methodology of survey. We acknowledge to HURFOM staff for their works in translation of the report to the local languages, Mon and Burmese. I thank more to community leaders and village youths for their participation in the survey.

Finally, I again would like to say thankfulness to all academics, community based organizations, civil society organizations, and all individuals for standing with us in protecting of natural resources, indigenous livelihood, environment and civilized society for not being exploited by inhuman investment.
I pray for all well being of all human kind in our globe.

The Venerable Soi La
Andin Monastery, Rehmonya Nikaya
Andin Village, Ye Township, Mon State

Foreword by Chairperson Foundation for Ecological Recovery

In August 2014, a Mon friend from Sangkhlaburi, Kanchanaburi Province in Thailand told me about a proposal for a 1,280MW coal-fired power plant in Ye Township, Mon State of Myanmar.

As I have always been interested in Myanmar's rich cultures, long history, and complex politics especially with what happen to areas near Thungyai Naresuan Wildlife Sanctuary—mainly Karen and Mon States—where I used to be responsible in protecting it as a chief ranger, it is difficult for me to refuse his request.

When Myanmar finally decided to open its doors, after more than 50 years, it reveals to the world its abundant natural resources and beautiful cultures that many countries are no longer able to cherish, especially the arts and traditions that revolve around Buddhism.

But the doors also allow foreign values to enter Myanmar. Its rich natural resources attract investors around the globe to try to commoditize the indispensible environment and traditions and take away ownership from local residents.

Ye is a port city at the southernmost area of Mon State. Although it does not receive the same attention from big businesses as Mawlamyine or Dawei, but it, too, is unable to escape capitalist invasion by foreign investments. Many of these foreign investors come with an offer that is more like a threat to local livelihoods and environments than an economic opportunity, such as Thai company TTCL's proposal to build a coal-fired power plant of Andin Village in Ye Township.

Based on the lessons learned from Mae Moh coal-fired power plant in Lampang Province of Thailand where waters and air turn into toxin that slowly wipes out healthy communities and fertile agricultural lands, it is unacceptable to see our neighbors to fight against dirty projects alone especially when the investors come from Thailand.

After consulting with my Mon friend, I decided to travel to Andin to talk directly to the people and to learn local environment. When I arrived at Andin, I went to the monastery to meet with the abbot. The monastery, as I understand, is what holds the people together thus it serves as a great gateway to the community. Without its support, any outsider would find it impossible to be welcomed in the village. Luckily, the abbot understood my purpose and granted me the permission to walk around Andin and to get familiarize with its geography.

Andin is an agricultural community, surrounded by evergreen betel nut and fruit gardens. It is located near the Andaman Sea and has various complex and diverse ecosystem ranging from the hilltop betel nut gardens, lowland paddy fields, mangrove forests at the estuary, to aquatic ecosystems that nourishes local fishery.

Two villagers guide me through betel nut gardens and emerald paddy fields to the sea; two kilometers is the distance between Andin and the proposed project site for a coal unloading jetty and a 1,280MW coal-fired power plant.

The evening breeze of late September fondles my skin on its way to the village. The rice in the fields bows down in synchronization with the rhythm of the wind. My feet pressed above the mudflats. My eyes stare ahead to the vast open sea. I think about the unimaginable future if the seafront would be replaced by a large jetty.

My first visit to Andin, even though it happened very quickly, affirms my intention to support local communities in their fight against a coal-fired power plant. Andin's economy, natural resources, traditional cultures and beliefs are the factors that make Andin special and these deserve to be protected from destruction.

The road to fight against the proposed coal-fired power plant project is not easy, but the community shows no reluctance or fear to withdraw. Instead, they choose to stand firmly and announce that they need to empower themselves. One way to do that is to compile the values of their homes and communicate this information among themselves and to the public because they believe that people should know that they can live happily and wealthily without a coal-fired power plant. As a result, we organized a workshop in Sangkhlaburi on 2-3 December 2014 for the community to learn how to conduct a participatory research and the impacts of a coal-fired power plant.

Conducting a research is not an easy task especially when one lacks the experience. Yet, the community shows no hesitation; they are ready to learn and eager to collect data. After all, this is their homes and no academics or experts would know this place better than the community who lives and dies here for many generations already.

The aim of this research goes beyond finding data and printing reports; it is the process of this research that serves the intention of the community--to allow people to see the importance and values of their homes and to build alliance against any challenges that come to threaten the community.

When I was standing on the mudflat, I notice a large mountain in the vicinity. When I asked my guide, he told me that the mountain is named "Parlain."

Today, local community adopts the name "Parlain" to label this remarkable research as it symbolizes the unity of the people in western part of Ye township, including Andin villagers.

With limited time and experiences, the community decides that the research should first focus on two issues: the socioeconomics of rice paddies, fishery, and betel nuts; and the ecosystems in mangrove forests and the mountains. However, I hope that they would continue the research and include other topics like the impacts of coal-fired power plant on health and local traditions and cultures. I hope to see that the community can strengthen themselves and extend their networks to include all the people in Parlain on this road to protect their homes and lives, just as they have hoped for.

Parlain Study is truly a participatory research because the community has already used this research in their campaigns against the proposed coal-fired power plant project even before the full report is printed. Parlain Study is different from other research. It is alive and thriving. It is a dynamic research because the people use it to mobilize the society, unlike many researches that lose their lives after being locked safely in a cabinet.

Parlain Study has already proved that it is a powerful tool to strengthen the community's voice against the coal-fired power plant. One great event to reflect this is the immense gathering of the people in front of Andin Monastery on 5 May 2015 which brought over 8,000 people to join the movement.

Veerawat Dheeraprasart
Chairperson Foundation for Ecological Recovery
5 June 2015 World Environment Day

CHAPTER 1 ABOUT PARLAIN STUDY

The idea of Parlain Study is first designed with representatives from Andin Village at the Workshop on Natural Resource Management Research held by Human Rights Foundation of Mon Land (HURFOM) and Towards Ecological Recovery and Regional Alliance (TERRA) in Sangkhlaburi, Thailand on 2-3 December 2014. The research intends to draw out the importance of Parlain ecosystems and natural resources and uses the results to facilitate the community to understand what exist in Parlain and their relationship with the environment, as well as to help them visualize possible impacts of the proposed coal-fired power plant on the environment and their community.

At the workshop, Andin representatives highlight that there are three most important resources that contribute to local economy: betel nuts, rice, and fishery. For this reason, the research focuses to bring out the socioeconomic values of these three key factors of Andin economy and livelihood.

To start, the team draws a map to show the location of Andin Village and its surrounding geography.

First map of Andin Village and its environment drawn by its residents at the workshop on Natural Resource Management Research

After the workshop, the community sets up a core research team comprised of village youth and monks to collect data on rice, betel nuts, and fishery and to find out how local residents use Parlain natural resources.

The survey looks at the socioeconomic values top three sources of incomes—betel nuts, rice, and fishery. Additional data on other type of fruits and income are also mentioned to calculate their contributions to local economy.

The questions used for the survey include:

- Number of household in a village
- Number of household who cultivate rice, own betel nut gardens, and do fishery
- Areas in acre for rice paddies and betel nut gardens

- Number of betel nut palms owned by each household
- Number of betel nut fruits collected by each household in a year
- Amount of unmilled rice by each household in a year
- Number of household who owns fishing boats and motorized boats
- Number of fishing nets owned by each household
- Income from betel nuts, rice, and fishery

As most members of the research team comes from Andin Village, they have to coordinate with local residents to conduct interviews and surveys with other community members. However, by January 2015, the research is recognized by many villagers and expanded to include more research teams from five villages in Parlain, namely: Sanint Krate, Kwan Tamort Pea, Saigram, Sanint Janu, and Plaing Sam.

Interviews and focus groups are conducted to inquire details on agricultural practices, fishing methods, and other values associated to these natural resources e.g. medicinal benefits, cultural and religious connections, social and leisure aspects.

After three months of data collection, in March 2015, the research team is able to estimate incomes generated from rice, betel nuts, and fishery in the six participating villages. Analysis of raw data is drawn out in various multi-media forms. Incomes are put in charts to explain estimated minimum total annual income from betel nuts, rice, and fishery.

Research team discusses about how to collect data.

Research team member explains the income of each village to the team.

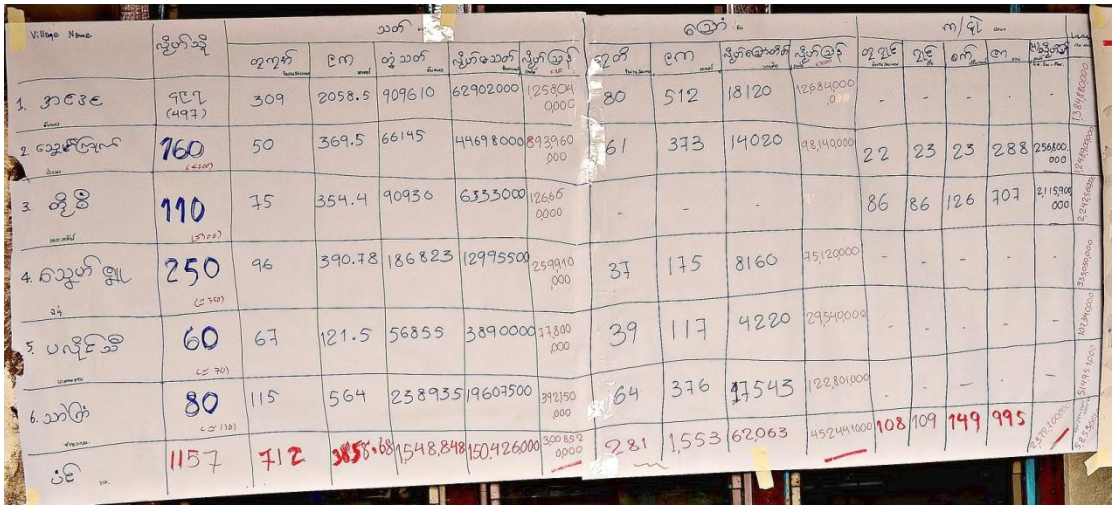
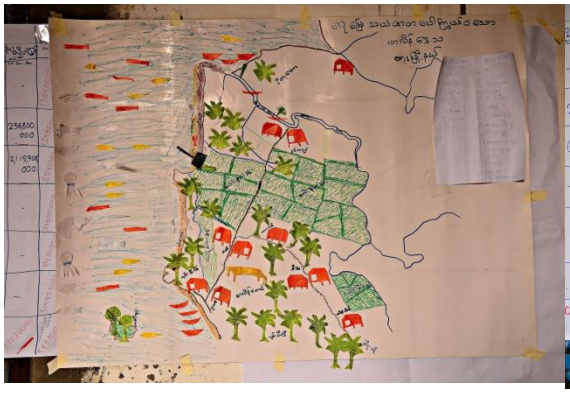


Table showing income from betel nut, rice, and fishery, drawn by the research team.

Since the research team expands the study area to cover more villages, it develops a more detailed map to illustrate the western Parlain's physical geography, its rich ecosystems, and community-environment relations. The research team travels from the mountaintop down to the sandy beach. Samples—such as plants in the mangroves—are collected to affirm their abundance and common names. When samples are difficult to gather—like fishes—the research team photographs the samples instead. Community members in each visited village are also invited to help identify the samples in local names and their usages--whether the sample is edible or toxic or has medicinal benefits. Additional questions on fishing method are asked for each fish sample.



Map of Parlain shows location of rice paddies, betel nut gardens, fishing ground, waterways, and the proposed coal-fired power plant project.

Research member explains the map to the team.

Research team consults local fisher folk on where each mangrove plant thrives and how it is used by locals.

Research team interviews fisher folks in Kwan Tamort Pea about fishery.

A research team member interviews women in the village.

A monk explains a map of Parlain's natural resources after editing it.

In May 2015, the research team sets out to explore the ecosystems in mangrove forests near Sanint Krate Village with local. The team also joins fisher folks in the sea to record fishing activity with Kwan Tamort Pea fisher folks. The number of commonly found wildlife species and aquatic species is gathered and affirmed by local residents.

Another map is developed based on the data and the previous map to show the location of the six participating villages, betel nut gardens, paddy fields, fishing zones, mangrove forests, mudflats, rivers and creeks.

After six months of data collection and exploration since December 2014, the research team finally concludes its first research project in May 2015 and publishes this report and the map of Parlain's abundant natural resources in June 2015.

The Parlain study is conducted completely by the communities of Parlain with supports from TERRA and HURFOM. These two organizations continue to monitor the study's progress, provide technical supports in the field as well as in the analysis part throughout the six months.

The research team would also like to thank Mr. Tara Buakamsri, Greenpeace Southeast Asia Country Director, who provides knowledge on coal-fired power plants and their impacts; Ms. Somporn Pengkam who helps design the community data collection and continually gives guidance to Andin representatives since the Workshop on Natural Resource Management Research; and Dr. Cherry Aung, a marine scientist from Mawlamyine University who supports the team with scientific data on mangrove ecosystems, and species in the mangrove forest and other aquatic ecosystems.

CHAPTER 2 ABOUT PARLAIN

At the coastline on the southern end of Mon State, Myanmar, there is a mountain named Parlain. Parlain mountain sits between the Andaman Sea and the Tenasserim Range. Its elongated north-south formation with a height exceeding 400 meters from the sea surface and its vicinity is home to over 30,000 ethnic Mon population. In addition, Parlain area encircles gardens covered with evergreen vegetation. The ubiquity of areca palms (more commonly known as betel nuts) in the area hints that local communities cultivate this plant largely. Other tropical fruits like durians, coconuts, marian plums, bananas, and jackfruits disperse in between gardens.

The great diversity of plants in the betel nut gardens resembles a mini healthy forest. This characteristics attract wildlife to find shelter and food in this area. Locals assert that they spot at least 71 different types of bird species in the garden such as Great knot (*Calidris tenuirostris*), White-winged duck (*Cairina scutulata*), Collared owlet (*Glaucidium brodiei*), Black-crowned night-heron (*Nycticorax nycticorax*), Red-billed tropicbird (*Phaethon aethereus*), White-tailed leaf-warbler (*Phylloscopus davisoni*).

Other wildlife that can be found in the garden includes red junglefowl, wild squirrels, Muntjac, pangolin, monkeys, wild hogs, panthers, and leopards.

Betel nut garden embraces the road to Andin Village.

Some local gardeners dry betel nuts before selling them to the market. Dried betel nuts can be stored for 9 months.

Parlain also encompasses the fertile low-lying paddy fields which are astoundingly situated so close to the seashore. In contrast to the evergreen gardens, the paddy fields alternate colors between the various shades of green to dark yellow according to the seasons and the presence of the rain. A web of creeks and canals--one other key feature of the area--feed the soils and nourish local agricultures, especially the rice paddies that blanket the area and embrace thousands of houses.

The most prominent waterline amid the landscape is the Sanint Krate River. Like many creeks that intertwine here, it emerges from the Ye River as a tiny creek running along the road that connects Parlain with Ye. As they run through the rice paddies, sediments and nutrients also join the flow down to the ocean. By the time these creeks finally meet and mingle with seawater, the river widens and branches out with nipa palms (*Nypa fruticans*) clustered along the channels. Its presence introduces newcomer to a different group of vegetation that has not appeared up on the mountains, mangroves. When the ocean tide ebbs, mangroves emerge and dominate the scenery.

The estuary and mangrove forests at the mouth of Sanint Krate River.

Nipa palms grow along the creeks and canals that link the estuary to the lowland paddy fields.

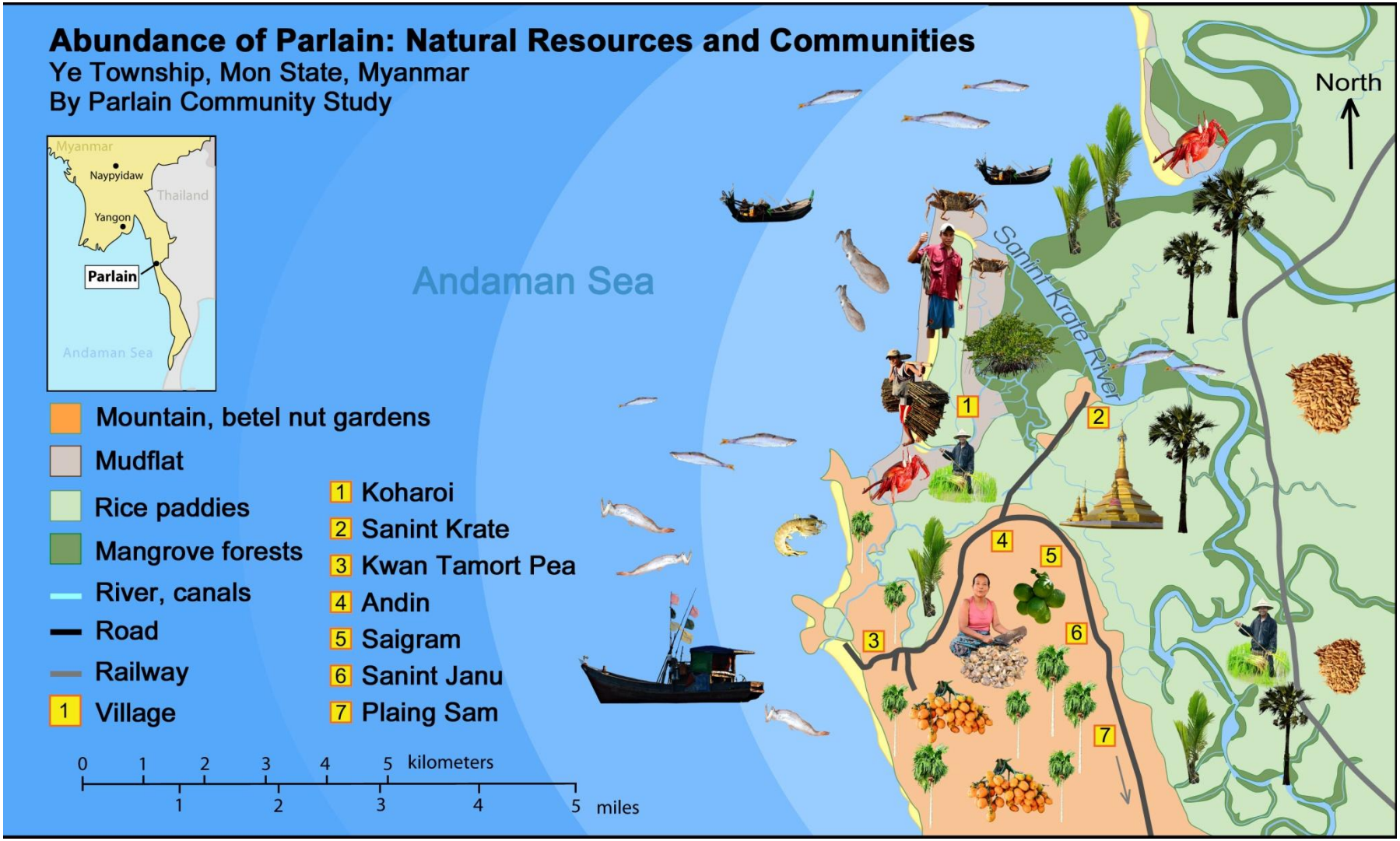
Expansive mudflat is exposed when the tide ebbs.

Freshwater creek creates its own path over the mudflat to reach the sea.

At the edge where the earth expands its terrestrial front and bore a young complex estuary is the mudflats. It acts as a buffer zone between freshwater and seawater to prevent unwelcome salinity to enter paddy fields. This is also where blady grass spreads widely. The sharpness of its leaves acts like a magnet to hold back silts—instead of letting it washed away with the tide. It also traps nutrients, creating a large free-for-all buffet to feed the million miniscule crabs (*Mictyris sp.*) and mollusk on the mudflat. This is also lobsters and mantis shrimps' most favorite hiding spots.

Blady grass near Andin Village.

Blady grass near the mangrove forests| at the mount of Sanint Krate River.



Map of Parlain's natural resources and communities

Between the estuary and Sanint Krate River in the north and sandy Kwan Tamort Pea beach in the west is another plot of rich fertile land. This is where Parlain's largest rice paddies thrive. The area covers over 1,500 acres and generate immense amount of rice to feed the people of Parlain as well as others in nearby towns like Ye.

Beyond landscape and livelihood, Parlain, as some locals explain, is the community where peace reigns over. This, as they elaborate, is attributed to by the richness of nature. An Andin villager affirms that there have never been such disastrous weather events as flood and drought in decades inflicting the village. And, as the research team observe, natural resources are so abundant. Hence, the regularity of products from rice fields, orchards, coastal areas and so forth, which bring well-being to the community.

Definition of Parlain even embraces spirituality. As one local puts it, the word carries the meaning of unity as an element of the being of Parlain. The villages are brothers and sisters. The respective monasteries (and monks) that are highly respectable to the villagers are closely related.

Another engrossing dimension of Parlain is how it carries a tone of identity. It is used as a "proper name" referred to a particular area out of the four areas sub-divided under Ye Township, the rest of which have no proper name of their own. Besides, the fame of Parlain appears to reach out to other parts of Mon State far beyond Ye. For instance, its products such as betel nuts or dried shrimps are known as having special quality and thus could deserve relatively higher prices.

To conclude for now, all above explanations infer that Parlain has multidimensional meaning. To really grasp the essence of it, a holistic approach of analysis is required. But one must bear in mind all that is not yet its entirety. As a local put it, "to get an even broader and/or deeper sense of Parlain, there are still more to describe about it".

CHAPTER 3 COMMUNITY AND LIVELIHOODS

Parlain is also its own administrative district, comprised of 2 zones: one in the west of the Parlain Mountain, the other in the east. The west zone has 6 large villages with its own head authority and one small village that was recently established at least 50 years ago named Koharoi. In the east zone, there are 3 villagers (with Duya being one of the three). This zone too has its own head authority.

The six major villages that are directly involved in this research come from western Parlain, which include: Sanint Krate, Kwan Tamort Pea, Andin, Saigram, Sanint Janu, and Plaing Sam. Sanint Krate and Kwan Tamort Pea are situated near the beach and are known to be fishery villages. Andin, Saigram, Sanint Janu, and Plaing Sam are further inland. Most villagers take up agriculture and other means to make a living.

In these villages, a monastery usually rises at or near the community center, acting as a focal hub for the communities to meet and sustain their traditions. Young novices live here to learn the Buddha's teachings while other children in the village arrive here to immerse in traditional cultures and practices. The monks usually walk around the neighborhood for morning alms before their studies continue for the rest of the day. In the evening, elders bring little children to the monastery with beautiful flower bouquets in hands. They head to the Buddha statues to show their gratitude and veneration to their beliefs.

One of the pagodas located on Parlain Mountain.

The livelihoods of the people here are loosely dictated by where they live and how they make a living. There is almost a clear line that distinguishes the role of women from men. Men are usually the ones who go out to catch fish or cut down the fruits. Women stand by, usually at home, to collect the catch and sort out accordingly. Women also take the main role in preparing and cooking for the family.

Two villages that this research is able to conduct comprehensive interviews are Andin and Kogruei. Information on agriculture is mostly obtained from a focus group and interviews with Andin villagers; whereas, Kwan Tamort Pea fisher folks provide fishery data.

Andin Village is one of the six villages that actively participate in the community-led research. Because its main source of income comes from betel nuts and rice, Andin makes a great place to start understanding the importance of agriculture in the Parlain Region's social relations and economy.

Andin Village is within the municipality of Ye Township, Mon State and is about 16 kilometers northwest of a nearest town, Ye Town. There are 497 households residing here. Almost all of them are Mon ethnic and adopt Mon as their primary language in every day's life. The name of the village also reflects its deep root in Mon culture.

Based on the focus group in Janurary 2015 and the survey on Andin Village, 80 households own farmlands. The rest work as laborers for other farmers or leave the village for employment in other areas of Myanmar or abroad (Thailand, Singapore, Malaysia, the US).

Another village that the research team conducted focus groups with is the villagers from Kwan Tamort Pea Village. This village is located at the end of the road that links Parlain

and Ye. It sits on a long sandy beach looking out to the Andaman Sea.

The first settlers of Kwan Tamort Pea Village come from Andin Village many decades ago. They first come here seasonally to catch fish and move back inland when the seawater floods the beach during Monsoon. Today, the population of Kwan Tamort Pea Village increases to at least 210 households, with the majority makes a living as fishers. For those who do not possess fishing boats, they take different means to make a living. Some choose to act as traders by buying seafood products from the fisher folks and selling it to other villages or markets in bigger cities. Some work as laborers for the boat owners. There are also those who own or work for the 10 duck farms in the village.

Students walk home after school in Kwan Tamort Pea Village.

A woman and her child in Kwan Tamort Pea Village.

A house in Kwan Tamort Pea Village. The ceiling is made of dried nipa palm leaves.

CHAPTER 4 THE BETEL NUT GARDEN

Around 100 years ago, betel nut palms entered Parlain Region not as cash crop but simply to satisfy locals' appetite for betel nut chewing. In the beginning, most betel nut palms were planted on the hills near the village and then extended out further to flatlands as the village's population grew. It was not until 40-50 years ago that betel nut palms gained popularity and started to dominate the majority of farmlands.

How the term betel nut comes to describe Areca is uncertain. It is the leaf that used to wrap areca nut when prepared or sold as chewing tobacco whose name is betel leaf. Nonetheless, betel nuts appear to be used regularly to convey the fruit of Areca throughout south Asia and Myanmar. For this reason, this report will also adopt "betel nut" to describe Areca, such as the following:

betel nut palm = Areca palm
betel nut (fruit) = Areca fruit

Canopy of betel nut palms covers the garden.

Betel nut fruits.

Betel (*Piper betle*) vines on the trunk of betel nut palms (*Areca catechu*).

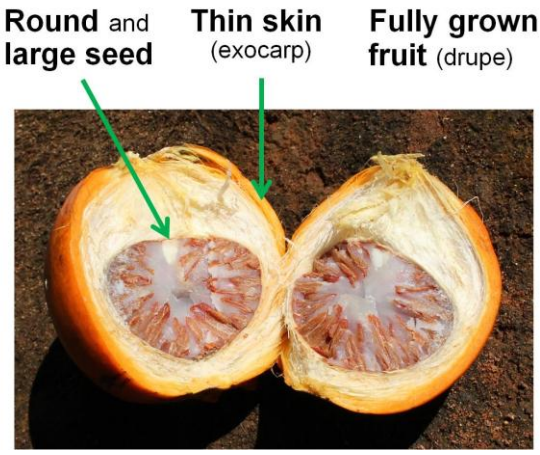
How to grow betel nut palms

"We don't take down an old betel nut palm down. We let it grow and fall down naturally."

When the time for a new set of betel nut palm to be planted arrives, usually in , farmers would select only the best fruits to use as cultivars. There are mainly two types of betel nut fruits found in Andin: a round shape and an oval shape. Regardless of the shape, cultivators would only breed cultivars that have fully-grown drupe with big pedicel, thin exocarp, and a big and tight seed.

It takes about 6-10 years before a betel nut palm will bear fruit and be ready for harvest. The fastest duration, 6 years, reflects the gardener's greatest care and most suitable conditions: the soil must be healthy and full of nutrients; there is enough for water for the whole 6 years. This is why areas located closer to the sea, especially on hilly areas, are usually more preferable because water is abundant. Nonetheless, most villagers say that it usually takes 10 years before they will be able to sell the first batch of betel nut from a newly planted betel nut palm.

Succession of young and old betel nut palm.



Characteristics of a preferred betel nut that will be used as cultivar.

Drying betel nuts can be found on the ground throughout the villages.
Locals also sundry betel nuts on racks made of bamboo and betel nut trunk.

The life span of a betel nut palm is about 50-70 years before it turns very old and fall down. Villagers explained that they do not take down a betel nut palm when it is old or stop bearing fruit. They usually leave the betel nut palm die and fall down naturally. At the same time, cultivators would plant a younger betel nut palm near a very old one to replace it when it falls down.

The harvest begins in August when the betel nut fruit starts to ripe and ends in February. Men would take part in taking down the fruits by using a long stick that attaches a sharp

knife at the tip. Women help out by sorting fresh betel nuts and sundry them by laying on the ground or on the racks in front of their houses or in an open area. After 45 days, these dried betel nuts are bagged and stored up to 9 months. Locals usually keep dried betel nuts under the house or in a storage within their house area. Before selling dried betel nuts to the market or the middle person, many locals, usually women, would peel off the fibrous skin with traditional cutting tool to add value to their products.

Betel nut seasonality chart

MONTH	3	4	5	6	7	8	9	10	11	12	1	2
Betel nut development and harvesting	Betel nut flowers bloom			Young betel nut fruits		Harvest begins		Drying betel nuts. It can take at least 45 days to completely dry a betel nut. Last batch for this harvest season usually ends in February				

Dried betel nuts are kept within the house up to 9 months and sold throughout the year.

Women are generally the ones who prepare betel nuts for storage or sale.

A woman peels off the betel nut skin for the seed. The market offers higher price when the gardeners sell the betel nut seeds than the whole fruit.

Tropical fruits

But the garden isn't only about betel nuts. It also provides an incredible range of fruits all year round to the villagers like durians and mangosteens before the rainy season; jackfruits and tamarinds for the summer; bananas and coconuts for the whole year; guava and oranges to provide vitamin C during chilly winter. Gardeners explain to the study team that there are at least 26 different types of fruits cultivated harmoniously amid the tall betel nut palms.

Gardeners collect these fruits for the family, share them among friends and other villagers, and/or offer the first batch to the monks to mark the beginning of the season and to show veneration towards their beliefs. The abundance of these fruits allow the gardeners to sell a great deal to the market within Parlain Region and to nearby towns like Ye. This shows that the number for incomes a gardener get his/her garden is much more than the calculations on only betel nuts. Such finding opens up more rooms for the research team to find out more.

The abundance of these gardens result from the knowledge and skills gardeners in Parlain have been polishing and passing down from generations to generations. Such practice like never cutting down a betel nut palm but allowing the old one to fall naturally and the young one to peak creates a natural succession of a healthy forest of edible flora, similar to how a forest regenerates itself. It also makes chemical fertilizer and pesticide unnecessary since the garden's diversity is able to compose natural detritus to feed the soil. As a result, this keeps the water springs clean enough to drink directly from the ground. This practice also prevents toxic chemicals to enter the garden which is also a habitat for many wildlife species like panthers, red junglefowl, wild squirrels, Muntjac, pangolin, monkeys, wild hogs, and leopards.

Parlain Seasonality Chart: Betel nuts and fruits in the garden

No.	Fruits found in garden	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1.	Banana	X	X	X	X	X	X	X	X	X	X	X	X
2.	Betel (*Piper betle*)	X	X	X	X	X	X	X	X	X	X	X	X
3.	Betel nuts (*Areca catechu*)	X	X						X	X	X	X	X
4.	Black pepper		X	X									
5.	Cashew nut	X	X										
6.	Champedak (*Artocarpus integer*)					X	X	X					
7.	Coconut	X	X	X	X	X	X	X	X	X	X	X	X
8.	Durian				X	X	X	X	X				
9.	Guava										X	X	X
10.	Jackfruit		X	X	X	X	X	X					
11.	Jering (*Archidendron pauciflorum*)				X	X	X						
12.	Large lemon (sour)		X	X	X	X	X	X					
13.	Large lemon (sweet)		X	X	X	X	X	X					
14.	Lime	X	X	X	X	X	X	X	X	X	X	X	X
15.	Long pepper (*Piper longum*)					X	X						
16.	Mango				X	X	X	X					
17.	Mangosteen					X	X	X	X				
18.	Marian plum (*Bouea macrophylla*)	X	X	X	X								
19.	Mushrooms					X	X	X	X				
20.	Orange	X	X								X	X	X
21.	Papaya	X	X	X	X	X	X	X	X	X	X	X	X

22.	Pineapple		X	X	X	X	X						
23.	Pomelo		X	X	X	X	X	X					
24.	Rambutan (*Nephelium lappaceum*)					X	X						
25.	Tamarind	X	X										
26.	Tangerine	X	X							X	X	X	X

X = indicates the time when each fruit is harvested.

Other fruits like bananas (left), coconuts (middle), and durians (right) are part of a betel nut garden.

Betel nut economy

Many villagers say that they prefer to cultivate betel nut palms because of its consistent price, which is usually higher than other cash crops like rubber and cassava.

In one acre of land, there are usually about 450-500 fully grown betel nut palms. Each betel nut palm usually bears around 250 fruits per year. For a fresh betel nut, it can be sold between 15-35 kyat/each (the highest price, 35 kyat/each, was found in March 2015), depending on the season. The villagers indicate that the norm price is usually 20 kyat/each. For dried ones, the price stays around 3,700 kyat per 1.3 kilograms or about 150 fruits. Many villagers prefer to sundry the betel nuts and wait until the market price goes higher. Although they do admit that dried betel nuts require them to wait longer and more efforts are needed to cut and peel the fruits rather than selling fresh betel nuts directly, without additional works, to the market. They also need to have storage to keep dried betel nuts from the rain. The majority of sold betel nuts, both fresh and dried fruits, is sold to a middle person in Ye. Some villagers tell the research team that they find out that these betel nuts are sold and exported to India, China, Taiwan, and Korea, but mostly, to India.

Different parts of a betel nut palm can be used for different things. The betel nut can be sold fresh or dried to the market and used as tobacco. Villagers also choose to dry it themselves to use as tobacco in the family. Villagers also assert that the fiber skin of a dried betel nut can be shredded to make papers. Dried skin is sold at the price of 50 kyat/1.3kg (as of January 2015). The leaf, after sun-dried, is also used as cigarette wraps (sold at the price of 1,500 kyat per 1.3 kg). After a betel nut palm falls, its trunk is used as posts for a house or a place to sundry betel nuts.

It can be said that the stored betel nut bags act like a bank where villagers for them to store their investments. As the season gets drier and further from harvest time, the price of these dried betel nuts rises like interests in one's bank account.

Income from betel nut in Parlain

BETEL NUT						
Village name	**Number of households***	**Number of households who own betel nut gardens**	**Acres (other fruits can also be found within)**	**Number of betel nut trees**	**Number of betel nut fruits**	**Income from betel nut (average price at 20 kyat/fresh betel nut fruit)**
Andin	497	309	2,058.50	909,610	62,902,000	1,258,040,000
Sanint Krate	200	50	369.5	66,145	44,698,000	893,960,000
Kwan Tamort Pea	210	75	354.4	90,930	6,333,000	126,660,000
Sanint Janu	310	96	390.78	186,820	12,995,500	259,910,000
Saigram	125	115	564	238,935	19,607,500	392,150,000
Plaing Sam	90	67	121.5	56,855	3,890,000	77,800,000
TOTAL	**1,432**	**712**	**3,858.68**	**1,549,295**	**150,426,000**	**3,008,520,000**

*Number of households in Parlain is inquired by asking the village chief

Of the 1,432 households in Parlain, the research team finds at least 712 households who own betel nut gardens, comprising at least 3,858.68 acres. Of the six villages, Andin Village has the most numbers of betel nut gardeners at 309 households, owning over 2,058.50 acres. Saigram ranks second at 115 households, covering 564 acres. In Sanint Janu, there are 96 households who have betel nut gardens and they own 390.78 acres. Plaing Sam's number is much lower with 67 households owning 121.5 acres of betel nut gardens. In the two fishery villages—Sanint Krate and Kwan Tamort Pea—some villagers also own betel nut gardens. There are 50 households in Sanint Krate who own betel nut gardens, totaling to 369.5 acres. For Kwan Tamort Pea, there are 75 households who possess a total of 354.4 acres of betel nut gardens.

The income from betel nuts is calculated at 20 kyat per each fresh betel nut fruit. This price is the minimum price a farmer gets when sold a fresh betel nut fruit to the market in early January 2015. The price is much higher if the betel nuts are sold dry and at a different time of the year.

Although a betel nut palm usually bears between 200-250 fruits a year, this calculation chooses to use a much lower number between 97-100 fruits which is possibly the lowest number that a gardener sell after sorting out bad or unsuitable fruits that cannot be sold.

Based on this research the total income from betel nuts from the six villages is 3,008,520,000 kyat. Andin can generate the most from betel nuts by bringing in at least 1,258,040,000 kyat each year. Sanint Krate ranks in second at 893,960,000 kyat. In average, each household in Andin makes 4,071,326.86 kyat from betel nuts, while each household in Sanint Krate receives at least 17,879,200 kyat in average each year.

CHAPTER 5 LOWLAND RICE PADDIES

The rich and fertile soil, extending from the foothill to the mudflats, nourishes the paddy fields and provides locals their staple food. Small streams and canals intertwine the mainland moistening the soil even when the rain rests during winter and summer.

The first rain that pours down a couple weeks after traditional New Year in mid-April, or water festival, marks the beginning of rice cultivation. It is finally time for farmers to plow the soil and get ready for the next harvest season. By August, what appeared to be bare brown lands earlier in the summer now transformed into an emerald green landscape—rice are ready to be harvested.

There are mainly three types of rice local farmers prefer to plant: big grains, small grains, and sticky rice. The big and small grains are local rice species whereas sticky rice is imported from Thailand.

Type of rice	Big grain	Small grain	Sticky rice
Rice origin	Local	Local	Thailand
Transplanting period	August	August	August
Harvesting period	November-December	September-October	November
Location	Lowland Deep water	Elevated areas Shallow water	Elevated areas Shallow water
Amount of rice used to transplant in each acre	1 puk/acre	1 puk/acre	More than 1 puk/acre
Selling price per puk	6,500-7,000 kyat/puk	4,500 kyat/puk	7,000 kyat/puk

Another type of rice that can be found increasingly more over the years in the area is jasmine rice from Thailand. Nonetheless, this is not very common and many local farmers still prefer to cultivate local rice varieties.

Local farmers use a measurement unit called "puk" to measure the volume for rice. Each puk is an equivalent to a 40-liter bucket.

For each acre of rice paddy, locals use one puk of rice cultivar to cultivate the field. At the end of the harvest, farmers usually gain 35-45 puk of rice, for both big grain and small grain. The amount of sticky rice harvested in each acre is usually more than the previous two types.

In 2014-2015, the market price for each puk of big grain rice is 7,000 kyat. The small grain receives 4,500 kyat per puk. The price for sticky rice is similar to the big grain at 7,000 kyat/puk.

For a family of 4 who cultivates rice, they can produce around 100 puk of rice. About 1/3 to half of the produced rice will be kept for the family to consume until the next harvest season. The other 2/3 or half will be sold to the market. For bigger families like those with 8-10 members, they can keep at least 140 puk of rice for the family alone.

Farmers prepare a dyke to keep saltwater from intruding their paddy fields.

Rice thrives before harvest season begins.

Locals use this bucket called "puk" to measure rice.

Local rice variety: Big grain.

Every village has its own rice mills. In Andin, there are 4 rice mills. One of the rice mill owners indicates that each rice mill can mill up to 100 puk of rice per day. The service fee for milling rice is 300 kyat per puk. The rice mill will keep the service fee and the rice bran.

Water used for irrigation mainly comes from rainwater and a system of small streams and canals than runs throughout the agricultural land. Locals note that in the past, saltwater intrusion is not unheard of but it rarely occurs. However, if saltwater fills the crop fields, it can damage the paddies causing it too salty to cultivate rice.

Yet the paddy fields aren't only homes to rice. Other plants like Centella (*Centella asiatica*) and fish also spring up to accompany rice and make the area more diverse—and flavor up each meal. Freshwater fish arise. Frogs and birds appear. The paddy fields are no longer a source of food for human but also much wildlife in the vicinity.

Rice economy

The research team uses surveys to find out how many rice farmers and how much rice paddies there are in Parlain. To further exemplify the portion and importance of rice in Parlain, the research team interviews and conduct focus groups with farmers from Andin Village.

It should also be noted that the location of the rice paddy may not be within the owner's village limit. It is possible for a rice farmer who is from, for example, Sanint Krate Village, to have his/her rice paddy in Andin Village area.

Income from rice in Parlain

RICE					
Village name	**Number of households**	**Number of rice farmers**	**Area of rice paddies (acre)**	**Amount of unmilled rice (puk)**	**Income (kyat)**
Andin	497	80	512	18,120	126,840,000
Sanint Krate	200	61	373	14,020	98,140,000
Kwan Tamort Pea	210	5	79	2,170	15,190,000
Sanint Janu	310	37	175	8,160	57,120,000
Saigram	125	64	376	17,543	122,801,000
Plaing Sam	90	39	117	4,220	29,540,000
TOTAL	**1,432**	**286**	**1,632**	**64,233**	**449,631,000**

- The total amount of unmilled rice in each village is calculated by combining the number interviewees indicated during the survey.
- Income = amount of unmilled rice x 7,000 kyat

The survey finds 286 rice farmers in Parlain. In Andin, there are 80 rice farmers or 16% of the total households. The total number of rice paddies in Andin alone is 512 acres and can produce at least 18,120 puk of unmilled rice as of 2015. This means that the income from rice, based on the market price (7,000 kyat) at the beginning of 2015, is estimated to be at least 126,840,000 kyat or 247,734.38 kyat per acre.

In Sanint Krate, 50 households or 38% of total households say they own at least 373 acres of rice paddies in total. In Sanint Janu, Saigram, and Plaing Sam, the number of rice farmer households is 96, 115, 67, respectively. Each of this village has at least 175, 376, and 117 acres of rice paddies, totaling to 668 acres. Kwan Tamort Pea has the least number of rice farmers. There are only 5 rice farmers in this village with a total of 79 acres of rice paddies. When combining all rice paddies among the 6 adjacent villages, the survey team finds 1,632 acres of land are dedicated mainly to rice cultivation, amounting to at least 64,233 puk of unmilled rice. If the price of rice stays at 7,000 kyat per puk, rice farmers from the six villages will gain at least 449,631,000 kyat in a year.

Traditions related to rice

Veneration of Nature and spirits is apparent and embedded in local cultures here. At the beginning of each planting season, before the first plowing begins, each rice farm owner would prepare two set of offerings for the spirits: one for the ancestors, another for Mother Earth. The offerings may include but not limited to betel nuts, tobacco, coconuts, sticky rice, orange juice, fish, and chicken.

After the harvest, each rice farm owner would bring the first batch of new harvest to the temple and offer it to the monk.

Fishing also occurs in paddy fields.

Numerous creeks can be found throughout paddy fields.

Paddy rice field at Andin village.

CHAPTER 6 FISHERY

There are two villages in Parlain where fishery is the most important way to make a living: Kwan Tamort Pea and Sanint Krate.

The setting between the two villages is different. Kwan Tamort Pea resides on the sand beach that bridges one hill of betel nut gardens to another in the western part of Parlain. Sanint Krate, on the other hand, is located in the northern part of Parlain, along the estuary of the Sanint Krate River.

Although the research team is able to interview fisher folks from both villagers, more in-depth information comes from Kwan Tamort Pea villagers. Thus most of the data present here focuses more on fishery in Kwan Tamort Pea Village. The research team has collected data from Sanint Krate during the interviews but it is not as much as the findings from Kwan Tamort Pea Village. However, we consult Sanint Krate fisher folks for common fish species found in their rivers and water and fish products like ngapi (shrimp paste).

KWAN TAMORT PEA FISHERY

From 210 households, we are able to interview 86 households who are fishing families.

Men are usually the ones who travel on boats to the sea to set up bag nets and await the tide to recede and rise, similar to what we see in Sanint Krate. Local fisher folks split fishing ground into three zones, starting from the shoreline to deeper areas towards the deep sea.

The fishing ground for Kwan Tamort Pea extends at least 5 kilometers (around 3 miles) from the sandy beach where village sits facing the open sea. Fishing area is divided into three zones: along the shoreline, between shoreline and open sea (middle zone), and open sea. Smaller boats travel only within the shoreline. Bigger motorized boats travel further but remain within the middle zone during Monsoon. The size of fish also gets larger as the boats travel further from the shoreline.

Zone 1 Along the shoreline. Small fish, lobsters, mantis shrimp, mollusk

Zone 2 Middle zone. Medium-size fish, especially Bombay duck (Harpadon nehereus)

Zone 3 Only a few months a year, usually after the rainy season.
Local fisher folks would avoid this area during dry and monsoon season.
Deeper area, larger-size fish

Fishing seasonality chart

MONTH	12	1	2	3	4	5	6	7	8	9	10	11
CATCH	LOW CATCH Approx 10 bags/day				HIGH CATCH Approx 100-125 bags/day							
							Ocean fishing to be suspended between 1 June to end of August, starting May 2015*					

*On 8 May 2015, Myanmar Times reports that the Ministry of Livestock, Fisheries and Rural Development releases a statement to suspend ocean fishing between 1 June to end of August in order to allow depleted fish stocks to recover[1].

The most common fishing gear local fisher folks use is a type of bag net called “Pangkla” in Mon or “Kya ba zat” in Burmese. It is usually 70 feet wide and at least 5 feet long. They would tie the bag net with plastic balls to keep one side of the net floating above the water surface and the other side with rocks to weigh down the net down to the bottom of the sea. The bag net is placed in east-west direction to let the water current, which flows in north-south direction, brings in the marine species. Typically, a fisher folk would set up around 10 bag nets in a fishing zone.

Beach at Kwan Tamort Pea Village.

Children play at beach in Kwan Tamort Pea Village.

Fisher folk collects fish products by using a bag net.

A fisher folk prepares bag net.

In a 24-hour cycle, fisher folks go out 5 times: the first trip is to set up the fishing gears; the rest is to collect the prize. The time that the tide rises and recedes dictates when the fisher folks go out to collect their products. The tide here rises and recedes twice a day and the exact time changes according to the moon calendar.

Each time the fisher folks go out to collect their prize, they have to spare at least 15-20 minutes before the collection begins, to wait for the neap tide. If the fisher folks come too late

[1] Myat Nyein Aye, "Ocean fisheries to be closed on June 1 for three months," Myanmar Times, 8 May 2015 (http://www.mmtimes.com/index.php/business/14360-ocean-fisheries-to-be-closed-on-june-1-for-three-months.html).

and the water starts to flow in the opposite direction, the fisher folks would lose their prize as the fish and other marine species follows the tide.

What the fisher folks collect here are mostly fish, crabs, and shrimps. Other marine species found here include: mollusk, squids, jellyfish, lobsters, mantis shrimps, stingrays.

The least amount of fish and other products caught in a day is usually between December and March when it is the driest. The amount of fish caught during this time is 10 bags a day (each bag weighs approximately 50 kilograms). The amount of fish increases after the end of March until late November. The most fish caught is around 100-125 bags a day.

For each bag of marine products, the fisher receives at least 25,000 kyat. The bag can be directly delivered to the family to be kept as food for the household, to the buyer who comes to receive the product after each boat trip, or to the women group to sort out according to the species type and size.

The most common caught fish is Bombay duck (Harpadon nehereus). Fisher folks may choose to sell this off fresh, but many prefer to sundry it because they can sell it at a better price. Shrimps and other fish species, may be sold fresh but fisher folks prefer to sundry them to get a better price. If sold, these seafood products can make their way as close as the markets in nearby villages in Parlain Region, or go further to downtown markets in Ye, Mawlamyine, and even Yangon.

Fishing boats by the beach near Kwan Tamort Pea Village

Women in Kwan Tamort Pea Village make dried fish

A woman in Kwan Tamort Pea Village slowly places bombay duck on the rack to make dried fish.

A woman in Andin mixes small shrimp and salt to make shrimp paste.

Another aquatic life that appears normal for local fisher folks but remain mostly unheard to other communities in Parlain is dolphins. Sometimes, when the fisher folks go out to collect their catch, dolphins would come to the surface near the boats. Local fisher folks say the dolphins usually come to eat the fish that are caught by the bag nets, especially when some are able to escape when fisher folks pull up the bag nets. Like local fisher folks, dolphins would only appear near the shore during neap tide.

It should also be noted that the research team finds no large fishing gear during the study. This point indicates that, though fisher folks regularly go out on their boats to collect their prize, they have their own mechanism to sustain natural resources instead of overexploiting Nature's abundance.

Drying small shrimps in
Kwan Tamort Pea Village

Drying bombay duck in
Kwan Tamort Pea Village.

Small shrimps found in the sea by
Sanint Krate Village

Young squids found in the sea by
Sanint Krate Village

Based on our talks and a number of focus groups with local fisher folks from the two villages, we find 138 fish species very common here in Parlain waterfronts and estuary (see Appendix); 121 fish species of these are among the 248 species listed on Myanmar Commercial Fish Species. Nonetheless, this number does not truly represent the great diversity of fish species in the area. Local fisher folks confidently assert that there are many more fish species found regularly by local fisher folks that are not listed on the official commercial fish species.

Lobsters and mantis shrimp

In Kwan Tamort Pea, mainly, there are 10 households that nurse lobsters and mantis shrimps. They usually buy these from other fisher folks and collect them before sending

them to Yangon. These are also a great source of income and possibly the highest income per kilogram that is brought by simple traditional fishing gear.

Local fisher folks use lobster pots (or lobster traps) to catch lobsters. It is usually made of bamboo and a rope net with dried fish as baits, hung inside the trap. The fisher folks would go out to the sea once a day in the morning to drop a series of pots (there are usually 20 lobster pots in one set) onto the sea floor. Each pot can hold up to three lobsters at a time. By late afternoon, fisher folks would go to collect the trap hoping to find lobsters in there.

Local traders in Kwan Tamort Pea Village then buy the lobsters from fisher folks. Each lobster is sorted according to its size, whether it is large, medium, or small. For a large lobster, fisher folks get 35,000 kyat per 3 kilograms ; 25,000 kyat per 3 kilograms for a medium size; and 3,000-3,500 kyat per 3 kilograms for a small one.

Table: Price of lobster sold in Kwan Tamort Pea Village

Lobsters size	Price per 3 kg (kyat)
Large	35,000
Medium	25,000
Small	3,000-3,500

The lobster trader uses a 15-kg box to pack lobsters when they are ready for delivery. The trader usually waits until there are at least 10 boxes or 150 kilograms of lobsters before delivering it directly to Yangon. The least amount of lobsters collected in a month is 7 boxes or 105 kilograms; the most is 50 boxes or 750 kilograms. The price sold at Yangon per box is 600,000 kyat or 30,000 kyat per kilogram.

The price for mantis shrimps is much higher than lobsters. For a large mantis shrimp, fisher folk can get as high as 60,000 kyat per 3 kilogram; 45,000 kyat per 3 kilogram for a medium-size; 35,000 kyat per 3 kilograms for a small-size. When sold to Yangon, the trader can get at least 80,000 kyat/each, which usually weighs less than a kilogram.

Table: Price of Mantis shrimp sold in Kwan Tamort Pea Village

Mantis shrimp	Price per 3 kg (kyat)
Large	60,000
Medium	45,000
Small	35,000

A fisher folk explains how he uses a lobster trap.

Lobsters (*Panulirus polyphagus*)

Lobster trap

Mantis shrimp found near mudflat by paddy fields

Other ways to make a living in Kwan Tamort Pea

There are 10 duck farms near Kwan Tamort Pea. Ducks here are farmed mostly for their eggs. Each day for a duck farm with 1,200 ducks, the farm owner can collect up to 1,100 duck eggs and sold to the market at 100 kyat per egg. The most number of ducks found among these 10 farms in Kwan Tamort Pea is 5,000 ducks.

The farm would buy mature ducks (at the price of 3,000 kyat each) and raise them for 3 years before they slowly lose their capacity to egg and selling them to other businesses. When asked how to tell which duck is too old to egg, local duck farm owner answers “by looking at its size but it’s easier for us to tell because we see these ducks everyday.”

Most of the expenditure for a duck farm of 1,200 ducks spends on food (tiny fish bought from local fisher folks, rice brans), fuel used to bring water to the farm, and labors to take care the ducks. One local duck farm owner says he plants vegetables such as morning glory, cucumber, bitter melon, and gourds for the farm and also sells it to the market. The income from these vegetables can help cover the cost for the duck farm and the fuel used for transportation. And since no chemical fertilizer or pesticide is applied on these vegetables, they are organic and safe for the ducks and the people, as well as the soil where the garden sits.

The greatest threat for a duck farm is rats that would come eat the eggs.

Duck farm in Kwan Tamort Pea Village.

Organic cucumber near a duck farm.

FISHERY IN SANINT KRATE

The research team consults local fisher folks in Sanint Krate Village to show us how they catch their fish and how they make nga-pi.

A boat ride along Sanint Krate River with local fisher folks allow the research team to witness an incredible numbers of mangrove species in the estuary such as some grass species that has long and narrow leaves, or the one with extended and complex external root system, *Rhizophora mucronata*. Local fisher folks are able to direct us to specific areas where certain types of mangroves species prosper without hesitancy. These species tend to grow further away from the main waterline to avoid being exposed directly to saltwater. We also see crabs clinging on the trunk of *Avicennia marina*.

Local fisher folks explain that there are many edible mangrove plants; however, some can be eaten in certain seasons before they become too toxic for human or small animals to consume in the rest of the year. Some mangrove plants also have medicinal benefits such as *Acanthus ilocifolius* which locals use the thorn along the edge of its leaf remedy poison on the skin near after a snake bite.

Research team with fisher folk collect mang leaves as sample.

Fishery in Sanint Krate River.

Rhizophora mucronata

Crab clinging on the trunk of *Avicennia marina.*

Fishery in Sanint Krate mainly occurs close to the estuary. Fisher folks would set up bag nets to catch fish and small shrimps (*Acetes sp.*) in the middle of the river. The key to catching fish with bag nets relies on the movement of the water current to bring in aquatic lives into the traps.

Local fisher folks explain that fishing occurs throughout the year, but the highest catch happens in two periods: between December and March; and between October and November. The least amount of catch happens around April when it is the hottest and the start of rainy season.

Fisher folks wash tiny shrimp and transport them to the village
to make *nga-pi* or shrimp paste.

Making *nga-pi* or shrimp paste in Sanint Krate Village.

Common parts of a mangrove species that locals eat, as well as aquatic species, are usually the leaf, fruits, and flowers. For example, the leaf of *Sesuvium portulacastrum* can be eaten as vegetables during a meal while the fruit of *Finlaysonia sp.* is eaten.

Another noticeable thing in the mangrove forests is the abundant number of small aquatic species. The presence of numerous krill also proves that the water at the estuary here is still very clean and has large amount of nutrients to feed one of the most sensitive species in water. Its abundance also gives locals the opportunity to collect krill and make shrimp paste. As many Mon dishes include shrimp paste, it can be said that shrimp paste definitely plays a significant component in Mon cuisine.

Commonly found mangrove species in the estuary of Sanint Krate River

Table: Commonly found mangrove species in the estuary of Sanint Krate River

No.	Scientific name	Use
1.	*Rhizophora mucronata*	-
2.	*Aegialites rotundifolia*	-
3.	*Excoecaria agalocha*	Leaf liquid is dangerous for the eyes.
4.	*Sesuvium portulacastrum*	Can be eaten as vegetables.
5.	*Dalbergia spinosa*	-
6.	*Acanthus ilocifolius*	Leaf is used to remedy poison. Locals explain that they use the thorn on the leaf to pinch on the skin near the location of a snake bite.
7.	*Avicennia marina*	-
8.	*Finlaysonia maritima*	-
9.	*Derris trifoliata*	-
10.	*Bruguira gymnorrhoza*	-
11.	*Finlaysonia sp.*	Fruit can be eaten.
12.	*Brownlowia tasa*	-
13.	*Avicennia alba*	-
14.	*Aegiscerus corniculatum*	-
15.	Same as 13	-
16.	*Nypa frutican*	*(not shown in above photo)* Leaf can be used to make ceiling. Fruits can be eaten raw, make juice and alcohol.

Income from fishery in parlain

FISHING						
Village name	**Number of households**	**Number of fisher folks**	**Number of boats**	**Number of motored (diesel) boats**	**Fishing nets**	**Income between December 2014 and March 2015 (4 months) (kyat)**
Andin	497	-	-	-	-	0
Sanint Krate	200	22	23	23	20	256,800,000
Kwan Tamort Pea	210	86	86	126	707	2,115,900,000
Sanint Janu	310	-	-	-	-	0
Saigram	125	-	-	-	-	0
Plaing Sam	90	-	-	-	-	0
TOTAL	**1,432**	**108**	**109**	**149**	**727**	**2,372,700,000**

Based on the interviews with 22 fisher folks from Sanint Krate, there are 23 boats and 23 diesel motors. There are at least 20 fishing nets currently being used to catch fish. The income generated between December 2014 and March 2015 (four months) among the 22 fisher folks is 256,800,000 kyat.

In Kwan Tamort Pea, the research team interviews 86 fisher folks and finds 86 boats and 126 diesel motors. There are 707 fishing nets. This village generates over 2,115,900,000 kyat from fishery between the four months.

In total, the interviewed 108 fisher folks from two villages point out that they could make at least 2,372,700,000 kyat from fishery in a year.

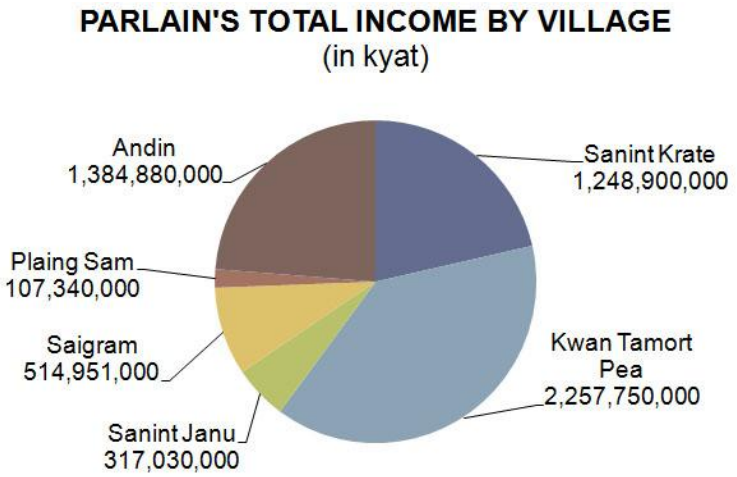
Nonetheless, it should also be noted that as of May 2015, as reported by Myanmar Times on 8 May 2015, the Ministry of Livestock, Fisheries and Rural Development releases a statement to suspend ocean fishing between 1 June to end of August in order to allow depleted fish stocks to recover. Local fisher folks explain that this new suspension can greatly affect their fishery and income, especially for those who catch lobsters and mantis shrimps, since these three months are within the high catch season.

CHAPTER 7 TOTAL INCOME

Based on the survey and interviews between January 2015 and March 2015, the minimum total income from betel nuts, rice, and fishery the six villages can generate in a year is 5,830,851,000 kyat.

Nearly half of Parlain's annual income comes from Kwan Tamort Pea at 2,257,750,000 kyat each year. Andin and Sanint Krate follow in terms of annual income at 1,384,880,000 kyat and 1,248,900,000 respectively. However, there are some differences between the two villages: Andin's income mostly results from betel nuts while Sanint Krate relies on fishery to generate income. Saigram, Sanint Janu, and Plaing Sam mostly depend on their agricultural lands to inquire income. Saigram's annual income is at least 514,951,000 kyat; Sanint Janu, 317,030,000 kyat; and Plaing Sam, 107,340,000 kyat.

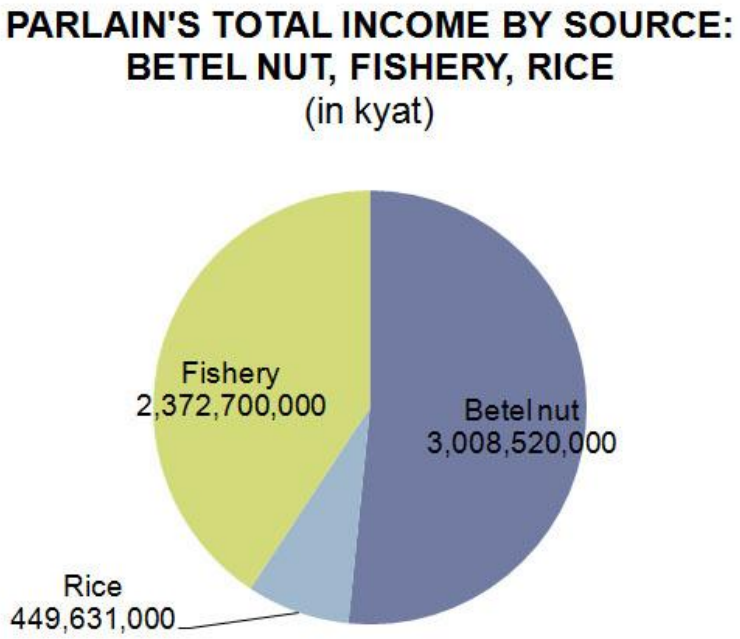
Table of parlain's total income by village



Village	Total income in kyat from betel nut, rice, and fishery
Plaing Sam	107,340,000
Sanint Janu	317,030,000
Saigram	514,951,000
Sanint Krate	1,248,900,000
Andin	1,384,880,000
Kwan Tamort Pea	2,257,750,000
TOTAL	**5,830,851,000**

When comparing the three sources of income, it appears that betel nuts contribute 3,008,520,000 kyat out of the total 5,830,851,000 kyat or 51.6 percent of the observed total income. Fishery comes second, contributing 2,372,700,000 kyat or 40.7 percent of the observed total income. Rice can generate at least 449,631,000 kyat as income for local villagers or 7.7 percent of the total income. Nonetheless, it should be noted that although rice may not appear to contribute as much income as betel nuts or fishery, but it is the main stable food for locals.

Table of parlain's total income by source: betel nut, fishery, rice



Source	Total income from six villages (kyat)	Percentage
Betel nut	3,008,520,000	51.6%
Fishery	2,372,700,000	40.7%
Rice	434,441,000	7.7%
Total	**5,830,851,000**	**100%**

A brief history of Andin Village

Andin monastery

Andin villagers come to the monastery every evening to pray and give flowers to the Buddha statues

In 1887, a Mon group led by U Sein settled down where Andin Village is currently located. Then, big forest and mangroves surrounded the village and stretched to the beach. At the end of the village, there is a long large lake where freshwater flows into, and, sometimes, the seawater gets in.

The lake is home for a variety of birds and wild animals. Many birds can usually be found around the lake throughout the year. As Adjutant birds dominate the lake, many villagers start to call the lake "ang daing," meaning Adjutant Bird Lake.

Five of the family who were the first settlers of Andin village converted forest areas into farmlands. Their livelihoods also depended on fishery such as shrimp, crabs, and fish as well as the wild animals from the forest.

As the land was so fertile and abundant, many settlers started to arrive at the village year by year. Eventually, what used to be a cluster of a few families turned into a big village and named Kwan In Dai by the Mon and Nget Kya Inn (Stripe bird Lake) by the Burmese. Later the village name from Kwan In Dai to Kwan In Din by the Mon and current name Andin by the Burmese.

A great number of migrants from central Burma also settled down in the village. Farming was the only livelihood at least a hundred years ago. Farming is still practiced today but locals also cultivate betel nuts, and rubber to make a living. Fishery is also the main business and livelihood for many fisher folks.

As the village is prosperous, the village household increase into 500, and many migrant workers from the central part of Burma are flooding for seasonal labor. The future of An-Din is bright because it has many marine, farms, long-term plantation products.

Location Situated at the foot of Parlain mountain. 16 kilometers northwest of Ye Township, one of the 10 townships in Mon state.

Inhabitants Over 95% of the village population is Mon ethnic.

Religion 100% Buddhist. There is one monastery in the village. The current abbott named Bandadhta Thila (Samasayiya) is the first Andin-born abbot and is carrying out the work of the elders Abbotts in this village by preaching the Lord Buddha teaching to the villagers, monks, and novices.

Economics The main businesses in the village are farming, betel nuts cultivation, and trading fishery products. Among them, betel nut planting and selling is the most prominent business here in this village. It is among the areas where

the majority of the betel nut distributed around Myanmar come from. Duya Danyin fruits, which is famous in Yangon and other big cities, are from this area as well.

Social life

In the events of funeral, festival, home ceremony, weddings, and so on, villagers help each other. Under the Abbotts' instruction, the villagers collected money, bought a car free funeral services, and formed a team of social service group in the village. In addition, in 2012, they bought an ambulance from the village collection money for the village health care system.

There is also a concrete monument in the middle of the village. The monument is funded by donation from Andin inhabitants who are working in Malaysia.

In 2014, the village is able to donate rice to the poor for the fourth time on Buddhist Lent day.

Education

By 1959, the village had already established one primary school. Then, after 1996, the school was upgraded into a secondary school. As the number of students increased, the secondary school was finally upgraded into a high school in 2012.

In addition, another school, the National Mon school, was established in 1971 as a place for Mon ethnic to maintain their cultures and languages. The school, supported by the New Mon State Party, was upgraded into a secondary school in 1985 and into a high school in 2000. Meaning that there are two high schools with different systems near the village: the state high school and the National Mon High School.

Health

The village had only state sponsored assistant midwife nurse. It also has a permanent midwife and a state run clinic. In addition, the New Mon State Party sponsored health care staffs are giving health care services to the village.

Sacred sites

There is a pagoda on the small hill at the east of the village built one hundred years ago. The old, dilapidated pagoda was found at the southern part of the village and it was renovated and worshiped until now. The villagers built a 2500 Pagoda--a pagoda built to celebrate and revere the 2500th anniversary of Buddhism--at the entrance of the village. According to the elders, sometimes, the old pagodas radiate miracle lights.

CHAPTER 8 ABOUT YE COAL-FIRED POWER PLANT PROJECT[2]

On 25 April 2014, a group of representatives from the coal-fired power plant project, proposed by TTCL (formerly, Toyo-Thai Corporation Limited) came to Parlain. The representatives told the villagers that a new project is planned and that they would have to lose 500 acres of their farmlands for the project.

After finding out that the company has proposed the project to the Ministry of Electric Power, the majority of the villagers respond with a clear opposition: They do not want a coal-fired power plant in their neighborhood or anywhere within or near Parlain.

The proposed project site would sit on one of Parlain's largest paddy fields near the estuary of Sanint Krate River and expansive intertidal mudflats. The construction of the coal-fired power plant and other facilities in the project site would require this area to be compacted and solid for the foundation to be laid. A jetty would also be constructed to receive imported coal brought by a train of large freight ships. The community worries that the construction of the jetty can alter the sea floor, changing the marine habitat and fisher folk's fishing ground.

Even though TTCL stated that the Memorandum of Understanding (MOU) between the company and the Ministry of Electric Power (MOEP) of Myanmar was signed since 21 March 2013, the villagers in Parlain continue to regularly show their disagreement and opposition to the project.

Parlain community is not alone. The public and local authority also supports Parlain's opposition. On 14 December 2014, over 400 local residents and Ye Social Society (YSS) marched through downtown Ye to express their opposition against the proposed project. The New Mon State Party and Mon National Liberation Army also issued a statement in support of local's position in January 2015, emphasizing political instability and inadequate environmental risks assessment.

Despite Mon State's prohibition on the project's feasibility study in September 2014 and continuous protests, on 9 April 2015 TTCL signs MOA with Department of Hydropower Planning, Ministry of Electric Power to build a 1,280 MW ultra-supercritical coal-fired power plant in Ye Township. The MOA indicates the total investment to be 2.8 billion USD, with 2.3 billion USD goes to the engineering, procurement, and construction contract. 75 percent of the investment would be loans and another 25 percent from equity.

At least 4 million tons of coal would be imported from Indonesia and elsewhere to feed the power plant throughout its 30-year operating concession. The construction would take 4-6 years before it generates electricity to be used domestically in Myanmar around 2019.

The news about the MOA travels fast among the people. The community is very shocked to hear that the company insists to proceed with its proposal without community consent. The MOA also leads to a mass protest of at least 6,000 people from across Ye Township in the middle of Andin Village in the morning of 5 May 2015.

[2] Information regarding the proposed Ye Coal-fired Power Plant project is compiled from various media and sources, including the Feasibility Study of 1,280 MW Ultra Super Critical (USC) Coal Fired Power Plant in the Republic of the Union of Myanmar, February 2014 by Environmental Research Management (ERM-Siam) for Toyo-Thai Corporation Plc. (TTCL)

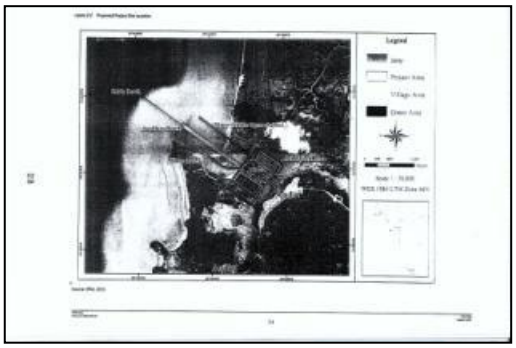
Mass protest against the proposed coal-fired power plant project in Ye Township was held on 5 May 2015. (Pictures from The IRRAWADDY)

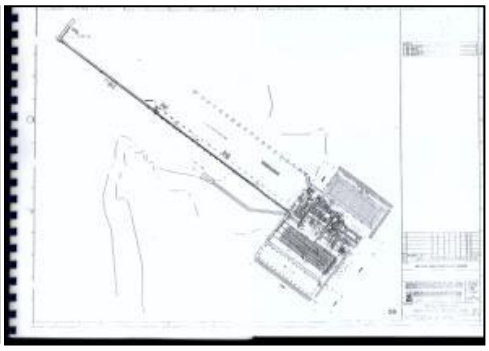
However, on 9 May 2015, TTCL director Hironobu Iriya and staff come to Andin Monastery to give offerings to the monks. The abbot explains that during the visit Mr. Iriya apologizes and admits that the MOA was signed without the community's consent. Additionally, according to a staff from the Ministry of Power Electric, the MOA was approved based on photographs from 3 occasions: the meeting at Andin Monastery in April 2014, the meeting at Ko Yin Lay Monastery in December 2014, and the trip to visit coal projects in Japan and Thailand organized by TTCL in December 2014.

The feasibility study conducted by the project's consultant company, Environmental Resource Management (ERM), states the specification of the proposed coal-fired power plant as the following:

- The 1,280 MW coal-fired power plant consists of 2 units, each with 640 MW capacity.
- The project site covers 1,500,000 square meters (approximately 370.66 acres).
- The construction takes 47 months and brings in at least 3,850 workers.
- The power plant uses around 3.5-4.5 million tons (at least 7.7-9.9 billion pounds) of coal a year.
- The plant stack is 200 meter high.
- The coal unloading jetty will be built 3-5 kilometers away from the shoreline after the seafront is dredged. The unloading jetty will be used to receive imported coal from abroad by 75,000 DWT coal vessels. It will contain coal conveyors to transport unloaded coal to the plant area.
- 60 percent of imported coal comes from Indonesia; 20 percent from Australia; 20 percent from South Africa.
- The cooling circulation needs 200,000 cubic meters (43,993,850 UK gallons) of seawater per hour.
- The coal yard uses 960 cubic meters (211,170.5 UK gallons) of spray water per hour. This water comes from deep well water (retention water and/or rainwater)
- The construction period requires 1,600 cubic meter (351,950.8 UK gallons) of water per hour. The water is used for residential areas and other facilities. This water comes from deep well water (retention water and/or rainwater)

The feasibility study indicates that there is one village and one stream within 0.5 to 1 km (0.31 to 0.62 mile) radius of the project site.





Chronology of events (25 April 2014 – 15 May 2015)

25 April 2014 TTCL enters Andin Village to explain about the proposed coal power plant. Many villagers disagree or did not grant their approval to the project. The villagers explain that the company did not inform much about the proposed project.

14 May 2014 Civil society in Mon state—Mon Youth Forum (led by Mi Soe Thein) and Ye Town Social Assistance Group—and local residents show their opposition against the proposed project. They explain that the project can contaminate soil and water, cause extensive and irreversible environmental damages.

Early June 2014 Over 100 members of Ye Social Service hold a "NO COAL" campaign around Ye Town and distribute brochures to inform villagers near the proposed site about the impacts of coal

13 June 2014 Dr. U Aung Naing Oo, a parliamentarian from Chaung Zon Township, visits the area and holds a meeting with the community, local monks, and township officials. Of the 216 villagers who attend the meeting and vote on the proposed coal-fired power plant, 206 vote NO to the plan; 4 agree to allow the project; 6 remain undecided.

5 September 2014 Mon state prohibits TTCL to conduct the feasibility study. The letter is sent to Moulmein Districts General Administration Department and Ye Township Administration Department, explaining that the deadline (20 July 2014) for the feasibility survey has already passed.

14 December 2014 Over 400 locals join Ye Social Society (YSS) to march through Ye Town. The march expresses their opposition against the proposed coal-fired power plant.

Mid-December 2014 TTCL recruits 10 people from Ye Township, which includes local residents, state parliament, and media to observe and study coal power plant in Japan and Thailand.

22 December 2014 More than 30 local residents and monks from the Parlain region meet with New Mon State Party (NMSP) chairperson and other executive members at NMSP headquarter in Ye-Chaung Payar to seek for NMSP's stance on the proposed project.

27 December 2014 More than 500 local residents sign the petition to oppose the coal-fired power plant. At the same time, TTCL also hosts its second meeting to talk about its proposal for an ultra-supercritical coal-fired power plant outside Parlain at Ko Yin Lay Monastery.

28 December 2014 Mon youth groups announce their opposition to the proposed coal-fired power plant at Mon Youth Day in Hnee Padaw Village, Modun Township.

30 December 2014 Nai Kyi San, secretary of NMSP Tavoy district; Nai Nyan Htun, 2nd colonel Battalian Commander and Mon National Liberation Army (MNLA) No.2; Nai Aung

Ma-ngae, Chairman of New Mon State Party (NMSP)'s Tavoy district; and over 20 NMSP representatives announce their support to oppose the proposed coal-fired power plant in Ye. Attendees of this meeting include more than 600 local residents from Parlain villages, representatives from United Parlain Region Group, Ye Social Society, Ahlin Eain Association (Youth Book Reading).

9 January 2015 Elders of Andin Village representing the local populace sent a letter officially to TTCL to object to the project, due to the lack of transparency and sincerity in TTCL's action.

January 2015 NMSP and MNLA issue a statement saying that the state's political situation is still unstable and unsuitable for development.
Nai Hongsar Bong Khaing, a spokesperson for the NMSP based in the state capital Moulmein, told The Irrawaddy that allowing the development to proceed would contravene party rules on three counts:
1) Political instability is too risky for large-scale developments;
2) Local communities and religious leaders have not been adequately consulted; and
3) Environmental risks have not been analyzed to the party's satisfaction.

31 January 2015 HURFOM (Human Rights Foundation of Monland) releases and distributes "Touching the Fire," a 38-minute documentary about ongoing conflicts surrounding the proposed coal-fired power plant in Ye Township and the community's majority voice to stop the project.

Late January-early February 2015 A group of power plant proponents gather signature from local residents. However, a number of locals who provided the signatures say they are not informed about the proposed project.

4 February 2015 The Ministry of Electric Power of Myanmar reports 3,970 MW were consumed in 2014 and additional 2,500 MW will be needed for 2015. The 10 proposed coal-fired power plants—including the one in Ye—is expected to generate 13,100 MW and contribute at least 96.6 million tons of CO2 emission or 11 times higher from the current rate at 8.9 million tons.
List of major coal power plants

Yangon Region
- Thailand's Toyo-Thai plans a 650-1200MW plant at Thilawa Special Economic Zone
- India's Orange Powergen, Singapore's Global Adviser and Myanmar's Diamond Palace Services plan a 500MW plant in Kyauktan township
- Huaneng Lancang and Htoo Company plan a 270MW plant in Htantabin township
- Virtue Land, subsidiary of Asia World, plan a 300MW plant in Kwan Chan Gone

Tanintharyi Region
- Thailand's RATCH and Blue Energy & Environment, Myanmar's Vantage and Kyaw Kyaw Phyo plan a 2460MW plant in Myeik
- Cwave Global and 24 Hours Mining & Industry plan a 500MW plant in Boat Pyin

Mon State
- Thailand's Toyo-Thai Group plans a 1280MW plant in Ye township

Ayeyarwady Region
- India's TATA Power plans a 660MW project in Nganyoutkaung township, Shan State
- Thailand's Lumpoondum plans a 500MW plant in Kyineton, Sagaing Region
- Singapore's ISDN and Myanmar's Tun Thwin Mining plan a 270MW plant

11 February 2015 YSS and locals suspect the legitimacy of a letter with over 6,000 local residents' signatures that is sent earlier to the President's office in Nay Pyi Daw. The letter indicates that locals are in support of the proposed coal-fired power plant because it uses

USC technology, provides electricity at affordable costs, and brings employment opportunities to locals.

On the other hand, YSS and locals say the signatures are given during a survey by 4 officials (2 from Andin). The survey asks whether locals wanted the area to have electricity and cheaper electricity but does not inform the locals about the proposed project.
YSS has been doing a campaign to oppose the coal-fired power plant. It submits the collected 3581 signatures that oppose the power plant to Mon state hluttaw (parliament).

Ashin Nanda, the abbot at the Ain Din Monastery, says only 15 of 490 households in Andin did not sign the petition opposing the proposed coal-fired power plant.

8 April 2015 Dr. U Aung Naing Oo submits a letter to oppose the Ye Coal-fired Power Plant Project at the Mon parliamentarians meeting where the Ministry of Electric Power's Mon State representative is present. However, the chairperson, other parliamentarians, and the representative from MEP ignore and/or show no sign of support.

9 April 2015 TTCL signs MOA with Department of Hydropower Planning, Ministry of Electric Power for the proposed 1,280 MW ultra supercritical coal-fired power plant project. The project's total investment will be 2.8 billion USD and EPC contract will be 2.3 billion USD. The construction is expected to take 4-6 years.

19 April 2015 Media in Thailand reports local's concerns over the impacts of the proposed coal-fired power plant.

21 April 2015 TTCL holds a press conference in Bangkok regarding the proposed coal-fired power plant in Ye Township.

5 May 2015 Mass protest against the coal-fired power plant in Ye with over 6,000 people joined at Andin Village in Parlain.

9 May 2015 TTCL director Hironobu Iriya and staff come to Andin Monastery to give offerings to the monks. The abbot explains that during the visit Mr. Iriya apologizes and admits that the MOA was signed without the community's consent. Additionally, according to a staff from the Ministry of Power Electric, the MOA was approved based on photographs from 3 occasions: the meeting at Andin Monastery in April 2014, the meeting at Ko Yin Lay Monastery in December 2014, and the trip to visit coal projects in Japan and Thailand organized by TTCL in December 2014.

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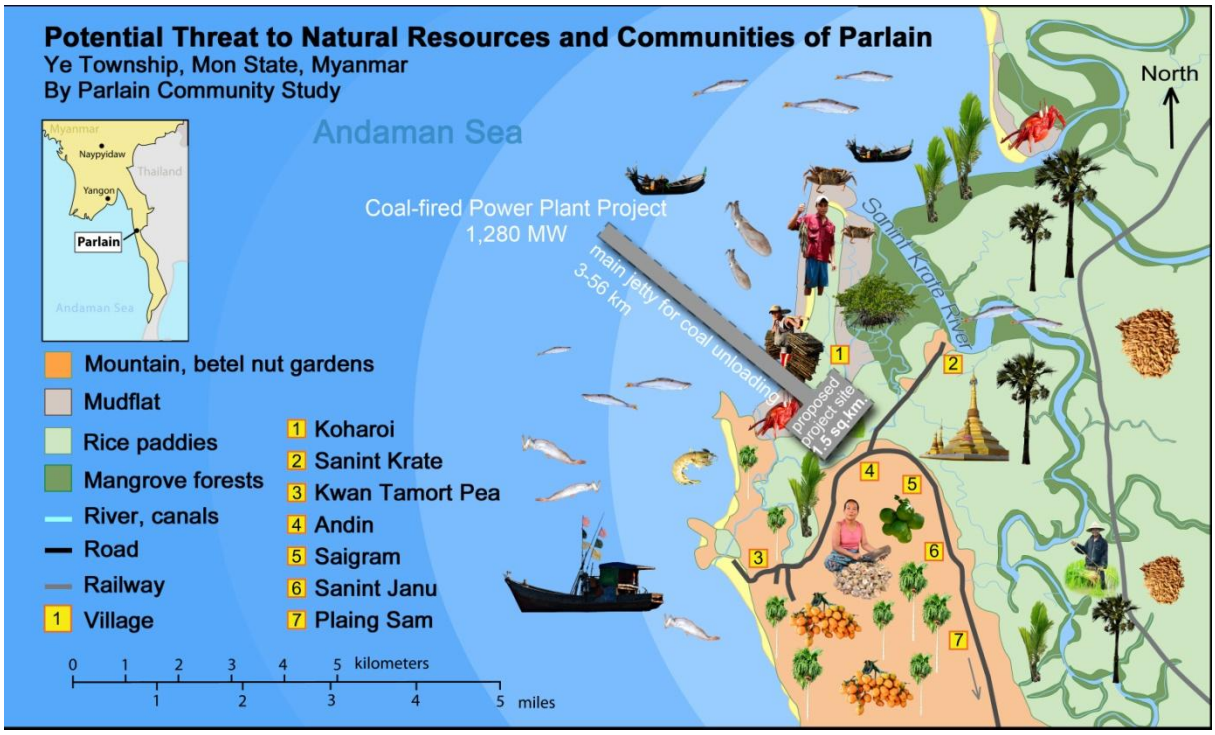
Overall impacts of a coal-fired power plant



Map shows potential threat to Parlain's natural resources and communities

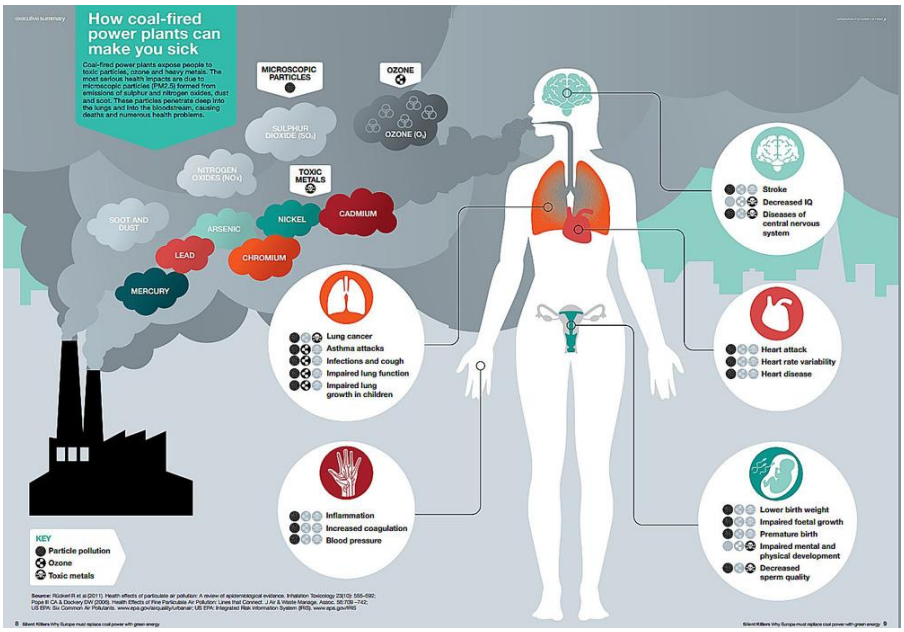
There are usually three key components in a coal-fired power plant project: the project site where the coal-fired power plant stands, the extended port and jetty to unload coal and deliver coal to the power plant, and the transmission line that connects the power plant to a grid. All of these components inevitably can bring change to existing environment.

Like many mega-projects, a coal-fired power plant can greatly change local natural landscape and replace it with something completely foreign. The infrastructure and its transmission line can replace existing forests, agricultural lands, residential areas, and coastal front. The seashore has to welcome a new jetty and a series of large ships to bring in coal from a faraway country. Water is diverted from natural ground to feed the power plant and keep the coal dust from overly disturbing the air. The temperature of the water that comes out from the coal-fired power plant is usually much higher than before the pipeline sucks it. This invisible difference can perish an active marine ecosystem that currently nurtures millions of aquatic lives.

The smokestacks, puffing endless smokes from the coal combustion throughout the day and night, release numerous toxic chemicals such as: soot and dust, lead, mercury, chromium, cadmium, nitrogen oxides, sulfur oxides, dioxin, isotopes, radioactivity, volatile organic compound (VOC), ozone, and microscopic particles. These toxins are immensely harmful to human body, causing asthma attacks, lung cancer, impaired physical and mental development, heart disease, heart attack, stroke, and decreased IQ—especially in the long term.

The coal-fired power plant also needs a large group of people to operate and maintain the power plant. Existing residents have to make room for a flood of newcomers. It is generally difficult to assume that the newcomers have cultures and customs similar to local community. Thus, this can pose potential conflicts between the current and the future homeowners.

Overall, we have to ask whether we really want to sacrifice Nature and the community we already have for a new coal-fired power plant and its intended—though not guaranteed—electricity?



Health impacts of coal-fired power plants (by Greenpeace EU)

Potential threat to Parlain's natural resources and communities

The impacts of coal-fired power plants in Myanmar, Thailand and throughout the globe are apparent. The community realizes this and fears that the proposed project can crumble the environment and community livelihood, at least in the following 5 aspects:

1. Rice, betel nuts, and fishery—the three most important sources for food and income—can be destroyed.
2. Foreign ideologies can dominate local culture and traditions.
3. Influx of people from other areas can accelerate changes and exacerbate the impacts.
4. Pollution from the power plant can deteriorate health and the environment.
5. Fish and the aquatic ecosystem can be contaminated or polluted by wastewater and air pollution.

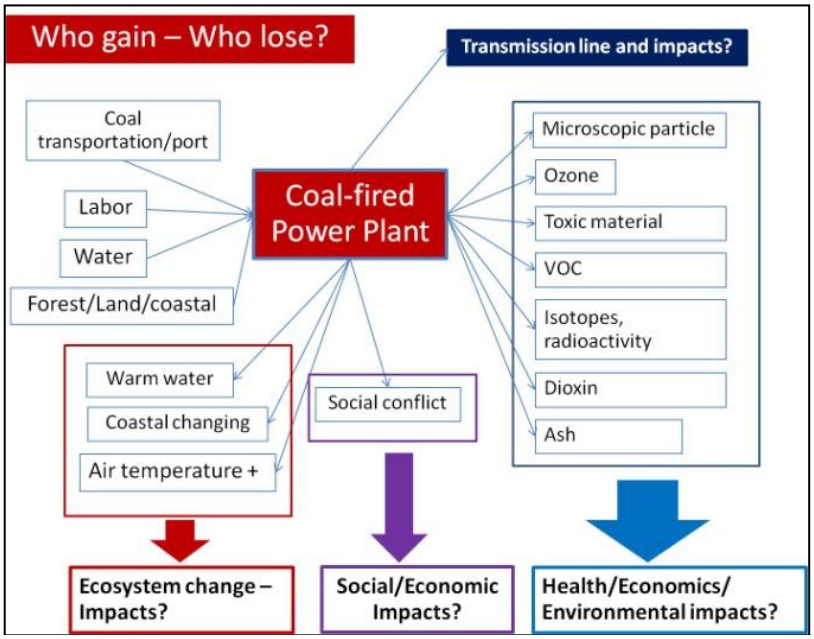


Diagram of potential threat to Parlain's natural resources, communities and human health.

CHAPTER 9 CONCLUSION

What has been described here is a miniscule portion of what Parlain is.

The rich natural resources reflect a diverse and healthy ecosystem. The abundance of tasty tropical fruits and betel nut in the garden, the half-submerged mangrove forest in the estuary, the widespread paddy fields, and numerous wildlife and aquatic species inland and in the sea exemplify the interconnection of each unique ecosystem that nourishes Parlain and its people.

The fertile land of Parlain also assures the people's basic needs--stable nutritious food, clean air and water--to survive. Their smiles and happiness reflect quality wellbeing of the people. The sense of a community cherishes and confirms local's root with their ancestors and beliefs. These undisturbed Nature and harmony with the environment form unity and peaceful coexistence among the people, without the need to struggle for survival. Along with the presence of the monasteries as a central hub to protect local customs and beliefs that shape who they are and hold the community together.

The number 5.8 billion kyat shown in the income table is only a jigsaw to the bigger picture. It only partially reflects the values of Parlain and how it feeds the lives of the people here. Nonetheless, if the number is gone, it is not only the local's income that leaves them; it's everything that's associated with it.

The research team hopes that this study--study of Parlain--is the beginning of the collection of the values of Parlain that locals are proud of. This study also shows that there is much more to discover and learn from Parlain and its people.

The research team also hopes that the knowledge and information gathered during this study will be able to start the discussion among Parlain communities to draw out the future they want to see and how to protect their homes from external threats that do not align with their visions.

APPENDIX

Fish species

No.	*SPECIES NAME*	BURMESE NAME	ENGLISH NAME
1.	*Abalistes stellaris*	*nga than*	Starry triggerfish
2.	*Ablennes hians*	*nga phaun yoe gyee*	Flat needlefish
3.	*Acanthurus mata*	nga yan shar	Elongate surgeonfish
4.	*Aesopia cornuta*	nga pha yone	Zebra sole
5.	*Akysis longifilis*	nga doke telk	Sittaung akysis
6.	*Alectis ciliaris*	byar san whaik	Threadfish trevally
7.	*Anabas testudineus*	nga pyay ma	Climbing perch
8.	*Anguilla bengalensis*	nga myeik htonn	Mottled eel
9.	*Anodontostoma chacunda*	nga wun pue, bar thi	Chacunda gizzard shad
10.	*Arius maculatus*	nga yaun	Spotted catfish
11.	*Atropus atropus*	nga da ma	Cleftbelly trevally
12.	*Auxis thazard*	tuna, nga poke yaunn, nga kyee kann	Frigate tuna
13.	*Bolephthalmus boddarti*	nga daunn pyauk, nga phyan, nga pyat	Goggle-eyed goby, Mud skipper
14.	*Caesio cuning*	shwe wun ne	Redbelly yellowtail fusilier
15.	*Carangoisdes coeruleopinnatus*	byar zan waik	Longnose trevally
16.	*Cephalopholis argus*	kyauk nga	Peacock hind
17.	*Cephalopholis boenak*	kyauk nga	Chocolate hind
18.	*Cephalopholis miniata*	kyauk nga	Coral hind
19.	*Channa striata*	nga yant	Snakehead mueerl
20.	*Chirocentrus dorab*	nga saik htoe, za lwe	Dorab wolf-herring
21.	*Chrysochir aureus*	thin warr	Reeve's croaker
22.	*Cirrhinus mrigala*	nga kyinn	Mrigal
23.	*Clarias batrachus*	nga khu	Walking catfish
24.	*Coilia dussumieri*	mee tan thwe, nga kyan ywet	Goldspotted grenadier anchovy
25.	*Coilia ramcarati*	n/a	n/a
26.	*Colisa fasciata*	nga phyinn tha let	Banded gourami
27.	*Congresox talabon*	nga hauk, thin baw pauk	Yellow pike conger
28.	*Congresox talabonoides*	thin paunn htoe, nga shwe	Indian pike conger
29.	*Cynoglossus bilineatus*	nga khwaye shar, khwa shar, shar lay	Fourlined tonguesole
30.	*Cynoglossus lingua*	nga khwaye shar, khwa shar, shar lay	Long tonguesole
31.	*Cynoglossus microlepis*	nga khwaye shar	Smallscale tonguesole
32.	*Danio nigrofasciatus*	nga noke pyauk, yay yauk nga	Spotted danio
33.	*Datnoiides quadrifasciatus*	n/a	n/a
34.	*Decapterus macrosoma*	pan zinn	Shortfin scad
35.	*Donax sp.*	n/a	gastropod
36.	*Drepane punctata*	nga pa le, sin narr ywet	Spotted sicklefish
37.	*Dussumieria acuta*	nga kyaw nyo, peinn ne sayt	Rainbow sardine
38.	*Eleuthronema tetradactylum*	za yaw gyi	Four finger threadfin
39.	*Ephippus orbis*	sin narr pu	Orbfish

40.	*Epinephelus areolatus*	kyauk nga	Areolate grouper
41.	*Epinephelus bleekeri*	kyauk nga	Duskytail grouper
42.	*Epinephelus coioides*	kyauk nga, nga tauk tu	Orange-spotted grouper
43.	*Epinephelus fasciatus*	kyauk nga	Blacktip grouper
44.	*Epinephelus faveatus*	kyauk nga	Barred-chest gropuer
45.	*Epinephelus fuscoguttatus*	kyauk nga	Brown-marbled grouper
46.	*Epinephelus malabaricus*	kyauk nga	Malabar grouper
47.	*Epinephelus tauvina*	kyauk nga	Greasy grouper
48.	*Euthynnus affinis*	tuna, nga mei lone, donn pyan	Kawakawa
49.	*Eutropiichthys vacha*	n/a	n/a
50.	*Exocoetus volitans*	nga pyan	Tropical two-wing flyingfish
51.	*Formio niger*	nga moke me	Block pomfret
52.	*Glossogobius giuris*	ka tha poe, nga sha poe	Tank goby
53.	*Gnathanodon speciosus*	ka la ngue	Golden trevally
54.	*Gonialosa manmina*	n/a	n/a
55.	*Gymnocranius griseus*	nga wet sat	Grey large-eye bream
56.	*Harpadon nehereus*	nga hnat, bar yar gar	Bombay duck
57.	*Heteropneustes fossilis*	nga kyee	Stinging catfish
58.	*Hyporhamphus limbatus*	daunn chinn, phonn dee	Congaturi halfbeak
59.	*Ilisha elongata*	myet san kyel, nga zinn pyarr, myet lonn kyel	Elongate ilisha
60.	*Johnius belangerii*	nga poke thin, nga gaunn pwa	Belanger's croaker
61.	*Johnius coiter*	nga poke thin, nga pyet, ka ta myin	Coiter croaker
62.	*Katsuwonus pelamis*	tuna, nga mei lone, done pyan	Skipjack tuna
63.	*Lactarius lactarius*	nga tee	False trevally
64.	*Lagoecephalus lunaris*	nga pue tinn	Green rough-backed puffer
65.	*Lates calcarifer*	ka ka tit, ka ta paunn	Giant seabass
66.	*Leiognathus equulus*	nga dinn garr, nga wainn	Common ponyfish
67.	*Lepturacanthus savala*	nga ta khun, nga tha ywe min kyarr	Savalani hairtail
68.	*Lethrinus nebulosus*	nga wat sat	Sprangled emperor
69.	*Liza tade*	n/a	n/a
70.	*Lobotes surinamensis*	pin lei nga pyay ma	Triple tail
71.	*Lutijanus vitta*	kyauk parr ne	Brownstripe red snapper
72.	*Lutjanus argentimaculatus*	nga khwaye pa ne, nga parr ne	Mangrove red snapper
73.	*Lutjanus johnii*	nga parr ne	John's snapper
74.	*Lutjanus kasmira*	nga parr ne	Common bluestripe snapper
75.	*Mastacembelus armatus*		zig- zag eel
76.	*Mene maculata*	ta yoke darr	Moonfish
77.	*Monopterus albus*	nga shint ne	Swamp eel
78.	*Monopterus cuchia*	nga shint mwe	Cuchia eel
79.	*Mugil cephalus*	ka ba lue	Flathead mullet
80.	*Mystus vittatus*	n/a	n/a
81.	*Mystus vittatus*	nga zin yainn	Striped dwarf catfish

82.	*Naucrates ductor*	hinn cho khat	Pilotfish
83.	*Nemapteryx caelatus*	nga yaun	Engraved catfish
84.	*Notopterus notopterus*	nga phere	Featherback
85.	*Ompok bimaculatus*	n/a	Butter catfish
86.	*Ophichthus lithinus*	n/a	Snake eel
87.	*Osteobrama alfredianus*	n/a	Carplet
88.	*Otolithes ruber*	thin phyu, nga poke thin	Tiger-toothed croaker
89.	*Otolithoides pama*	nga poke thin	Pama croaker
90.	*Pampus argenteus*	nga moke phyu	Silver pomfret
91.	*Pampus chinensis*	onn nga moke	Chinese silver pomfret
92.	*Pangasius pangasius*	nga tan	Yellowtail catfish
93.	*Panulirus polyphagas*	kyauk pa zun, ba ghel	Mud spiny lobster
94.	*Parastromateus niger*	nga moke mei	Black pomfret
95.	*Pastinachus sephen*	leik kyauk tinn khun	Cowtail stingray
96.	*Pellowna ditchela*	nga zinn pyarr	Pellona
97.	*Platax teira*	nga leik pyar gyee	Batfish
98.	*Platycephalus indicus*	nga sin ninn	Bartail flathead
99.	*Plectorhinchus lineatus*	nga wet	Yellowbanded sweetlips
100.	*Plectropomus areolatus*	bar thar	Squaretail coralgrouper
101.	*Plotosus canius*	pin lei nga khu, ka byaunn	Gray eel-catfish
102.	*Polynemus indicus*	ka kue yan, kyawl yin	Indian threadfin
103.	*Polynemus paradiseus*	nga pon narr	Paradise threadfin
104.	*Pomacanthus annularis*	nga leik pyar	Bluering angelfish
105.	*Pomadasys maculatus*	kyar kyawt nge, ka larr goke	Saddle grunt
106.	*Pseudambassis ranga*	n/a	n/a
107.	*Pseudeutropius antherinoides*	n/a	n/a
108.	*Pseudorhombus arsius*	nga khwaye shar	Largetooth flounder
109.	*Pseudorhombus dupliciocellatus*	nga khwaye shar	Ocellated flounder
110.	*Pterocaesio digramma*	shwe asinn	Double-lined fusilier
111.	*Pterotolithus maculatus*	nat ka tor	Blotched tiger-toothed croaker
112.	*Raconda russeliana*	nga da lar	Raconda
113.	*Rastrelliger kanagurta*	pa lar tue, shan pa due	India mackerel
114.	*Rhinomugil corsula*	n/a	n/a
115.	*Sardinella albella*	n/a	n/a
116.	*Sardinella gibbosa*	nga kone nyo	Goldstripe sarinella
117.	*Scatophagus argus*	nga khet, nga pa thun, nga bee	Spotted scat
118.	*Scolopsis bimaculatus*	myet lonn gyee	Thumbprint monocle bream
119.	*Scomberoides commersonianus*	nga zar pyat, nga let war	Takang queen fish
120.	*Scomberomorous guttatus*	nga kun shut	Mackerel
121.	*Seriolina nigrofasciata*	nga htaw pat	Blackbanded trevally
122.	*Sicamugil hamiltonii*	n/a	n/a
123.	*Siganus canaliculatus*	nga yun shar, nga hsu than	White-spotted spinefoot
124.	*Sillaginopsis panijus*	nga pa lway, nga the htoe	Flathead sillago, whiting
125.	*Sillago sihama*	nga pa lway, nga the htoe	Silver sillago, whiting
126.	*Silonia silondia*	nga myuin	Butter catfish

127.	*Sphyraena barracuda*	pin le nga mway htoe, nga lunn, kyi pwayt taunt	Great barracuda
128.	*Tenualosa ilisha*	nga tha lauk	Hilsa shad
129.	*Tenualosa toli*	nga tha lauk yauk pha	Toli shad
130.	*Terapon jarbua*	nga gonn kyarr	Jarbua terapon
131.	*Terapon theraps*	nga gonn kyarr	Largescaled therapon, finger perce
132.	*Tetradon cutcutia*	nga pue tinn, pa jinn, nga se pue	Green puffer
133.	*Thunnus obesus*	nga poke yaun, nga kyee kann, tue nar	Bigeye tuna
134.	*Tylosurus crocodilus*	sa lon kyauk	Hound needlefish
135.	*Ulua mentalis*	zar kyann	Longrakered trevally
136.	*Wallogo attu*	n/a	n/a
137.	*Xenetondon cancila*	nga phaun yoe	Freshwater garfish
138.	*Yunnanilus brevis*	nga bauk sarr	Polka loach


Paradise threadfin (*Polynemus paradiseus*)

Bombay duck (*Harpadon nehereus*)

Reeve's croaker (*Chrysochir aureus*)

Prawn species

NO.	*SPECIES NAME*	BURMESE NAME	ENGLISH NAME
1.	*Acetes sp.*	n/a	n/a
2.	*Harpiosquilla raphidea*	kinn pa zun	Giant mantis shrimp
3.	*Macrobrachium idella idella*	n/a	n/a
4.	*Macrobrachium malcolmsonii*	n/a	n/a
5.	*Macrobrachium rosenbergii*	n/a	Giant fresh water prawn
6.	*Macrobrachium villosimanus*	n/a	n/a
7.	*Metapenaeus brevicornis*	n/a	Sand shrimp
8.	*Metapenaeus conjunctus*	n/a	n/a
9.	*Metapenaeus tenuipes*	n/a	n/a
10.	*Metapenus affinis*	n/a	Jinga shrimp
11.	*Parapenaeopsis sculptilis*	n/a	Rainbow shrimp
12.	*Penaeus canalciculatus*	n/a	Witch prawn
13.	*Penaeus japonicus*	n/a	n/a
14.	*Penaeus indicus*	n/a	Indian prawn
15.	*Penaeus monodon*	n/a	Asian tiger shrimp

Giant freshwater prawn

(*Machrobrachium rosenbergil*)

เคย (*Acetes* sp.)

Crab species

NO.	*SPECIES NAME*	BURMESE NAME	ENGLISH NAME
1.	*Charybdis feriata*	ga nann	Coral crab
2.	*Grapsus sp.*	ga nann	n/a
3.	*Ocypoda ceratophthalma*	ga nann	n/a
4.	*Portunus pelagicus*	ga nann	Blue swimming crab
5.	*Portunus sanquinolentus*	ga nann	Redspot swimming crab
6.	*Macrophthalmus sulcatus*	ga nann	n/a
7.	*Matuta planipes*	ga nann	Flower moon crab
8.	*Ocypoda certophthalma*	ga nann	Horn-eyed ghost crab
9.	*Scylla serrata*	ga nann	Mangrove Crab

Ocypoda ceratophthalma

Macrophthalmus sulcatus

Grapsus sp.

Matuta planipes

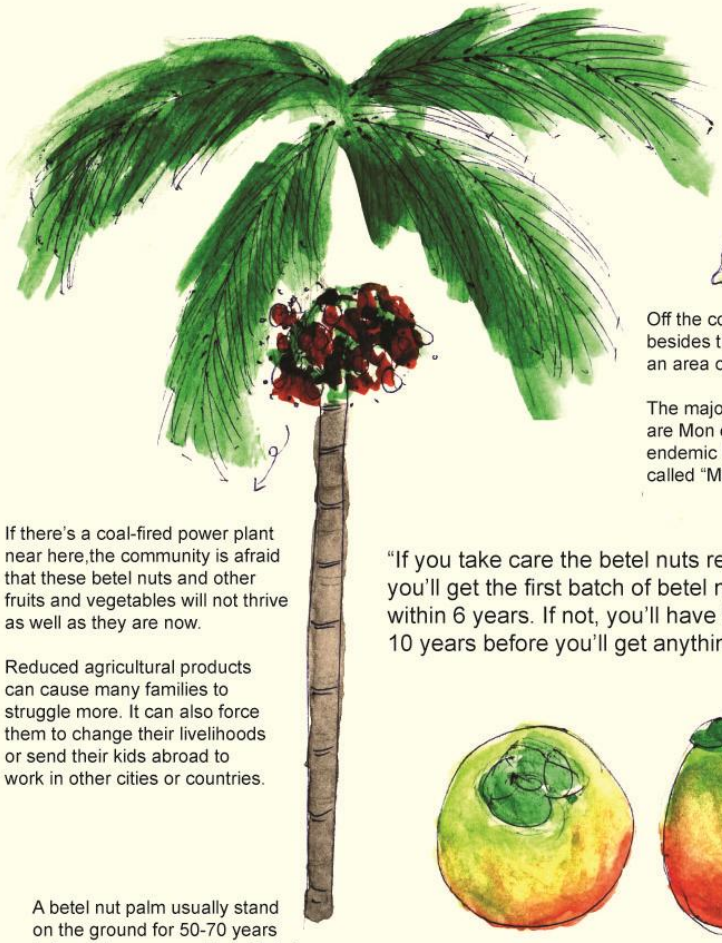
Bird species

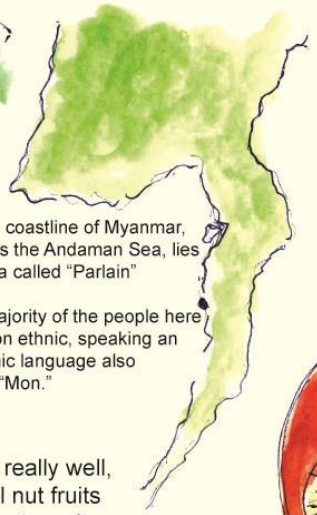
NO	SCIENTIFIC NAME	COMMON NAME	HABITAT
1	*Accipiter badius*	Shikra	
2	*Accipiter trivirgatus*	Crested goshawk	forests, second growth
3	*Accipiter virgatus*	Besra	wooded areas
4	*Aegithina tiphia*	Common iora	forest edge, gardens, scrub, mangroves, rubber
5	*Anas poecilorhyncha*	Spot-billed duck	marshes, rivers, lakes
6	*Anser anser*	Grey-lag goose	rivers, lakes, grain fields, grasslands
7	*Anser indicus*	Bar-headed goose	large rivers, lakes, grain fields, grasslands
8	*Apus affinis*	House swift	cliffs, caves, rocky islets, cities; feeds over open areas
9	*Aviceda leuphotes (lophotes)*	Black baza	open forests, second growth, villages
10	*Botaurus stellaris*	Great bittern	reeds, marshes
11	*Bubulcus ibis*	Cattle egret	paddyfields, pastures, marshes
12	*Cairina scutulata*	White-winged duck	streams and swamps in dense forest by day; rivers and paddyfields at night
13	*Calidris temminckii*	Temmick's stint	mud-flats, marshy areas
14	*Calidris tenuirostris*	Great knot	mud-flats, sea-coasts
15	*Certhia discolor*	Brown-throated treecreeper	forests
16	*Circus melanoleucos*	Pied harrier	open country, marshes, paddyfields
17	*Collocalia esculenta (linchi)*	White-bellied swiftlet	forests, second growth
18	*Collocalia fuciphaga (inexpectata francica, vestita)*	Edible-nest swiflet	presumably over forest; elsewhere nest under waterfalls
19	*Crocethia alba*	Sanderling	sea-coasts, mud-flats
20	*Crypsirina temia*	Racket-tailed treepie	open country, scrub, second growth, cultivation
21	*Dicrurus hottentottus*	Spangled drongo	forests, second growth
22	*Dicrurus paradiseus*	Greater racket-tailed drongo	open forests, second growth, cultivation
23	*Egretta alba*	Great egret	paddyfields, lakes, marshes, mangroves, mud-flats
24	*Egretta eulophotes*	Chinese egret	coastal flats, estuary
25	*Egretta garzetta*	Little egret	marshes, mangroves
26	*Egretta intermedia*	Plumed egret	paddyfields, lakes, marshes, mangroves, mud-flats
27	*Ficedula dumetoria*	Rufous-chested flycatcher	evergreen forest, bamboo
28	*Fregata andrewsi*	Christmas frigatebird	coastal waters, islands
29	*Fregata ariel*	Lesser frigatebird	coastal waters, islets
30	*Fregata minor*	Great frigatebird	coastal waters, islands
31	*Gallus gallus*	Red junglefowl	forest, second growth, scrub, rice stubble
32	*Gavia stellata*	Red-throated diver	sea-coasts, large lakes, rivers
33	*Glaucidium brodiei*	Collared owlet	forests
34	*Haliaeetus leucogaster*	White-bellied sea-	sea-coasts, large lakes, rivers

		eagle	
35	*Haliastur indus*	Brahminy kite	open wooded areas, often near civilization
36	*Heteroscelus brevipes (incanus)*	Grey-tailed tattler	mud-flats, sea-coasts
37	*Hirundo daurica (striolata, hyperythra)*	Red-rumped swallow	open areas
38	*Hodgsonius phaenicuroides (phoenicuroides)*	White-bellied redstart	dense grass and scrub in open country
39	*Icthyophaga nana*	Lesser fish-eagle	forested waterways
40	*Ixobrychus sinensis*	Yellow bittern	reeds, marsh grass, paddyfields
41	*Loriculus vernalis*	Vernal hanging parrot	forests, second growth
42	*Machaerhamphus alcinus*	Bat hawk	wooded limestone hilly country
43	*Malacopteron magnum*	Rufous-crowned babbler	bushes and small trees in forest and second growth
44	*Microhierax caerulescens*	Collared falconet	open forest, forest edge
45	*Microhierax fringillarius (horsfieldi)*	Black-thighed falconet	semi-open country, forest edge, second growth
46	*Milvus migrans (lineatus)*	Black kite	open and coastal areas, rivers, harbours, cities
47	*Nycticorax nycticorax*	Black-crowned night-heron	marshes, mangroves
48	*Phaethon aethereus*	Red-billed tropicbird	oceans, oceanic islands
49	*Phylloscopus davisoni*	White-tailed leaf-warbler	evergreen forest
50	*Pitta phayrei*	Eared pitta	forests, second growth
51	*Plegadis falcinellus*	Glossy ibis	marshes, lakes
52	*Pseudibis davisoni (papillosa)*	White-shouldered ibis	lakes, rivers, marshes, paddyfields
53	*Pseudibis gigantea*	Giant ibis	swamps, lakes, open forest
54	*Psittacula finschii (himalayana)*	Grey-headed parakeet	forests, second growth
55	*Pteruthius aenobarbus*	Chestnut-fronted shrike-babbler	evergreen forest and edge
56	*Pycnonotus cyaniventris*	Grey-bellied bulbul	forests, open wooded country
57	*Pycnonotus melanicterus (dispar, flaviventris)*	Black-crested bulbul	forest edge, second growth, scrubs
58	*Rhaphidura leucopygialis*	Silver-rumped swift	forests, especially near streams
59	*Rhipidura perlata*	Spotted fantail	evergreen forest (usually subcanopy)
60	*Sarkidiornis melanotos*	Comb duck	marshy lakes, paddyfields
61	*Seicercus affinis (burkii)*	White-spectacled warbler	evergreen forest
62	*Spilornis cheela*	Crested serpent-eagle	forests
63	*Spizaetus alboniger (nipalensis)*	Blyth's hawk-eagle	forests (imm. Often in lower, more open areas)
64	*Streptopelia chinensis*	Spotted dove	open country, cultivation, gardens, open forest, second growth
65	*Strix seloputo (orientalis)*	Spotted wood-owl	forests, second growth, orchards, town parks, villages, paddyfields

66	*Tesia castaneocoronata*	Chestnut-headed tesia	undergrowth in evergreen forest
67	*Threskiornis melanocephalus (aethiopica)*	Black-headed ibis	marshes, lakes
68	*Treron bicincta*	Orange-breasted pigeon	open coastal areas, forest, second growth
69	*Turnix sylvatica*	Little buttonquail	scrub, cultivation
70	*Yuhina castaniceps (torqueola, striata)*	Striated yuhina	open forest, edge of evergreen
71	*Yuhina nigrimenta*	Black-chinned yuhina	scrub, evergreen forest

Travelogue: January 2015





Off the coastline of Myanmar, besides the Andaman Sea, lies an area called "Parlain"

The majority of the people here are Mon ethnic, speaking an endemic language also called "Mon."

In Parlain, there are many villages. Among them are the six villages that reside on the western part of Parlain. Four of these villages are mainly agricultural villages, while the other two mostly depend on fishery in the rivers and the sea. One common thing among many others is local's ownership of betel nut gardens.

Since one enters Parlain territory, it becomes impossible to turn away from the immensity of these betel nut gardens from the hills to the lowlands.

My first visit to Parlain led me to one of the mostenchanted beaches. Though I have never beento more than five beaches in my whole life, but that moment, when the wave slides above the sand,creating the sound of pristine beauty, I was sure that

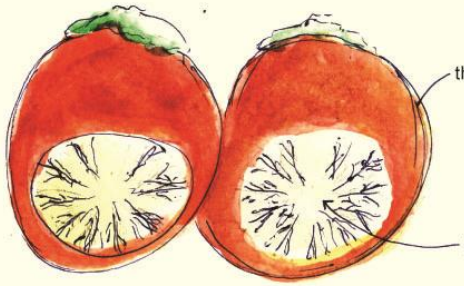
I was seized by Mother Nature at Parlain.

If there's a coal-fired power plant near here,the community is afraid that these betel nuts and other fruits and vegetables will not thrive as well as they are now.

Reduced agricultural products can cause many families to struggle more. It can also force them to change their livelihoods or send their kids abroad to work in other cities or countries.

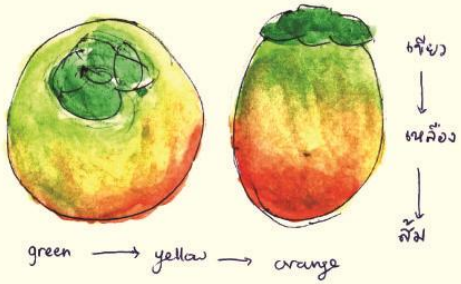
"If you take care the betel nuts really well, you'll get the first batch of betel nut fruits within 6 years. If not, you'll have to wait 10 years before you'll get anything"

Healthy soil and **abundant water** help **betel nuts** grow quicker.



When the time for a new set of betel nut palm to be planted arrives, farmers would select only the best fruits to use as cultivars.

Preferred betel nuts gardeners use as **cultivars**



Price for a **fresh** betel nut: 20-24 kyat each.

Price for **dried** betel nut: 3,700 kyat/peittha (~1.3kg)

price as of January 2015

A betel nut palm usually stand on the ground for 50-70 years before it turns very old and fall down.

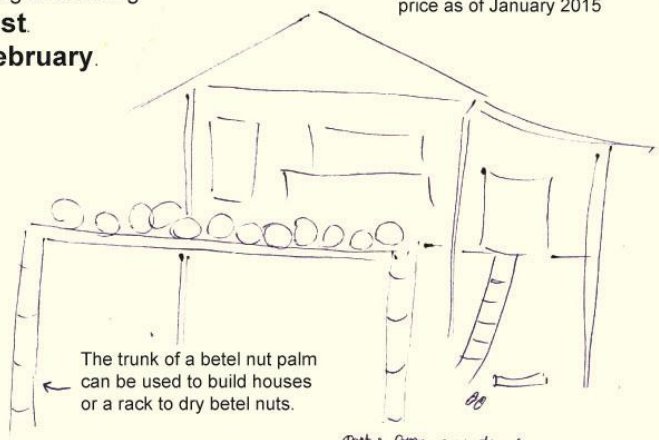
Gardeners start harvesting and selling betel nuts around **August**.
The season ends in **February**.

ကွမ်းသီး **"Gong-dee"** is Burmese word for betel nuts.

သင်္ဘာ In Mon, it's called "Sawt"

Betel nut gardeners try to find out how far these betel nuts go.They say that not only that these betel nuts are sold widely in Myanmar but also shipped abroad to India, Chia, andh Korea.

There's a saying in Thailand,
"hard rice, costly betel nut"
to show a time when rice is hard to find and betel nuts become very expensive, meaning a time when the economy is doing very bad.



The trunk of a betel nut palm can be used to build houses or a rack to dry betel nuts.