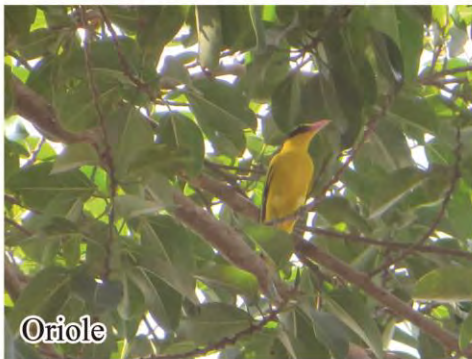


# A case study of ecosystem services rendered by Kelatha Wildlife Sanctuary for the local communities



1



Oriole

2



Golden Birdwing

3



Pig-tailed Macaque

4



Amherstia nobilis

5

30 July 2016



## Location of Kelatha Wildlife Sanctuary



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### Acknowledgements:

This report could not be accomplished without the support, participation and cooperation of many people. For this I wish to offer my deepest appreciation to the following persons:

We would like to thank Amatae Project (British Council) and the funder - Department of International Development (DFID) who have made this possible.

To: My BANCA workmates, U Aung Kyaw Nyunt for leading the socio-economic team, Dr. Thiri Dae Wei Aung for bird, U Tin Aung Tun for mammal, U Myint Kyaw Thura for herpetofauna, Daw Naing Naing Win for entomology and U Toe Chit Hmu Paing for flora survey team.

To: U Nyi Nyi Soe (Staff Officer) Forest Department of Bilin Township for providing the information of the Keltha Wildlife Sanctuary.

To: All supporting team members staff who worked tirelessly during the survey period of hot summer months of March and May.

To: Dr. Thiri Dae Wei Aung and U Pyae Phyo Aung, Program Managers of BANCA, for compiling all survey data and preparation for presentation.

To: All village communities around Kelatha Wildlife Sanctuary who helped and gave guidance in carrying out the surveys in a successful and receptive way.

Finally to Hein Thura (Graphic Artist) of BANCA, for preparation of mapping design.

Although all of those people have contributed to the presentation of this report, I am solely responsible for any errors, inconsistencies or omissions which may remain.

Saw Tun Khaing

Executive Director

BANCA

## **A Case Study of ecosystem services rendered by Kelatha Wildlife Sanctuary for the local communities**

### **Abstract**

Biodiversity And Nature Conservation Association (BANCA) is focusing on Gulf of Mottama (GOM) since 2008 to establish this area as a future Ramsar Site of Myanmar. The establishment includes protection of globally and critically endangered Spoon-billed Sandpiper and thousands of northern wintering migrants and also for promotion of coastal communities for their training in protection, education awareness and livelihoods.

In the promotion of livelihood sector, BANCA has provided 8 earth-ponds for 8 villages in the coastal area in the form of livelihood development as the area is in crucial need of freshwater. However, the earth-ponds dried up in summer during which the communities had to expect donation of water from highland communities living around Kelatha Wildlife Sanctuary, where spring water abound all the year-round. Unused spring water is wasted particularly in Khitthit stream of Winka village, which is only three miles away from the coastal area.

The approach of sustainable supply of freshwater for coastal communities from Winka water source is the main concern of BANCA to carry out the socio-biological survey of Kelatha Wildlife Sanctuary. 6 professional teams were involved in the survey and the findings of each team is presented. Overall evaluation of these findings were again assessed and further overall findings and recommendations were made for the long-term existence of the Sanctuary and sustainable availability of fresh spring water for the coastal communities.



## **A Case Study of ecosystem services rendered by Kelatha Wildlife Sanctuary for the local communities**

### **1: Introduction:**

As an affiliate of BirdLife International, BANCA has been endeavoring to develop Gulf of Mottama (Martaban) as a prospective Ramsar Site since 2008. This idea was conceptualized, by focusing first on sighting of a single species of water bird, Spoon-billed Sandpiper, a globally threatened and a wintering migrant from Siberian Russia. Due to the yearly census of birds in later years, more information could be gleaned from GoM, not only as the place of stop over for the highest number of wintering SBS, globally but also as a feeding ground of 100000-150000 migratory shore-birds from Northern Hemisphere. International interest grew more as the area is further known as one of the important East Asian-Australasian Flyway (EAAF) routes in Asia, including China, Korea, Thailand and Bangladesh.

As a result of this important role of GoM in global perspective, BANCA, with the financial and technical support of various international organizations, such as BirdLife International, RSPB, BTO, MOEJ, KNCF, RNJ, WWF, TEI, CEPF, LHF, BBC Wildlife Fund and WWT, initiated to play the leading role of establishing GoM as a Ramsar Site for Myanmar.

BANCA has already set up a base-station at Thein Ngu village in order to carry out the effective education and livelihood activities for the coastal communities. In future, it is planned to transform this site into an Education Center cum village library for local communities and a prospective source of tourism for bird enthusiasts of GoM and Kelatha Community-Led Sanctuary.

In the development process of Ramsar, BANCA put careful emphasis not only on safety of the birds but also uplifting the welfare and education awareness of the coastal communities of GoM. For protection measures of the site, Local Conservation Groups (LCGs) were formed and provided with education and awareness trainings and local school children and villagers were also provided with education and awareness training. For the development of livelihoods, coastal communities were provided with alternative earning facilities such as boats, and fishing nets in order to change their life style from bird hunting to fishing.

As freshwater availability is a crucial issue for the coastal communities whose village lands are virtually inundated by the seawater, BANCA has provided 8 rain water earth-ponds of size (100'x100') for 8 villages with proper hygienic facilities of fencing, buoyant timber platforms for bucketing and tree planting around the ponds. However, these earth-ponds dried up in summer months, during which the coastal communities had to expect donation of fresh water from the highland communities living around the Kelatha Wildlife Sanctuary where spring water abound all the year round.

This approach of sustainable supply of freshwater for the coastal communities is the major concern for BANCA to carry out the socio-biological survey of the Kelatha Wildlife Sanctuary.



## 2: Major Objectives:

- To tap surplus freshwater from Winka village springs inside the Sanctuary to freshwater deficit 3 coastal villages which fall within the proposed Ramsar Site of GoM.
- To study the richness in biodiversity of the protected area which had been established over 70 years ago.
- To study the socio-economic status of the surrounding communities in order to access the dependence of the community on the ecosystem services of the Sanctuary.
- To promote the management system of vegetation cover of the Sanctuary for the sustainable supply of water from the mountain streams and surface wells of the foothill communities of the Sanctuary.
- To promote GoM and Kelatha as an eco-tourism sites due to the presence of rich biodiversity and archeological sites which rekindle the region of once powerful nation of Mon Kingdom originated at Thuwunna Bhumi, around Kelatha and its environs.

## 3: Socio-biological Survey:

The project was initiated by BANCA and the funding was provided by Amatae of British Council. In order to get the permission to survey the Kelatha WS, the proposal was presented to the Director General of the Forest Department with letter BANCA/Request/003/2016 date 10.2.2016 and the permission was received with letter no. Uyin.Samaka/BANCA/1105/2016 dated 22.2.2016.

## 4: Survey Teams:

As presented in the proposal, the teams consist of (6) branches of professionals with (18) members. The following are the represented branches of professionals and the number of participants in each team:

| Sr.No | Team           | Members |
|-------|----------------|---------|
| 1     | Socio-economic | 3       |
| 2     | Avifauna       | 5       |
| 3     | Entomology     | 3       |
| 4     | Herpetology    | 2       |
| 5     | Mammalogy      | 2       |
| 6     | Flora          | 3       |

The detailed list of participants is given in Annex: (1).

## 5: Survey Period:

Depending on the work-load of each team, the survey period starts from 5 March 2016 to 30 June 2016. The longest period being the overall evaluation of the status of the Sanctuary undertaken by the Executive Director of BANCA.

## 6: Kelatha Wildlife Sanctuary:

### 6.1: Location:

It is situated in Bilin Township, Mon State lying between **N17° 13', E 97° 07'**. It is a small sanctuary whose boundaries are demarcated by a ringed road running all around the site. The ringed road is 14 miles in length and 8 miles was tarred and 6 miles section metalled. This was done in the past 15 years due mainly to the dedicated and relentless effort of the late Kyaikhti Saung Sayadaw, who has presided at Zokthok village, 7 miles away from Kelatha WS. It is 6 miles away from Kyaikhto to the nearest northwestern edge of Ayetthima village and 8.5 miles from Bilin to the southeastern edge of Taung Zun village.

Due to the existence of famous pagodas such as Buddha's sacred hair-enshrined Kelatha, Mya Thabiek, Kelathapha and Kyaik Dae Yon on the mountainous ranges, the area has become a popular tourism site, second to the Rock Pagoda of Kyaikhtiyo in Mon State. As Mount Kelatha is 1181' high at the edge of the Sittaung lowland valley, which also makes it as a seascape view point for further attraction of tourism.

### 6.2: Current Status of the Area:

Kelatha is a small sanctuary of about 8.6 sqmiles (5548.473) areas which has been designated with the Ministerial Order (11/2016) dated 21.1.2016. The original area was 9.45 sq miles or 6048 acres as designated by the Forest Department Order (9/1942), dated 12.1.1942. Due to the degazetment of 44.81 acres for Prison Department housing complex and mining area 454.717 acres of Taung Zun quarry mine, the present area now stands at 5548.473 acres. Within this parameter, there are 134.227 acres of exclusion for religious entities such as Buddha's sacred hair-enshrined Kelatha, Kelathapha and Mya Thabeik pagoda complexes. There are also private orchard farms inside the Sanctuary, whose status, either legal or illegal encroachments are not clearly known. There is also no permanent boundary either demarcated with concrete pillars, timber posts or marked with cairns. The complexity of land ownership, tax collections of orchard farms and the occupation of individual orchard farms will be highlighted in later sections.

### 6.3: Current status of Management:

Kelatha WS is currently under the management of the Forest Department (Proper) of Bilin Township, Mon State. The management of the Sanctuary is placed under the charge of an Area Ranger, two Forest Rangers and one Forester. With this few men-power, protection has been made and local communities surrounding the Sanctuary are sometimes provided with education awareness talks with the aim of wise use of the Sanctuary.

## 7: Survey Findings:

During the period of surveys from 5 March to 30 June 2016, each team has recorded the findings and the results are presented below:

### 7.1: Socio-economic Team:

Socio-economic team led by U Aung Kyaw Nyunt with two professional members, conducted socio survey, covering 8 villages and 5 monasteries which fall inside the parameter of the sanctuary. The survey was started from 5 March to 2 April 2016 lasting for a period of 28 days.

#### 7.1.1: Method of survey:

In collection of socio data, the method is the systematic approach using “Community Based Natural Resource Management” (CBNRM) applying Participatory Rural Appraisal (PRA) tool which includes:

#### 7.1.2: Population Census:

Data collection for total population of each village which depends partly on the Sanctuary for food, water and forest products was started with the participation of the village community. With the cooperation of the 10 house gaungs and educated youths from each village, population census for that village was collected and recorded with the formatted forms as prescribed by BANCA.

List of population of 8 villages depending on the Sanctuary is given in Annex (2)

#### 7.1.3: Wealth Ranking:

Wealth Ranking of the above 8 villages was evaluated by classifying the communities into 4 categories based on the status of Food Surplus (A), Food Sufficient (B), Food Sometimes Deficient (C) and Food Insufficient (D) categories. These categories are not classified by survey staff but by village communities themselves. The staff play the role of the communicators and recorded the results on board papers displayed, in front of village the communities.

The open and free assessment was made by 5 selected women and 5 selected men including the respective authorities of each village.

List of classified wealth ranking categories for all villages is given in Annex (3).

#### 7.1.4: Socio- status Assessment:

After classification of 4 categories in Wealth Ranking, two households from (A)and (D) categories from each village were randomly selected for comparison and their status in details as regards possession of land, materials, employment and incomes were assessed. An example of detailed assessment for Ayetthima was given in Annex (4).

#### 7.1.5: Yearly Occupation of livelihoods of the communities:

This assessment was made together with the socio-status assessment gathering of the community. In the process, the community expressed their way of judgment for weather, planting time, working period and type of crops for their livelihoods.

#### 7.1.6: Monasteries inside the Sanctuary:

The team collected the number of monasteries within the parameter of the Sanctuary and (5) monasteries were randomly selected to get the information on how the monasteries are depending on the ecosystem services of the Sanctuary. Altogether, there are 101 monasteries in these 8 villages and out of this number, 47 fall inside and 54 outside the parameter of the Sanctuary. The list of 47 monasteries within the parameter of the Sanctuary is given in Annex (5).

In addition to this record, some socio information were recorded from 5 monasteries falling within the boundary as regards the dependency on the ecosystem services of the Sanctuary. The information is given in Annex (6).

#### 7.1.7: General Information:

In addition to the particular information as regards the population, households and living status of the communities around the Sanctuary, general information of transportation, education and health care were obtained by the interview of 3 knowledgeable respondents from each village.

### 7.2: Avifauna Team:

The team was headed by Dr. Thiri Dae Wei Aung with 5 professionals as her team members, conducted bird survey starting from 5 to 9 March 2016.

#### 7.2.1: Method of Survey:

Prior to entering the Sanctuary, a total of 4 sites were divided, based on the information provided by Winka village community. Thus, entry points were selected at Winka, Taungyi, Kyibin and Mayangone, so that the whole Sanctuary be covered. The survey was carried out by using point transects and direct observations. It was conducted on foot with the aid of a GPS and local guide. Along each transect route, the type of forest and habitat were recorded. The type and number of calls were noted, if there are any calls or songs. The bamboo flute was used to attract the birds by owl calls.

Field guide to the Birds of South-East Asia by Craig Robson 2014 was used for identification.

#### 7.2.2: Study Site I Winka village:

The site is situated on the eastern side of Winka and also on the western site of the Sanctuary. The survey was carried out on 5 March 2016. Records of birds were done in the orchard farms, secondary forest and in the parameter of the village. A total of 77 individuals of 33 species were

recorded. The richest bird species is Asian Palm Swift and the poorest is Van Hasselt's Sun bird, Hooded Pitta and Brown-throated sunbird.

#### 7.2.3: Study site II Winka village:

The site is situated on the western site of Winka and the western site of the Sanctuary. The survey was carried out on 6 March 2016. It was done in the orchard farm, secondary forest and within the parameter of the village. A total 126 individuals of 37 species were recorded. The richest bird species are Asian Palm Swift and Black-crested Bulbul and the poorest are Van Hasselt's Sun bird, Hooded Pitta and Brown-throated sunbird.

#### 7.2.4: Study site III Mayangone Village:

The study site is situated in the northern part of the Sanctuary. The survey was carried out on 7 March 2016. It was done in the orchard farm, secondary forest and within the parameter of the village. A total of 102 individuals of 30 species were recorded. The richest species is Asian Palm Swift and the second richest being Black-crested Bulbul and Streak-eared Bulbul and the poorest are the Short-toed Snake-Eagle and Emerald Dove.

#### 7.2.5: Study Site IV Kyibin and Taunggyi village:

The study site is situated in the southern part of the Sanctuary. The survey was carried out on 8 March 2016. It was done in orchard farm, secondary forest and within the parameter of the village. A total number of 83 individuals of 24 species were recorded. The richest species are Amar Falcon, House Sparrow, House Crow and Jungle Myna and the poorest are Yellow-browed warbler, Yellow-bellied Warbler and Pond Heron.

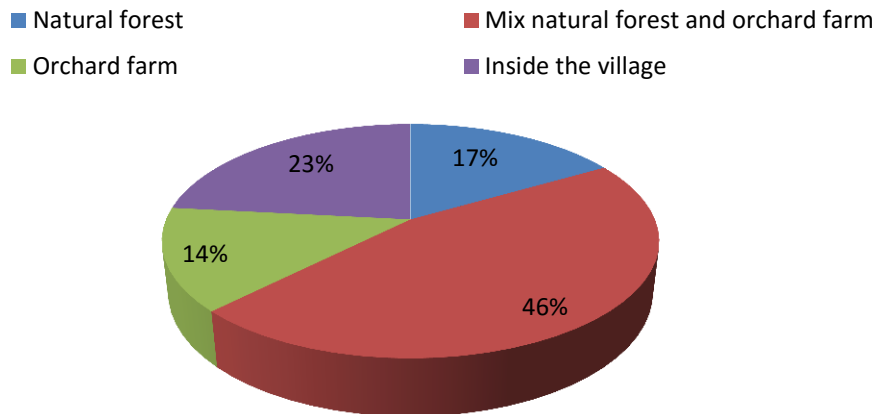
In concluding the avifauna survey, from all 4 sites a total of 396 individual birds comprising 69 species were recorded from Kelatha Wildlife Sanctuary. The summarized list of bird species is given in Annex (7).

#### 7.2.6: Habitat Utilization of Bird Species in Kelatha WS:

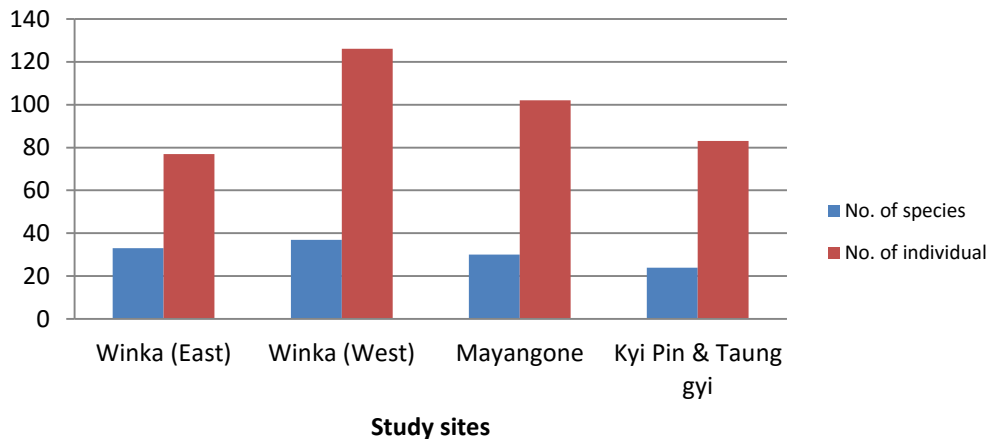
The team also studied the habitat utilization of bird species in all 4 sites of Kelatha WS and found that 46 percent was recorded in mixed natural forest and orchard farm and the poorest 14 percent in orchard farm. Therefore, mixed natural forest and orchard farm is the optimum habitat for all bird species in the Sanctuary.

Habitat utilization of bird species in Kelatha Wildlife Sanctuary can be seen in the graph and pie diagram below:

### Habitat Utilization of bird species in Kelatha Wildlife Sanctuary



### Species composition



### 7.3: Mammal Team:

The team was headed by U Tin Aung Tun with one professional as his member and conducted mammal survey from 5 to 9 March 2016.

#### 7.3.1: Method of survey:

Site selection was made with reference to satellite images and consultation of suitable area for mammal tracks and signs with the local people in Winka village. The team collected and recorded animal tracks and signs in a systematic manner. Two methods, direct and indirect surveys were used. Direct survey method includes direct sightings and hearings. Indirect survey includes observation of tracks and signs. The survey was mainly conducted on the jungle paths and animal trails. The interview surveys were also conducted in Winka, Taung Zun, Kyibin and Taungalay villages.

In addition, 4 small traps were set up during the survey period. The mammals were identified with the reference of Charles M. Francis (2008) and Tin Than and John W.K Parr (undated). All data on the presence and relative abundance of mammal species were compiled. Status of mammals were categorized using the IUCN categorization (2015).

### 7.3.2: Mammal Species Recorded:

A total of 17 mammal species of 15 genera belonging to 14 families under 6 orders were recorded during the survey. Seven species were directly sighted and the rest were recorded by using tracks and signs and interview survey method.

In assessing the conservation status of the recorded species one is classified as Critically Endangered Pangolin species (*Manis spp*) and three are classified as Vulnerable under the criteria of IUCN Red List (IUCN-2015). Those are Asian Slow Loris (*Nycticebus bengalensis*), Northern Pig-tailed Macaque (*Macaca leonine*) and Sambur (*Rusa unicolor*). List of mammals species recorded is given in Annex(8).

### 7.3.3: Threats:

Kelatha WS is virtually covered with private orchard farms and Buddhist monasteries and natural forests have been gradually transformed into man-made tree farms. On the other hand, the Sanctuary is encircled by many villages and the communities are heavily depending on the Sanctuary for water, food, timber, fuel wood, charcoal and non-timber forest products. In addition, hunting pressure is one of the main threats to wildlife species especially Barking Deer and Civet species. The community from Taungalay village involves more than any other villages in wiping out wildlife species from the sanctuary.

About 20 meter long nylon nets were used for hunting. Wildlife was driven by several people with the assistance of hunting dogs and thus wiping out both large and small mammals. The other signs of threats are the practice of charcoal burning, the presence of two quarries, one is Rock Well Mine near Taungalay and the other is Taung Zun Prison Department Mine, at the foot of Kyaik Daeyon Pagoda, in the south-eastern part of the Sanctuary.

## 7.4: Entomology Team:

Prior to entering the Sanctuary, meeting and discussion were made with the community of Winka village in order to select the entry points for the survey. Based on the suggestion and led by a local guide, the survey trail was taken from Winka to Mount Kelatha, Mya Thabeik Taung and Mount Kyaung Taya, Kyar Taya, on foot on the first day. On the second day, the trail was taken from Mayangone village to Nat Hmyar Taung and Mount Wae Ponla on foot. On the third day, the trail was taken to Kyibin and Kin villages on foot.

### 7.4.2: Method of survey:

#### 7.4.2.1: Use of Aerial Nets:

Applying the standard method, it was conducted randomly around the survey area and along the trails or pathways. Identification of Butterfly species was made directly in the field. If the encountered butterfly species were unable to identify directly in the field, they were collected by using long-handled aerial nets.



At the camp, the collected specimens were studied for their morphological characters, such as patterns, spots, stripes and colors. The mouth parts were carefully examined and the body and wing length measured. The specimens were photographed for photo record. After that, the species were released back into the original habitat.

Unidentified species were kept separately in the triangle envelopes and the date of the collection and the location of the collected points (GPS) were recorded on the envelopes. All separated envelopes were preserved in the air-tight plastic containers to avoid humidity and also put mothball inside to prevent from the growth of moulds.

#### 7.4.2.2: Using Light Traps:

Light traps were used to collect moth, beetle and other night-flying insects. Many night-flying insects attracted towards light, particularly at the end of the spectrum. Insects attracted to can be caught using a net or inside a collecting container. Catchers can be screwed by positioning the light beside a white wall next to or above the white sheet.

#### 7.4.3: Species Recorded:

A total of 91 species of insects were recorded in the study area. That includes 72 species of butterfly, 12 species of beetle and 7 species of dragonflies and damselflies. There is no threatened species of IUCN Red List (2015). Myanmar has 6 rarest species of butterflies but only one species, Golden Birdwing was found in this area. List of Butterflies, Beetles, Dragonflies and Damselflies recorded are given in Annex (9).

#### 7.4.4: Threats:

Insect habitat destruction occurs due mainly to logging and encroachment of orchard farming. Production of charcoal by felling trees particularly using chain-saws are the main threats of the insects in Kelatha WS.

### 7.5: Herpetology Team:

The team was headed by U Myint Kyaw Thura with 1 professional as his team member, conducted herpetology survey in the Sanctuary from 5 to 9 March 2016.

#### 7.5.1: Method of survey:

Prior to entering the Sanctuary, meeting and discussion were made with the community of Winka village, to set the entry points for the survey. Based on the suggestion and led by a local guide, the trail was taken on 3 sites. The first is the forested area near Winka village around Man Ku Taung, Kelatha Taung and Mya Thabeik Taung. The second is the forested area near Ywa Tan Shay village around Nat Hmyar Taung, Linlunpin Taung and Wae Ponla Taung. The third is the forested area near Kyibin village around Myat Min Chaung.

Field survey was conducted randomly by walking along the forest trails around the mountains, streams, foot hills of the selected area where there was the prospective habitat for herpeto-faunas. Surveys were made twice a day, one in daytime and another in nighttime. Scanning among trees,

holes in ground, digging through leaf litter, turning logs and stones near the streams were done for visual encounters. Diurnal walks were carried out for live sighting of these species and pictures taken simultaneously using a Cannon Camera. The collected localities were recorded with GPS. Their morphometric characters and measurement of each specimen were recorded, such as size, shape, pattern, spot, stripe, color and body length in the data sheets. The specimens were measured for the analysis as snout vent length (SVL) using measuring tape. Identification was carried out according to the methods described in the attached references.

### 7.5.2: Species Recorded:

During the survey, 14 herpetofauna species were recorded, comprising 6 species of amphibian and 8 species of reptile. Among the reptiles, there are 6 species of lizard and 1 species of snake. The recorded snake was non-poisonous. List of species recorded is given in Annex (10).

### 7.5.3: Threats:

The threats for the wildlife sanctuary and herpetofauna is mainly due to various forms encroachments such as establishment of monasteries, orchard farms and human inhabitation , illegal logging, charcoal burning and granite mining practices within the boundary of the sanctuary.

Moreover, some of the local inhabitants prefer species of amphibians and reptiles as food, more than any other wild animals. Some locals have been eating even skinks. Therefore, amphibians and reptiles are always under threat in the area.

## 7.6: Flora Team:

The team was headed by U Toe Chit Hmu Paing with 2 foresters as his members from Bilin Township, conducted flora survey from 5 to 14 March 2016.

### 7.6.1: Method of survey:

Based on the information from the local community, the team decided to cover the area in 4 sectors. The first, is to survey in the natural forest, if there is any natural forest left. The second is the orchard farmland, the third is the natural forest mixed with the orchard farm land and the fourth is the monastery all of which fall within the parameter of the Sanctuary. All 4 sector-wise surveys were carried out in each village, where socio-survey team has ear-marked for the collection of socio-data.

Flora team picked up 7 villages leaving Kyibin village due to time constraint. After identifying 4 sectors, in each village, a quadrant of size (20mx20m) was marked in each sector, at the center of which, GPS position was taken. All trees with a minimum GBH diameter 6 cm and above within the quadrant were measured with a diameter tape and recorded together with their respective heights. The heights were measured using a clinometer. Undergrowth of bamboos, rattan and medicinal plants were also counted only in numbers. The same principle was applied for each sector covering a total of 28 quadrants within a survey period of 28 days.

Altogether, (3271) number of trees and (98) species were recorded from all quadrants. The list is given in Annex (11).

### 7.6.2: Threats:

The threat for the wildlife sanctuary and its flora is mainly due to the encroachment of orchard farms, mining of individual orchard farmer as well as the government allotted mining quarries for Prison Department and Private Company. Logging, charcoal burning and increased use of chain-saws by the orchard farmers also pose as the serious threats for the long-term existence of the sanctuary.

## 8: Evaluation of Kelatha Wildlife Sanctuary:

### 8.1: Evaluation by the survey team:

Based on the findings of 6 professional teams, general evaluation of the Sanctuary can be made as under:

- From the Socio-economic study, it is found from the wealth ranking status that among all eight villages assessed so far, Pauktaw and Kyibin villages are the poorest, where surplus households are few, only 5 and 2, and deficient households percentage stand highest with 82.14 and 65.57% respectively. (Refer annex 3)
- When compare the socio-economic status of surplus and deficient household in each village, it is also found a big gap of income and expenditure. This can be seen in the sample village of Ayetthima. (Refer Annex 4).
- The team also found that almost all of the communities depend on Kelatha as their source of water, either from spring or surface well or livelihood from orchard produce, timber and fuel wood.
- From the Bird survey, it is indicated that the bird species and population are still in satisfactory condition, although the survey has to be carried out in summer months. It is expected to find and record more in winter season when migrant are coming back.
- From the Entomology team, as they found only one rarest species, they are a bit concerned about the threats of logging and charcoal burning practiced by orchard farmers.
- Herpetology team recorded very few reptiles and amphibians and they are also worried about long-term survival of species as some of the local communities are bent on eating skinks.
- Mammal team found only few species of small mammal due to the hunting pressure of using traps, nylon nets and hunting dogs.
- Flora team found that the vegetation cover is completely intact but the communities claim that, virtually all land inside the Sanctuary belong to orchard farmers and monasteries.

### 8.2: Overall assessment:

- Kelatha is a small Sanctuary whose name is recognized as a religious connection with Buddha's sacred hair-enshrined Kelatha pagoda built on Mount Keletha for many generations ago.
- From aerial view, the vegetation cover of the Sanctuary is completely intact, but on ground, pure natural forest as a core zone is virtually non-existent due to the occupation of Buddhist monasteries and private orchard farms.

- The original vegetation is the typical evergreen forest, dominated by *Dipterocarpus turbinatus*, whose remnants can still be seen all around the Sanctuary.
- The Sanctuary's land ownership belongs to Forest Department. However, there is no distinct boundary demarcation on ground. It is given on map with Mapanya references but not with GPS. There are no demarcation signs traditionally marked with wooden pillars, concrete posts or cairns. The communities living in or around the Sanctuary used to say that the Sanctuary boundary runs 200' inside from the edge of ringed road boundary.
- The Forest Department of Bilin Township has appointed 3 forest staff to manage the Sanctuary.
- As the whole land area of the Sanctuary is in the hands of the orchard farmers and the presiding monks, encroachment or destruction from outside sources are checked and the status quo of the evergreen vegetation is maintained to some extent.
- However, these evergreen vegetation are not in their true nature, but mostly manipulated by human inhabitants surrounding with or within the parameter of the Sanctuary. This also indicates that the whole area is occupied by Buddhist monasteries and orchard farms belonging to the communities from 7 villages in the foothills of the Sanctuary who are depending mainly on the ecosystem services rendered by Kelatha WS.
- So the evergreen nature of the Sanctuary is not strictly governed by law, but by the common interests of the orchard farm owners, and presiding monks among themselves.
- Orchard farmers used to traditionally demarcated their farm land boundaries either with granite boulders or with big trees.
- Although the whole land area of the Sanctuary is dotted with granite rock boulders, the lateritic red soil is fertile due to better porosity for roots and optimum precipitation for growing fruit trees.
- Orchard farmers depend heavily on fruit trees for their living. From the Sanctuary nearly 20 species of fruit trees and leaves are commercially marketed. The consumer zones are Yangon and Kyaikhto where the fruits are sold as fresh or preserved delicacy. The list of commercial fruits and leaves produced from the Sanctuary area is given in Annex (12).
- Discovery of Thaw ka-gyi tree, *Amherstia nobilis* in orchard farmers-owned natural forest of the Sanctuary, which is regarded as extant species in its native habitat of Tanintharyi Range. It is endemic to Myanmar, mostly found only as the cultivated plant in the city of Yangon. In order to raise the interest on Thaw ka-gyi, the background story of this endemic flowering tree is presented and attached in a separate sheet.
- Due to the inclusion of Mountain ranges in the Sanctuary and facing openly to the vast lowland plains of the GOM, the precipitation is high and these ranges become the sources of numerous springs for water supply. And the presence of well-covered forests either natural or manipulated, surface wells around the foothills are also filled with ground water. As such some spring water are not generally used, and they become wasted and unused, particularly in Winka village area.
- Due to the inundation of sea-water in coastal area, only 3 miles away from the source of spring water, freshwater scarcity is a serious problem that has to be faced by the communities, particularly in summer seasons. It has become a regular pattern of coastal communities to wait for the water donors from the highland areas of Kelatha area.

- In addition to the natural landscape beauty of the Sanctuary, the area also possesses the historic archeological site of Thuwunna Bhumi, Mon capital dated back earlier than Bagan and almost comparable to Pyu culture of World Heritage fame.
- This area has also another controversial site of Kin village, whether King Alaung Phaya's grave site existed or not during his retreat from battle of Ayudhaya in Thailand.
- Due to the balanced coexistence of human and nature in the area, Kelatha WS can be treated as a unique Sanctuary among 47 protected areas of the country. This Sanctuary can even be termed as a "Community-led Wildlife Sanctuary of Myanmar".
- Being a Sanctuary, it is clear that ownership of the land belongs to Forest Department. But the land is saturated with Buddhist monasteries and private orchard farms, whose status, either legal or illegal encroachments are not clearly known.
- Private orchard farmers, when asked, always showed payment slips of Land Records Department to verify their legality of ownership inside the Sanctuary.
- It is also an accepted fact that if the Sanctuary is managed by the focal stake holder alone, law enforcement will be not effective enough and the current situation of check and balance will be lost, leading to degeneration of the green landscape.
- Private orchard farmers also express their willingness to pay less payment tax with Form 7 of Land Records, which is flexible enough to sell, transfer or inheritable property.

### 8.3: Threats endangering the long-term existence of the Sanctuary:

Although the status of the Sanctuary for the long-term existence is in a favorable position, the incidence of threats is not without perfection. The followings are some, which should be tackled with proper approach and understanding of all communities depending on the ecosystem services of the Sanctuary.

- Although, the Sanctuary is small and saturated with orchards and human settlements, there is still the presence of hunting for small mammals and herpetofauna, particularly from Taungalay Community. During the mammal survey, evidence of hunting using nylon nets, dogs, and traps for capturing small mammals are recorded.
- Being presumed as their owned land, individual orchard farmers practice extraction of granite rocks, and soil for commercial purposes.
- The same presumption as logging and charcoal burning when the orchard land is cleared for crop pattern change or to supply the demand of sawn timber from the saw-mills nearby the Sanctuary.
- In the act of crop pattern changes, old original fruiting trees were cleared to replace with short-term and high-price yielding crops, such as rubber when its price are high and drumsticks, which fruits within a short period of 2 to 3 years compared to 7 to 8 years of Mayan and Duyin.
- The presence of saw mills around the Sanctuary is also an issue for the healthy nature of the Sanctuary. Although the owners are claiming to get the raw materials from faraway mountains, it cannot be ruled out from the source of the nearby Sanctuary.

- Due to the sea erosion in the coastal area, there is an influx of orchard farmers in the Sanctuary for house dwelling and farming livelihoods with the financial support of the younger workers who worked in Thailand.
- According to the information given by the village head of Kinywa, about 300 young people from his village alone were in Thailand, seeking job opportunities. Naturally they send back money and the parents try to buy orchard land for investment.
- The other modern threat is the recent practice of using chain-saws, which is commonly known as “Sting” in the area.
- Of all threats, the most serious one is the presence of big scale commercial mine of Rock Well, private mine near Taungalay village and Prison Department mine of the Government in Taung Zun village where all quarries fall inside the Sanctuary. The impact of mining effect not only the religious entities of Kelatha but also the growth and yield of fruiting trees and most importantly for the sustainable flow of spring water. This year, impact is more pronounced due to the incidence of Al Nino. Water supply recedes very early in March and April.

## 9: Recommendations:

Kelatha Wildlife Sanctuary is small in size compared to most of the other protected areas of Myanmar. Although the size is small, ecosystem service that is providing for the communities is heavy. As such, the Sanctuary should be managed putting emphasis on:

- Raising education awareness of the local communities on the values of ecosystem services that the Sanctuary is providing for them.
- Although the Sanctuary is virtually occupied by private Orchard farms and monasteries, the specific boundary be demarcated with durable and visible boundary posts, so that community can easily recognize the definite line between the community and the focal stakeholder, Forest Department.
- Mining of granite and extraction of soil by individual house-holders from commercial interest should be prohibited.
- Felling of trees, either fruit bearing or construction timber trees should be prohibited if it is meant for commercial purposes.
- Hunting of any kind of wild animals should be prevented either by providing education awareness or enforcing law for the protection of wildlife by the Forest Department.
- Specific protection should be encouraged for the local people about the cultural value of Thaw ka-gyi (*Amhersta nobilis*) or “Pride of Burma” endemic and extant species’ refuge for Myanmar which can only be found in natural state in Kelatha WS.
- As extant species of Thaw ka-gyi and other unidentifiable tree and medicinal plants are found in the Sanctuary, a Botanical Survey with the participation of University academics should be attempted. This sort of survey or research can be initiated either by BANCA or any other NGO with the support of international or local donors.
- Due to the presence of religious entities, such as Kelatha, Buddhist’s hair-enshrined pagoda, ancient archiological sites of Thuwunna Bhumi and the controversial grave site of King Alaungphaya at Kin village in combination with the development of Ramsar Site of GoM,

Kelatha has a great potential to attract ecotourism for Mon State. Hence, systematic management of Kelatha WS be made for the long-term existence.

- Due to the balance co-existence of human and nature in the Sanctuary, management of the area should not be handled by the focal stakeholder or any other branch of institution. It should be cared under the combined management of a CBO, whose members should be represented by heads of the villages, conservation minded individuals of the local community and related institutional heads of Bilin Township and Sangha bodies of Kelatha, who are benefitting from the ecosystem services of the Sanctuary.
- In doing so, BANCA will take initiative for the establishment of CBO, so that it will officially be recognized by the authorities of Mon State. Then only, the CBO can help official networking capability to work either with BANCA or any other NGOs including INGO and international organizations. The name of the organization is suggested as “Kelatha Forever” or (Kelatha Htawara) in Myanmar. In the current situation, this form of co-management system will be the only suitable means of approach for the long-term existence of the Sanctuary.

## **10: Conclusion:**

Kelatha WS is a unique area, among all 47 protected areas of Myanmar, where man and nature coexists together and shows an example of the ecosystem services rendered by nature for men. This case study can pinpoint only for the ecosystem services in general and cannot be measured the actual ecosystem service values. In order to measure the values, will call for time, financial and technical support together with international expertise.



### Thaw Ka-gyi (*Amherstia nobilis*)

*Amherstia nobilis* (Myanmar: Thaw ka-gyi), a single endemic species of Myanmar where it can be found in its natural habitats of Martaban, Tenasserim and Malacca (Hooker 1879). Now, it is generally accepted that the species is extant because no one is reported to find it in the natural habitat so far.

However, during the ecosystem services survey of Kelatha Wildlife Sanctuary, carried out by BANCA, the species was surprisingly found in its natural habitat of Khithit stream of Winka village.

In order to report its first finding to the focal institution and contribute the enhancement of conservation and the interest of this species by the general public, the following piece of information is presented.

#### *Amherstia*

*Amherstia nobilis*, so unique as a flowering tree that it is coined with different names: The Pride of Burma, Orchid Tree, Tree of Heaven, Queen of the Flowering Tree and Lady Amherst's Pheasant. The scientific name was commemorated in honor of Lady Amherst and her daughter Sarah during the time of British rule in Myanmar.

#### Description:

The extravagant flowers are seen hanging from the long inflorescence, or flower stalk, which is a bright crimson red at the end. There are 5 petals although 2 of these are of unequal size. These petals are also crimson, the two medium sized petals is broad and fan-shaped with a wavy upper margin and a yellow triangle of color extending from the lip down into the flower. The compound leaf bear 6-8 large leaflets, these are broadly oblong in shape and are pallid underneath.

Pod large, flat, almost woody, dehiscent. Seeds large, round-oblong and compressed.

Note: Adapted from Wikipedia and Flora of British Burma (1879)



|                |                                |
|----------------|--------------------------------|
| Kingdom:       | Plantae                        |
| Order:         | Fabales                        |
| Family:        | Fabaceae                       |
| Sub-family:    | Caesalpinioideae               |
| Binomial name: | <i>Amherstia nobilis</i> Wall. |

Annex (1): List of professional participants for socio-biological survey of  
Kelatha Wildlife Sanctuary

**1. Socio Team:**

| Sr.No | Name              | Profession      | Representative Organization | Remarks     |
|-------|-------------------|-----------------|-----------------------------|-------------|
| 1.    | U Aung Kyaw Nyunt | B.Sc (Maths)    | BANCA                       | Team Leader |
| 2.    | U Htet Phyo Naung | B.Sc (Forestry) | BANCA                       | Member      |
| 3.    | U Thaw Phyo Shwe  | B.Sc (Geology)  | BANCA                       | Member      |

**2.Ornithology Team:**

| Sr.No | Name                  | Profession              | Representative Organization | Remarks     |
|-------|-----------------------|-------------------------|-----------------------------|-------------|
| 1.    | Dr.Thiri Dae Wei Aung | Ph.D (Zoology)          | BANCA                       | Team Leader |
| 2.    | Daw Thiri Sandar Zaw  | B.Sc (Zoology)          | BANCA                       | Member      |
| 3.    | U Min Thein           | B.Sc (Zoology)          | Freelance                   | Member      |
| 4.    | U Aung Myint Tun      | M.Sc (Marine Science)   | Freelance                   | Member      |
| 5.    | Daw Tin Nwe Latt      | M.Sc (Wildlife Science) | Freelance                   | Member      |

**3.Herpetology Team:**

| Sr.No | Name               | Profession     | Representative Organization | Remarks     |
|-------|--------------------|----------------|-----------------------------|-------------|
| 1.    | U Myint Kyaw Thura | M.Sc (Zoology) | Freelance                   | Team Leader |
| 2.    | U Nay Myo Win      | B.Sc (Zoology) | Freelance                   | Member      |

**4.Entomology Team:**

| Sr.No | Name                | Profession      | Representative Organization | Remarks     |
|-------|---------------------|-----------------|-----------------------------|-------------|
| 1.    | Daw Naing Naing Win | M.Sc (Zoology)  | MEI                         | Team Leader |
| 2.    | U Kyaw Naing Oo     | B.Sc (Zoology)  | Freelance                   | Member      |
| 3.    | Daw Thin Thiri Aung | B.Sc (Forestry) | BANCA                       | Member      |

**5.Mammalogy Team:**

| Sr.No | Name           | Profession       | Representative Organization | Remarks     |
|-------|----------------|------------------|-----------------------------|-------------|
| 1.    | U Tin Aung Tun | B.A (Geography)  | BANCA                       | Team Leader |
| 2.    | U Thaw Zin     | Higher Education | Freelance                   | Member      |

**6.Foresrty Team:**

| Sr.No | Name                 | Profession      | Representative Organization | Remarks     |
|-------|----------------------|-----------------|-----------------------------|-------------|
| 1.    | U Toe Chit Hmu Paing | B.Sc (Forestry) | BANCA                       | Team Leader |
| 2.    | U Aung Myo           | Forester        | Forest DEPT (Bilin)         | Member      |
| 3.    | U Aung Thein         | Forester        | Forest DEPT (Bilin)         | Member      |

Annex (2): List of population and households of (8) villages depending on the ecosystem services of Kelatha Wildlife Sanctuary

| Sr.No | Village       | Houses      | Households  | Population  |             |              |             |             |             |              |              |              | Remarks                                                                                                                                                               |
|-------|---------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |               |             |             | > 18 years  |             |              | < 18 years  |             |             | Total        |              |              |                                                                                                                                                                       |
|       |               |             |             | M           | F           | Total        | M           | F           | Total       | M            | F            | Total        |                                                                                                                                                                       |
| 1     | Mayangone V.T | 456         | 456         | 748         | 775         | 1523         | 248         | 253         | 501         | 996          | 1028         | 2024         | Although there area village tracks with many villages, only those villages which depend on ecosystem services of Kelatha WS are selected and included in survey data. |
| 2     | Ayetthima     | 456         | 456         | 853         | 866         | 1719         | 418         | 399         | 817         | 1271         | 1265         | 2536         |                                                                                                                                                                       |
| 3     | Winka         | 1303        | 1303        | 1731        | 1889        | 3620         | 1065        | 1054        | 2119        | 2796         | 2943         | 5739         |                                                                                                                                                                       |
| 4     | Taunggyi      | 467         | 467         | 833         | 904         | 1737         | 272         | 304         | 576         | 1105         | 1208         | 2313         |                                                                                                                                                                       |
| 5     | Kinywa        | 837         | 837         | 805         | 726         | 1531         | 272         | 312         | 584         | 1077         | 1038         | 2115         |                                                                                                                                                                       |
| 6     | Pauktaw V.T   | 1484        | 1484        | 2727        | 2947        | 820          | 789         | 1609        | 2398        | 3547         | 3736         | 7283         |                                                                                                                                                                       |
| 7     | Taung Zun V.T | 458         | 458         | 796         | 994         | 1790         | 314         | 266         | 580         | 1110         | 1260         | 2370         |                                                                                                                                                                       |
| 8     | Kyibin        | 134         | 134         | 247         | 252         | 499          | 100         | 96          | 196         | 347          | 348          | 695          |                                                                                                                                                                       |
|       | <b>Total</b>  | <b>5595</b> | <b>5595</b> | <b>8740</b> | <b>9353</b> | <b>13239</b> | <b>3478</b> | <b>4293</b> | <b>7771</b> | <b>12249</b> | <b>12826</b> | <b>25075</b> |                                                                                                                                                                       |

**Annex(3): List of classified wealth ranking categories of 8 villages depending on the ecosystem services of Kelatha Wildlife Sanctuary**

| Sr. No | Village      | Village       |             |             |              |              |              | Status of food sufficiency |            |                    |             | Total       | Deficient (%) |
|--------|--------------|---------------|-------------|-------------|--------------|--------------|--------------|----------------------------|------------|--------------------|-------------|-------------|---------------|
|        |              | Area in acres | House       | Households  | Population   |              |              | Surplus                    | Sufficient | Sometime Deficient | Deficient   |             |               |
|        |              |               |             |             | M            | F            | Total        |                            |            |                    |             |             |               |
| 1      | Mayangone    | 3823          | 456         | 456         | 996          | 1028         | 2024         | 26                         | 75         | 109                | 246         | 456         | 53.94         |
| 2      | Ayeththima   | 4614          | 456         | 456         | 1271         | 1265         | 2536         | 11                         | 37         | 194                | 323         | 565         | 57.16         |
| 3      | Winka        | 15932         | 1303        | 1303        | 2796         | 2943         | 5739         | 67                         | 213        | 330                | 693         | 1303        | 53.18         |
| 4      | Taunggyi     | 1320          | 467         | 467         | 1105         | 1208         | 2313         | 9                          | 26         | 181                | 251         | 467         | 53.74         |
| 5      | Kinywa       | 3356          | 837         | 837         | 1077         | 1038         | 2115         | 11                         | 43         | 314                | 469         | 837         | 56.03         |
| 6      | Pauktaw      | 12285         | 1484        | 1484        | 3547         | 3736         | 7283         | 5                          | 29         | 231                | 1219        | 1484        | 82.14         |
| 7      | Taung Zun    | 237           | 458         | 458         | 1110         | 1260         | 2370         | 67                         | 117        | 161                | 113         | 458         | 24.67         |
| 8      | Kyibin       | 32            | 134         | 134         | 347          | 348          | 695          | 2                          | 9          | 35                 | 88          | 134         | 65.57         |
|        | <b>Total</b> |               | <b>5595</b> | <b>5595</b> | <b>12249</b> | <b>12826</b> | <b>25075</b> | <b>198</b>                 | <b>549</b> | <b>1555</b>        | <b>3402</b> | <b>5704</b> | <b>59.64</b>  |

Annex (4): Comparison of Food Surplus (A) and Deficient (D) categories for their Yearly Income and Expenditure of Ayetthima Village

| Surplus Householder: U Than Oo       |                                                  |                |                                               |                |                |
|--------------------------------------|--------------------------------------------------|----------------|-----------------------------------------------|----------------|----------------|
| Sr.no                                | Type of work/business (For Income)               | Income         | Expenditure                                   | Expenditure    | Balance        |
| 1                                    | Sales of Paddy: 325 baskets x 6000 MMK           | 1950000        | Food: 30 days x 12 months x 2500              | 900000         |                |
| 2                                    | Sales of bean: 90 baskets x35000 MMK             | 3150000        | Clothing : For all families:                  | 50000          |                |
| 3                                    | Sales of Mayan fruits: 120 Vissx 1000MMK         | 120000         | Donation for religious affairs:               | 100000         |                |
| 4                                    | Sales of Mango fruits: 1000 x 100 MMK            | 100000         | Wedding and birthdays etc:                    | 150000         |                |
| 5                                    | Sales of Kyetmauk fruits: 25000x0.35 MMK         | 8750           | Funereal occasion support:                    | 50000          |                |
| 6                                    | Financial support from daughters from Thailand   | 1300000        | Agriculture expenses, labour for harvesting   | 1600000        |                |
| 7                                    |                                                  |                | Transport, travelling cost, oil for motorbike | 120000         |                |
| 8                                    |                                                  |                | Communication phone:                          | 36000          |                |
| 9                                    |                                                  |                | Betel, cheroot and coffee etc:                | 50000          |                |
| 10                                   |                                                  |                | Personal Hygiene:                             | 15000          |                |
|                                      | <b>Total</b>                                     | <b>6628750</b> |                                               | <b>3071000</b> | <b>3557750</b> |
| Deficient Householder: Daw San Myint |                                                  |                |                                               |                |                |
|                                      | Type of work/business (For Income)               | Income         | Expenditure                                   |                |                |
| 1                                    | Rice field work :30 days x 5000 MMK (Harvesting) | 150000         | Food: 30 days x 12 months x 3000 MMK          | 1080000        |                |
| 2                                    | Rice planting 30 days x 2000 MMK (Moonson work)  | 60000          | Health care:                                  | 120000         |                |
| 3                                    | Income by son-in-law 12 months x 20 daysx5000MMK | 1200000        | Clothing:                                     | 50000          |                |
|                                      |                                                  |                | Donation for Religious affairs:               | 30000          |                |
|                                      |                                                  |                | Wedding, birthdays etc:                       | 10000          |                |
|                                      |                                                  |                | Funereal occasion support:                    | 10000          |                |
|                                      |                                                  |                | Transportation, travels:                      | 3000           |                |
|                                      |                                                  |                | Cheroot, betel, coffee:                       | 10000          |                |
|                                      |                                                  |                | Personal Hygiene:                             | 10000          |                |
|                                      |                                                  |                | Miscellaneous :                               | 30000          |                |
|                                      | <b>Total</b>                                     | <b>1410000</b> |                                               | <b>1353000</b> | <b>57000</b>   |

**Annex (5): List of monasteries falling within the parameter of Kelatha Wildlife Sanctuary**

| Sr.No | Village   | Monasteries inside the Sanctuary | Remarks |
|-------|-----------|----------------------------------|---------|
| 1     | Winka     | 1. Mya Thabeik                   |         |
|       |           | 2. Kyataya                       |         |
|       |           | 3.Kyaung taya                    |         |
|       |           | 4.Sin Kyaung                     |         |
|       |           | 5.Khit Thit Maha Theikpan        |         |
|       |           | 6.Thein Gone                     |         |
|       |           | 7.Thanni Thukha                  |         |
| 2     | Ayetthima | 1.Wae Ponla                      |         |
|       |           | 2.Mya Thein Tan                  |         |
|       |           | 3.Kyauk Htaung                   |         |
|       |           | 4.Tha bye Kan                    |         |
|       |           | 5.Kyauk Set                      |         |
|       |           | 6.Taung Kyaung                   |         |
|       |           | 7.Nay Thuyein                    |         |
|       |           | 8.Thukha Kari                    |         |
|       |           | 9.Mingala Shae                   |         |
| 3     | Mayangone | 1.Phaya Lay Yetagon Mountain     |         |
|       |           | 2.Nat Hmyar Taung                |         |
|       |           | 3.Win Kabaw                      |         |
|       |           | 4.Nget Thaik Kyaung              |         |
|       |           | 5.Thein Oo                       |         |
| 4     | Taunggyi  | 1.Panntaw Myaing                 |         |
|       |           | 2.Kelatha                        |         |
|       |           | 3.Kelathapha                     |         |
| 5     | Kyinywa   | 1.Kyungale                       |         |
|       |           | 2.Phayalae                       |         |
|       |           | 3.Yetagon                        |         |
|       |           | 4.Sidawgone                      |         |
| 6     | Kyibin    | 1.Shwe Pyi Aye                   |         |
| 7     | Taung Zun | 1.Pann Tanaw                     |         |
|       |           | 2.Thawka Myaung                  |         |
|       |           | 3.Mani Zayon                     |         |
|       |           | 4.Dama Duta                      |         |
|       |           | 5.Thaphan Cho                    |         |
|       |           | 6.Mingun Mamauk                  |         |
|       |           | 7.Wiwayka Watta                  |         |
|       |           | 8.Seint San Myaung               |         |
|       |           | 9.Shwe Zedi                      |         |
|       |           | 10.Phaya Koesu                   |         |
|       |           | 11.Kyaik Daeyon                  |         |
| 8     | Pauktaw   | 1.Pathein Zetawun Tawya          |         |
|       |           | 2. Thumana Thiri                 |         |
|       |           | 3. Letpan Kayung                 |         |

|  |  |                                                                                 |  |
|--|--|---------------------------------------------------------------------------------|--|
|  |  | 4. Phaung Taw Oo<br>5. Kyaik Daeyon<br>6. Hnit Htut Kyaung<br>7. Kyet Min Taung |  |
|--|--|---------------------------------------------------------------------------------|--|

**Annex (6): Some information on ecosystem services dependency of 5 selected Monasteries within the parameter of the Sanctuary**

| Sr.No | Monastery              | Area in Acres | Year established | Year Registered | Available Natural Resources |      |        |       |        |       |        |       |        |        |
|-------|------------------------|---------------|------------------|-----------------|-----------------------------|------|--------|-------|--------|-------|--------|-------|--------|--------|
|       |                        |               |                  |                 | Water                       | Fuel | Thayat | Mayan | Danyin | Duyin | Peinne | Nanat | Kanzoe | Mingut |
| 1     | Wae Ponla              | 30            | 1926             | -               | √                           | √    | √      | √     | √      | √     | √      | -     | -      | -      |
| 2     | Nat Hmyar Taung        | 6             | 2000             | -               | √                           | √    | √      | √     | -      | √     | √      | -     | -      | -      |
| 3     | Khitthit Maha Theikpan | 2             | 1916             | -               | √                           | √    | -      | √     | √      | -     | √      | -     | -      | -      |
| 4     | Thawka Myaung          | 20            | 1925             | 1925            | √                           | √    | √      | √     | √      | √     | √      | √     | √      | √      |
| 5     | Pathein Zetawun Tawya  | 10            | 1916             | -               | √                           | √    | √      | √     | -      | √     | √      | -     | -      | -      |

- Pathein Zetawun has grown rubber, teak, mahogany, kaungmu and Thingan.
- Thawka Myaung is well forested better than a good natural forest. The name of the monastery is known because of Thawkalay Flowering trees in the campus.



**Annex (7): List of Bird species recorded in Kelatha Wildlife Sanctuary**

| Family name                                                                     | No. | Common New Name        | Scientific name             | Local Name        | IUCN status | Population | Habitat                                             |
|---------------------------------------------------------------------------------|-----|------------------------|-----------------------------|-------------------|-------------|------------|-----------------------------------------------------|
| <b>PHASIANIDAE:</b><br><b>PHASIANINAE:</b><br><b>Pheasants &amp; junglefowl</b> | 1   | Red Junglefowl         | <i>Gallus gallus</i>        | တောကြက်           | LC          | 1          | Orchard farm                                        |
| <b>ARDEIDAE: ARDEINAE:</b><br><b>Hérons &amp; egrets</b>                        | 2   | ? Pond Heron           | <i>Ardeola spp.</i>         | ပျိုင်းအောက်      | LC          | 1          | Inside the village                                  |
|                                                                                 | 3   | Little Egret           | <i>Egretta garzetta</i>     | ပျိုင်း           | LC          | 1          | Inside the village                                  |
| <b>FALCONIDAE:</b><br><b>FALCONINAE: Falcons</b>                                | 4   | Amur Falcon            | <i>Falco amurensis</i>      | သိမ်း             | LC          | 20         | Inside the village                                  |
| <b>FALCONIDAE:</b><br><b>ACCIPITRINAE: Hawks, eagles &amp; allies</b>           | 5   | Himalayan Buzzard      | <i>Buteo burmanicus</i>     | သိမ်း             | LC          | 1          | Orchard farm                                        |
|                                                                                 | 6   | Oriental Honey-Buzzard | <i>Pernis ptilorhynchus</i> | သိမ်း             | LC          | 4          | Orchard farm                                        |
|                                                                                 | 7   | Short-toed Snake-Eagle | <i>Circaetus gallicus</i>   | သိမ်းငှက်         | LC          | 2          | Mixed natural forest and orchard farm               |
|                                                                                 | 8   | Eurasian Sparrowhawk   | <i>Accipiter nisus</i>      |                   | LC          | 1          | Orchard farm                                        |
|                                                                                 | 9   | Black Kite             | <i>Milvus migrans</i>       | စွန်              | LC          | 2          | Orchard farm, mixed natural forest and orchard farm |
|                                                                                 | 10  | Shikra                 | <i>Accipiter badius</i>     | ချိုးသိမ်း။သိမ်း။ | LC          | 4          | Orchard farm                                        |

|                                                                                       |    |                            |                               |                |    |    |                                       |
|---------------------------------------------------------------------------------------|----|----------------------------|-------------------------------|----------------|----|----|---------------------------------------|
| <b>COLUMBIDAE:</b><br><b>COLUMBINAE: Typical pigeons &amp; doves</b>                  | 11 | Spotted Dove               | <i>Streptopelia chinensis</i> | ချိုးလည်ဖြောက် | LC | 2  | In the village and natural forest     |
|                                                                                       | 12 | Emerald Dove               | <i>Chalcophaps indica</i>     | ချိုးစိမ်း     | LC | 1  | Mixed natural forest and orchard farm |
| <b>COLUMBIDAE:</b><br><b>TRERONINAE: Green-pigeons, imperial-pigeons &amp; allies</b> | 13 | Thick-billed Green-Pigeon  | <i>Treon curvirostra</i>      | နှုတ်သီးထူငှက် | LC | 12 | Natural forest                        |
|                                                                                       | 14 | Ashy-headed Green - Pigeon | <i>Treon phayrei</i>          | ဘုမတီး         | NT | 6  | Inside the village                    |
| <b>PSITTACIDAE:</b><br><b>PSITTACINAE: Parrots &amp; parakeets</b>                    | 15 | Red-breasted Parakeet      | <i>Psittacula alexandri</i>   | ကြက်တူရွေး     | NT | 1  | Mixed natural forest and orchard farm |
| <b>CUCULIDAE:</b><br><b>PHAENICOPHAEINAE: Malkohas &amp; allies</b>                   | 16 | Green-billed Malkoha       | <i>Rhopodytes tristis</i>     | ဝါဖလေး         | LC | 3  | Natural Forest                        |
| <b>CUCULIDAE:</b><br><b>CENTROPODINAE: Coucals</b>                                    | 17 | Greater Coucal             | <i>Centropus sinensis</i>     | ဘုတ်ကြီး       | LC | 1  | Natural forest                        |
| <b>APODIAE: APODINAE: Typical swifts</b>                                              | 18 | Asian Palm-Swift           | <i>Cypsiurus balas</i>        | ပျံလွှား       | LC | 73 | Mixed natural forest and orchard farm |
| <b>MEROPIDAE: Bee-eaters</b>                                                          | 19 | Chestnut-headed Bee-eater  | <i>Mecops leschenaulti</i>    | ပုစဉ်းထိုးငှက် | LC | 3  | Mixed natural forest and orchard farm |
|                                                                                       | 20 | Little Green Bee-eater     | <i>Merops orientalis</i>      | ပုစဉ်းထိုးငှက် | LC | 2  | Natural forest                        |

|                                                            |    |                             |                                |                   |    |    |                                                       |
|------------------------------------------------------------|----|-----------------------------|--------------------------------|-------------------|----|----|-------------------------------------------------------|
| <b>RAMPHASTIDAE:</b><br><b>MEGALAIMINAE: Asian barbets</b> | 21 | Lineated Barbet             | <i>Megalaima lineata</i>       | ဖိုးခေါင်းငှက်    | LC | 11 | Mixed natural forest and orchard farm                 |
|                                                            | 22 | Coppersmith Barbet          | <i>Megalaima haemaccephala</i> | ငှက်ပန်းတိမ်      | LC | 7  | Mixed natural forest and orchard farm                 |
|                                                            | 23 | Blue-throated Barbet        | <i>Megalaima asiatica</i>      | -                 | LC | 1  | Mixed natural forest and orchard farm                 |
| <b>PITTIDAE: Pittas</b>                                    | 24 | Hooded Pitta                | <i>Pitta sordida</i>           | တောင်ငုံး/မြေငုံး | LC | 1  | Inside the village                                    |
| <b>ORIOLIDAE: Orioles &amp; allies</b>                     | 25 | Black-naped Oriole          | <i>Oriolus chinensis</i>       | ငှက်ဆန္ဒင်းဝါ     | LC | 4  | Mixed natural forest and orchard farm                 |
| <b>AEGITHINIDAE: Ioras</b>                                 | 26 | Common Iora                 | <i>Aegithina tiphia</i>        | ရွှေပြည်စိုး      | LC | 4  | Orchard farm, natural forest                          |
| <b>DICRURIDAE: Drongos</b>                                 | 27 | Black Drongo                | <i>Dicrurus macrocercus</i>    | ငှက်တော်          | LC | 3  | Natural forest                                        |
|                                                            | 28 | Ashy Drongo                 | <i>Dicrurus leucophaeus</i>    | ငှက်လင်းမြီးစွဲ   | LC | 6  | Natural forest, mixed natural forest and orchard farm |
|                                                            | 29 | Bronzed Drongo              | <i>Dicrurus aeneus</i>         | -                 | LC | 1  | Natural forest                                        |
|                                                            | 30 | Lesser Racket-tailed Drongo | <i>Dicrurus remifer</i>        | ငှက်တော်မြီးရှည်  | LC | 2  | Natural forest                                        |

|                                                                           |    |                             |                                 |                                |               |    |                                                       |
|---------------------------------------------------------------------------|----|-----------------------------|---------------------------------|--------------------------------|---------------|----|-------------------------------------------------------|
| <b>MONARCHIDAE:<br/>Monarchs, paradise-flycatchers &amp; allies</b>       | 31 | Black-nape Monarch          | <i>Hypothymis azurea</i>        | စာမဲ                           | LC            | 1  | Natural forest                                        |
| <b>CORVIDAE: Crows, nutcrackers, magpies, jays, treepies &amp; allies</b> | 32 | House Crow                  | <i>Corvus splendens</i>         | ကျီးကန်း                       | LC            | 19 | Inside the village                                    |
|                                                                           | 33 | Red-billed Blue Magpie      | <i>Urocissa erythrorhyncha</i>  | ငှက်တော်ပြာ/ငှက်အောင်မ/ငှက်စပ် | LC            | 5  | Natural forest                                        |
| <b>LANIIDAE: Shrikes</b>                                                  | 34 | Brown Shrike                | <i>Lanius cristatus</i>         | ငှက်ဘီလူး                      | LC            | 6  | Inside the village                                    |
| <b>NECTARINIIDAE: Sunbirds &amp; spinderhunters</b>                       | 35 | Brown-throated Sunbird      | <i>Anthreptes malacensis</i>    | ဝတ်ရည်စုပ်ငှက်                 | LC            | 1  | Natural forest                                        |
|                                                                           | 36 | Van Hasselt's Sunbird       | <i>leptocoma brasiliiana</i>    | ဝတ်ရည်စုပ်ငှက်                 | Not evaluated | 1  | Orchard farm                                          |
|                                                                           | 37 | Olive-backed Sunbird        | <i>Cinnyris jugularis</i>       | ဝတ်ရည်စုပ်ငှက်                 | LC            | 12 | Orchard farm, mixed natural forest and orchard farm   |
|                                                                           | 38 | Crimson Sunbird             | <i>Aethopyga siparaja</i>       | ဝတ်ရည်စုပ်ငှက်                 | LC            | 2  | Mixed natural forest and orchard farm                 |
|                                                                           | 39 | Little Spiderhunter         | <i>Arachnothera longirostra</i> | ပင့်ကူစားငှက်                  | LC            | 1  | Natural forest                                        |
| <b>DICAEIDAE: Flowerpeckers</b>                                           | 40 | Scarlet-backed Flowerpecker | <i>Dicaeum cruentatum</i>       |                                | LC            | 8  | Natural forest, mixed actual forest and orchard farm, |

|                                                                          |    |                              |                             |                   |               |    | orchard farm                                                        |
|--------------------------------------------------------------------------|----|------------------------------|-----------------------------|-------------------|---------------|----|---------------------------------------------------------------------|
| <b>ESTRILDIDAE:<br/>LONCHURINAE: Java Sparrow, munias,</b>               | 41 | White-rumped Munia           | <i>Lonchura striata</i>     | စာဝတီ:            | LC            | 5  | Natural forest, orchard farm                                        |
|                                                                          | 42 | Scaly-breasted Munia         | <i>Lonchura punctulata</i>  | စာဝတီ:            | LC            | 8  | Orchard farm, natural forest                                        |
| <b>STURNIDAE:<br/>STURNINAE: Mynas, starlings &amp; allies</b>           | 43 | Jungle Myna                  | <i>Acridotheres fuscus</i>  | တောဆက်ရက်         | LC            | 14 | Orchard farm, mixed natural forest and orchard farm, natural forest |
|                                                                          | 44 | Common Myna                  | <i>Acridotheres tristis</i> | ဆက်ရက်            | LC            | 10 | Inside the village                                                  |
| <b>PASSERIDAE: Sparrows &amp; allies</b>                                 | 45 | House Sparrow                | <i>Passer domesticus</i>    | အိမ်စာ            | LC            | 15 | Inside the village                                                  |
|                                                                          | 46 | Eurasian Tree-Sparrow        | <i>Passer montanus</i>      | ပသျှူးစာ          | LC            | 11 | Inside the village                                                  |
| <b>TURDIDAE: Thrushes, cochoas, Grandala &amp; allies</b>                | 47 | Chestnut-bellied Rock Thrush |                             | -                 | LC            | 1  | Information                                                         |
| <b>MUSCICAPIDAE:<br/>SAXICOLINAE:<br/>Shortwings, robins, redstarts,</b> | 48 | Pied Bushchat                | <i>Saxicola caprata</i>     | ငှက်ကျား/ လယ်ခြား | LC            | 1  | Inside the village                                                  |
|                                                                          | 49 | Eastern Stonechat            | <i>Saxicola maurus</i>      | -                 | Not evaluated | 3  | Inside the village                                                  |

|                                                                                   |    |                               |                                |                              |    |    |                                                       |
|-----------------------------------------------------------------------------------|----|-------------------------------|--------------------------------|------------------------------|----|----|-------------------------------------------------------|
| <b>MUSCICAPIDAE:<br/>MUSCICAPINAE: Old<br/>World flycatchers &amp;<br/>allies</b> | 50 | Taiga Flycatcher              | <i>Ficedula albicilla</i>      | -                            | LC | 1  | Natural forest                                        |
|                                                                                   | 51 | Oriental Magpie-Robin         | <i>Copsychus saularis</i>      | သပိတ်လွယ်                    | LC | 2  | Natural forest                                        |
|                                                                                   | 52 | White-rumped Shama            | <i>Copsychus malabaricus</i>   | တောသားသပိတ်လွယ်/ တဲသလိပ်ဆွယ် | LC | 2  | Natural forest                                        |
| <b>STENOSTIRIDAE:<br/>Canary-flycatchers &amp;<br/>allies</b>                     | 53 | Grey-headed Canary-Flycatcher | <i>Culicicapa ceylonensis</i>  | -                            | LC | 4  | Natural forest                                        |
| <b>PYCNONOTIDAE:<br/>Bulbuls</b>                                                  | 54 | Black-headed Bulbul           | <i>Pycnonotus atriceps</i>     | ဗွတ်                         | LC | 2  | Natural forest                                        |
|                                                                                   | 55 | Black-crested Bulbul          | <i>Pycnonotus flaviventris</i> | ဗွတ်                         | LC | 34 | Natural forest, mixed natural forest and orchard farm |
|                                                                                   | 56 | Stripe-throated Bulbul        | <i>Pycnonotus finlaysoni</i>   | ဗွတ်                         | LC | 5  | Mixed natural forest and orchard farm, natural forest |
|                                                                                   | 57 | Streak-eared Bulbul           | <i>Pycnonotus blanfordi</i>    | ဗွတ်                         | LC | 9  | mixed natural forest and orchard farm, natural forest |
|                                                                                   | 58 | Red-vented Bulbul             | <i>Pycnonotus cafer</i>        | ဗွတ်ဖင်နီ                    | LC | 2  | Natural                                               |

|                                                                       |    |                         |                                   |          |               |    |                                                       |
|-----------------------------------------------------------------------|----|-------------------------|-----------------------------------|----------|---------------|----|-------------------------------------------------------|
|                                                                       |    |                         |                                   |          |               |    | forest                                                |
|                                                                       | 59 | Red-whiskered Bulbul    | <i>Pycnonotus jocosus</i>         | ဗွတ်ကလုံ | LC            | 2  | Mixed natural forest and orchard farm                 |
|                                                                       | 60 | Sooty-headed Bulbul     | <i>Pycnonotus aurigaster</i>      | ဗွတ်     | LC            | 10 | mixed natural forest and orchard farm, natural forest |
| <b>PHYLLOSCOPIIDAE:<br/>Seicercus &amp;<br/>Phylloscopus warblers</b> | 61 | Dusky Warbler           | <i>Phylloscopus fuscatus</i>      | -        | LC            | 1  | Natural forest                                        |
|                                                                       | 62 | Yellow-brown Warbler    | <i>Phylloscopus inornatus</i>     | -        | LC            | 1  | Natural forest                                        |
|                                                                       | 63 | Yellow-bellied Warbler  | <i>Abroscopus superciliaris</i>   | -        | LC            | 1  | Natural forest                                        |
|                                                                       | 64 | Two Barred Warbler      | <i>Phylloscopus plumbeitarsus</i> | -        | Not evaluated | 2  | Mixed natural forest and orchard farm, natural forest |
| <b>TIMALIIDAE: Babblers</b>                                           | 65 | Pin-Striped Tit-Babbler | <i>Macronus gularis</i>           | -        | LC            | 3  | Inside the village, natural forest                    |
|                                                                       | 66 | Chestnut-capped Babbler | <i>Timalia pileata</i>            | -        | LC            | 1  | Natural forest                                        |
|                                                                       | 67 | Puff-throated Babbler   | <i>Pellorneum ruficeps</i>        | -        | LC            | 2  | Natural forest                                        |



|                                                                      |    |                       |                                |             |               |   |                                    |
|----------------------------------------------------------------------|----|-----------------------|--------------------------------|-------------|---------------|---|------------------------------------|
| <b>ACROCEPHALIDAE:</b><br><i>Acrocephalus</i> warblers<br>& allies   | 68 | Oriental Reed Warbler | <i>Acrocephalus orientalis</i> | -           | Not evaluated | 2 | Natural forest, inside the village |
| <b>CISTICOLIDAE:</b><br>Cisticolas, tailorbirds,<br>prinias & allies | 69 | Common Tailor bird    | <i>Orthotomus sutorius</i>     | နံမြဲညံ့စုံ | LC            | 5 | Natural forest, orchard farm       |

### Annex (8): List of mammal species recorded in Kelatha Wildlife Sanctuary

| Order               | Family         | No. | Common Name                    | Scientific Name                   | IUCN Status<br>Version 3.1 |
|---------------------|----------------|-----|--------------------------------|-----------------------------------|----------------------------|
| <b>Chiroptera</b>   | Pteropodidae   | 1   | Large Flying Fox               | <i>Pteropus vampyrus</i>          | NT                         |
| <b>Pholidota</b>    | Manidae        | 2   | Pangolin spp.                  | -                                 | -                          |
| <b>Primate</b>      | Lorisidae      | 3   | Asian Slow Loris               | <i>Nycticebus bengalensis</i>     | VU                         |
|                     | Ceropithecidae | 4   | Long-tailed Macaque            | <i>Macaca fascicularis</i>        | LC                         |
|                     | Ceropithecidae | 5   | Northern Pig-tailed Macaque    | <i>Macaca leonine</i>             | VU                         |
| <b>Carnivora</b>    | Mustelidae     | 6   | Large-toothed Ferret-Badger    | <i>Melogale personata</i>         | DD                         |
|                     | Viverridae     | 7   | Common Palm Civet              | <i>Paradoxurus hermaphroditus</i> | LC                         |
|                     | Felidae        | 8   | Cat spp.                       | -                                 | -                          |
| <b>Artiodactyla</b> | Suidae         | 9   | Eurasian Wild Pig              | <i>Sus scrofa</i>                 | LC                         |
|                     | Tragulidae     | 10  | Red Muntjac                    | <i>Muntiacus muntjak</i>          | LC                         |
|                     | Cervidae       | 11  | Sambur                         | <i>Rusa unicolor</i>              | VU                         |
| <b>Rodentia</b>     | Sciuridae      | 12  | Black Giant squirrel           | <i>Ratufa bicolor</i>             | NT                         |
|                     | Sciuridae      | 13  | Phayre's Squirrel              | <i>Callosciurus phayrei</i>       | LC                         |
|                     | Sciuridae      | 14  | Indochinese Flying Squirrel    | <i>Hylopetes phayrei</i>          | LC                         |
|                     | Muridae        | 15  | Polynesian Rat                 | <i>Rattus exulans</i>             | LC                         |
|                     | Spalacidae     | 16  | Horay Bamboo Rat               | <i>Rhizomys pruinosus</i>         | LC                         |
|                     | Hystriidae     | 17  | Asiatic Brush-tailed Porcupine | <i>Atherurus macrourus</i>        | LC                         |

Note: NT=Near Threatened, UV=Vulnerable, DD= Data Deficient, LC=Least Concerned

**Annex (9): List of Butterflies, Beetles, Dragonflies and Damselflies recorded in Kelatha  
Wildlife Sanctuary**

| Sr.No | Family Name            | Common Name            | Scientific Name                    | IUCN Status |
|-------|------------------------|------------------------|------------------------------------|-------------|
|       | <b>(A):Butterflies</b> |                        |                                    |             |
| 1     | Papilionidae           | Golden Bird wing       | <i>Troides aeacus</i>              | NE          |
| 2     | Papilionidae           | -                      | <i>Atrophaneura zaleucus</i>       | NE          |
| 3     | Papilionidae           | Common Mormon          | <i>Papilio polytes</i>             | NE          |
| 4     | Papilionidae           | Common rose            | <i>Pachilioptera aristolochiae</i> | NE          |
| 5     | Papilionidae           | Red Heren              | <i>Papilio helenus</i>             | NE          |
| 6     | Papilionidae           | -                      | <i>Papilio hipponous</i>           | NE          |
| 7     | Papilionidae           | Great Mormon           | <i>Papilio memnon</i>              | NE          |
| 8     | Papilionidae           | Lime Butterfly         | <i>Papilio demoleus</i>            | NE          |
| 9     | Papilionidae           | Black and White Heren  | <i>Papilio nephelus</i>            | NE          |
| 10    | Papilionidae           | Common Jay             | <i>Graphium doson</i>              | NE          |
| 11    | Papilionidae           | -                      | <i>Graphium evemon</i>             | NE          |
| 12    | Papilionidae           | Tiled Jay              | <i>Graphium agamemnon</i>          | NE          |
| 13    | Papilionidae           | -                      | <i>Graphium arycles</i>            | NE          |
| 14    | Papilionidae           | Green Dragontail       | <i>Lamproptera meges</i>           | NE          |
| 15    | Pieridae               | Psyche                 | <i>Leptosia nina</i>               | NE          |
| 16    | Pieridae               | Painted Jezebel        | <i>Delias hyparete</i>             | NE          |
| 17    | Pieridae               | Chocolate Albatross    | <i>Appias lyncida</i>              | NE          |
| 18    | Pieridae               | Yellow Orange Tip      | <i>Ixias pyrene</i>                | NE          |
| 19    | Pieridae               | Great Orange Tip       | <i>Hebomoia glaucippe</i>          | NE          |
| 20    | Pieridae               | Lemon Emigrant         | <i>Catopsilia pomona</i>           | NE          |
| 21    | Pieridae               | Malayan Wanderer       | <i>Pareronia valeria</i>           | NE          |
| 22    | Pieridae               | -                      | <i>Eurema ada</i>                  | NE          |
| 23    | Pieridae               | -                      | <i>Eurema blanda</i>               | NE          |
| 24    | Pieridae               | Chocolate Grass Yellow | <i>Eurema sari</i>                 | NE          |
| 25    | Pieridae               | -                      | <i>Eurema simulatrix</i>           | NE          |
| 26    | Pieridae               | Common Grass Yellow    | <i>Eurema hecabe</i>               | NE          |
| 27    | Danaidae               | Monarch Butterfly      | <i>Danaus genutia</i>              | NE          |
| 28    | Danaidae               | Yellow Glassy Tiger    | <i>Parantica aspasia</i>           | NE          |
| 29    | Danaidae               | Striped Blue Crow      | <i>Euploea mulciber</i>            | NE          |
| 30    | Danaidae               | -                      | <i>Euploea klugii</i>              | NE          |
| 31    | Danaidae               | -                      | <i>Euploea diocletianus</i>        | NE          |
| 32    | Danaidae               | -                      | <i>Euploea aglea</i>               | NE          |
| 33    | Danaidae               | -                      | <i>Euploea core</i>                | LC          |
| 34    | Satyridae              | -                      | <i>Melanitis zitenius</i>          | NE          |
| 35    | Satyridae              | -                      | <i>Melanitis phedima</i>           | NE          |
| 36    | Satyridae              | -                      | <i>Lethe confuse</i>               | NE          |
| 37    | Satyridae              | -                      | <i>Lethe verma</i>                 | NE          |
| 38    | Satyridae              | -                      | <i>Lethe vindhya</i>               | NE          |
| 39    | Satyridae              | -                      | <i>Penthema darlisa</i>            | NE          |

|    |              |                            |                             |    |
|----|--------------|----------------------------|-----------------------------|----|
| 40 | Satyridae    | -                          | <i>Mycalesis visala</i>     | NE |
| 41 | Satyridae    | -                          | <i>Ypthima philomela</i>    | NE |
| 42 | Satyridae    | -                          | <i>Ypthima asterope</i>     | NE |
| 43 | Satyridae    | -                          | <i>Elymnias casiphone</i>   | NE |
| 44 | Nymphalidae  | Common Leopard             | <i>Phalanta phalanta</i>    | NE |
| 45 | Nymphalidae  | Lacewing                   | <i>Cethosia biblis</i>      | NE |
| 46 | Nymphalidae  | LemonPansy                 | <i>Junonia lemonias</i>     | NE |
| 47 | Nymphalidae  | Chocolate Soldier          | <i>Junonia iphita</i>       | NE |
| 48 | Nymphalidae  | Peacock Pansy              | <i>Junonia almana</i>       | LC |
| 49 | Nymphalidae  | Grey Pansy                 | <i>Junonia atlites</i>      | NE |
| 50 | Nymphalidae  | Egg fly                    | <i>Hypolimnas anomala</i>   | NE |
| 51 | Nymphalidae  | -                          | <i>Pantoporia sandaka</i>   | NE |
| 52 | Nymphalidae  | Malayan Oakleaf            | <i>Kallima limborgii</i>    | NE |
| 53 | Nymphalidae  | Common Sailer              | <i>Neptis hylas</i>         | NE |
| 54 | Nymphalidae  | Colour sergeant            | <i>Athyma nefte</i>         | NE |
| 55 | Nymphalidae  | Klipper                    | <i>Parthenos sylvia</i>     | NE |
| 56 | Nymphalidae  | Knight                     | <i>Lebadea martha</i>       | NE |
| 57 | Nymphalidae  | Common Earl                | <i>Tanaecia julii</i>       | NE |
| 58 | Nymphalidae  | -                          | <i>Tanaecia flora</i>       | NE |
| 59 | Nymphalidae  | -                          | <i>Charaxes aristogiton</i> | NE |
| 60 | Amathusiidae | Common Duffer              | <i>Discophora sondaica</i>  | NE |
| 61 | Lycaenidae   | Long- banded<br>Silverline | <i>Spindasis lohita</i>     | NE |
| 62 | Lycaenidae   | Common Imperial            | <i>Cheritra freja</i>       | LC |
| 63 | Lycaenidae   | Common Posy                | <i>Drupadia ravindra</i>    | NE |
| 64 | Lycaenidae   | -                          | <i>Drupadia niasica</i>     | NE |
| 65 | Lycaenidae   | -                          | <i>Psolos fuligo</i>        | NE |
| 66 | Lycaenidae   | Grand Imperial             | <i>Surendra vivarna</i>     | NE |
| 67 | Lycaenidae   | -                          | <i>Pseudocola deniaddon</i> | NE |
| 68 | Hesperiidae  | -                          | <i>Taractrocera archias</i> | NE |
| 69 | Hesperiidae  | Yellow Grass Dark          | <i>Taractrocera archias</i> | NE |
| 70 | Hesperiidae  | Fulvous Pied Flat          | <i>Pseudocoladenia ada</i>  | NE |
| 71 | Hesperiidae  | Red Demon                  | <i>Ancistroides armatus</i> | NE |
| 72 | Hesperiidae  | Indian Palm Bob            | <i>Suastus gremius</i>      | NE |

**Annex (9): List of Butterflies, Beetles, Dragonflies and Damselflies recorded in Kelatha Wildlife Sanctuary**

| Sr.No | Family Name   | Common Name              | Scientific Name             | IUCN Status |
|-------|---------------|--------------------------|-----------------------------|-------------|
|       | (B):Beetles   |                          |                             |             |
| 1     | Coccinellidae | Lady bug beetle          | <i>Cycloneda munda</i>      | NE          |
| 2     | Melyridae     | Soft-wing flower Beetle  | <i>Hypebaeus sp.</i>        | NE          |
| 3     | Galerucinae   | Flea beetle              | <i>Parchicola sp.</i>       | NE          |
| 4     | Cerambycidae  | Long horn Beetle         | <i>Xylotrechus colonus</i>  | NE          |
| 5     | Elateridae    | Click Beetle             | <i>Ctenicera divaricate</i> | NE          |
| 6     | Burprestidae  | Burprestid Beetle        | <i>Acmoedera tubulus</i>    | NE          |
| 7     | Carabidae     | Violet Ground Beetle     | <i>Carabus violaecus</i>    | NE          |
| 8     | Carabidae     | Ground Beetle            | <i>Amora oulica</i>         | NE          |
| 9     | Cicindelidae  | Tiger Beetle             | <i>Cicindela sp.</i>        | NE          |
| 10    | Cassilidae    | Tortoise Beetle          | <i>Chariodatella sp.</i>    | NE          |
| 11    | Lucanidae     | Stag Beetle(caterpillar) | <i>Lucanus cervus</i>       | NE          |
| 12    | Criocerinae   | Shining Leaf Beetle      | <i>Neolema sexpunctata</i>  | NE          |

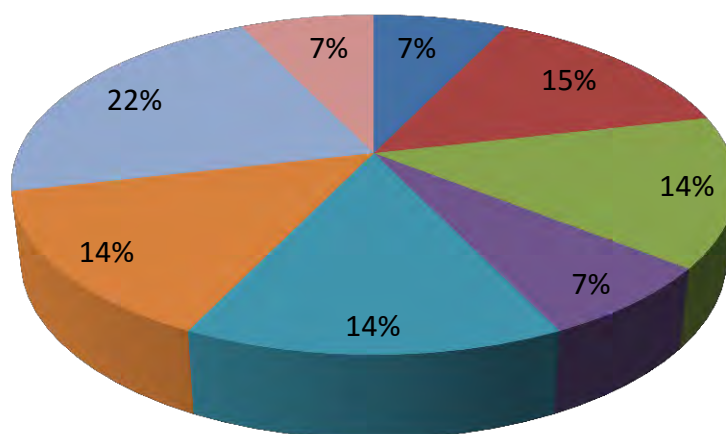
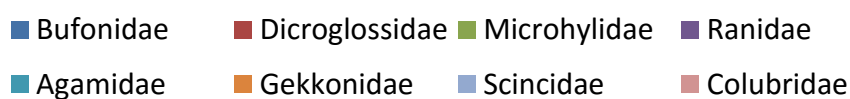
| Sr.No | Family Name                     | Common Name | Scientific Name              | IUCN Status |
|-------|---------------------------------|-------------|------------------------------|-------------|
|       | (C):Dragonflies and Damselflies |             |                              |             |
| 1     | Libellulidae                    | -           | <i>Diplacodes nebulosa</i>   | NE          |
| 2     | Libellulidae                    | -           | <i>Neurothemis tulia</i>     | NE          |
| 3     | Libellulidae                    | -           | <i>Orthetrum triangulare</i> | NE          |
| 4     | Libellulidae                    | -           | <i>Tholymis tillarga</i>     | NE          |
| 5     | Petaluridae                     | -           | <i>Agriocemis sp.</i>        | NE          |
| 6     | Petaluridae                     | -           | <i>Calicnemia imitans</i>    | NE          |

## Annex (10): List of herpetofauna species found in Kelatha Wildlife Sanctuary

| Sr.No | Family Name    | Common Name                | Scientific Name                   | Population | IUCN Status   |
|-------|----------------|----------------------------|-----------------------------------|------------|---------------|
| 1     | Bufo           | Asian Black-spined Toad    | <i>Duttaphrynus melanostictus</i> | 2          | LC            |
| 2     | Dicroglossidae | Paddy Frog                 | <i>Fejervarya limnocharis</i>     | 1          | LC            |
| 3     | Dicroglossidae | Common Floating Frog       | <i>Occidozyga lima</i>            | 3          | LC            |
| 4     | Microhylidae   | Asian Painted Frog         | <i>Kaloula pulchra</i>            | 1          | -             |
| 5     | Microhylidae   | Ornate Narrow-mouthed Frog | <i>Microhyla ornata</i>           | 10         | LC            |
| 6     | Ranidae        | Long-toed Slender Frog     | <i>Hylarana macrodactyla</i>      | +          | LC            |
| 7     | Agamidae       | Garden Fence Lizard        | <i>Calotes vericolor</i>          | 9          | LC            |
| 8     | Agamidae       | Narrow-lined Flying Lizard | <i>Draco taeniopterus</i>         | 7          | Not Evaluated |
| 9     | Gekkonidae     | Tokay Gecko                | <i>Gekko gecko</i>                | 3          | Not Evaluated |
| 10    | Gekkonidae     | Asian House Gecko          | <i>Hemidactylus frenatus</i>      | 1          | -             |
| 11    | Scincidae      | Common Sun Skink           | <i>Eutropis multifasciata</i>     | 12         | -             |
| 12    | Scincidae      | Little Ground Skink        | <i>Eutropis macularia</i>         | 10         | -             |
| 13    | Scincidae      | Forest Skink               | <i>Sphenomorphus maculatus</i>    | +          | Not Evaluated |
| 14    | Colubridae     | Many-spotted Cat Snake     | <i>Boiga multomaculata</i>        | 1          | NT            |

Note: (+)=common

Species composition for each family of herpetofauna found in Kelatha Wildlife Sanctuary



**Annex (11): List of tree species recorded in Kelatha Wildlife Sanctuary (Monasteries, Orchard, Natural Forest and Mixed Orchard+ Natural Forest)**

| Sr. No | Local Name   | Scientific Name               | Species Population |         |                |                                | Total | Remark |
|--------|--------------|-------------------------------|--------------------|---------|----------------|--------------------------------|-------|--------|
|        |              |                               | Monastery          | Orchard | Natural Forest | Mixed Orchard + Natural Forest |       |        |
| 1      | Anan-bo      | <i>Crypteronia paniculata</i> | 23                 | 2       | 4              | 1                              | 30    |        |
| 2      | Arthaw-ka    | <i>Polyalthia longifolia</i>  | -                  | 1       | -              | -                              | 1     |        |
| 3      | Aseik        | <i>Antiaris toxicaria</i>     | 1                  | -       | -              | -                              | 1     |        |
| 4      | Balsa        | <i>Ochroma pyramidale</i>     | 4                  | -       | -              | -                              | 4     |        |
| 5      | Banda        | <i>Terminalia catappa</i>     | 4                  | -       | -              | -                              | 4     |        |
| 6      | Bamaw        | <i>Elaeocarpus wallichii</i>  | -                  | -       | -              | 2                              | 2     |        |
| 7      | Bawdi-nyaung | <i>Ficus religiosa</i>        | 4                  | -       | -              | -                              | 4     |        |
| 8      | Bawzagaing   | <i>Leucaena leucocephala</i>  | 6                  | -       | -              | -                              | 6     |        |
| 9      | Bonmeza      | <i>Albizia chinensis</i>      | 2                  | -       | 1              | -                              | 3     |        |
| 10     | Danyin       | <i>Abarema bigemina</i>       | 105                | 12      | 20             | 22                             | 159   |        |
| 11     | Dan-da-lun   | <i>Moringa oleifera</i>       | 154                | 24      | -              | -                              | 178   |        |
| 12     | Duyin        | <i>Durio zibethinus</i>       | 63                 | 3       | 1              | 29                             | 96    |        |
| 13     | Gangaw       | <i>Mesua ferrea</i>           | 11                 | -       | -              | -                              | 11    |        |
| 14     | Gwe          | <i>Spondias mangifera</i>     | 5                  | -       | -              | -                              | 5     |        |
| 15     | Hmangu       | <i>Pygeum anomalum</i>        | -                  | -       | 2              | 2                              | 4     |        |
| 16     | Ka-aung      | <i>Ficus oligodon</i>         | -                  | -       | -              | 1                              | 1     |        |
| 17     | Kadiba       | <i>Diospyros discolor</i>     | 1                  | -       | -              | -                              | 1     |        |
| 18     | Kanazo       | <i>Baccaurea flaccida</i>     | 15                 | 6       | 11             | 2                              | 34    |        |
| 19     | Kanyin       | <i>Dipterocarpus alatus</i>   | 1                  | -       | -              | -                              | 1     |        |
| 20     | Kara-way     | <i>Cinnamomum inunctum</i>    | 1                  | -       | -              | -                              | 1     |        |
| 21     | Khayay       | <i>Mimusops elengi</i>        | 2                  | -       | -              | -                              | 2     |        |

|    |                  |                                     |     |    |    |    |     |  |
|----|------------------|-------------------------------------|-----|----|----|----|-----|--|
| 22 | Kinbilin         | <i>Antidesma velutinum</i>          | -   | -  | 1  | -  | 1   |  |
| 23 | Kokko            | <i>Albizia lebbek</i>               | 1   | -  | -  | -  | 1   |  |
| 24 | Kyaung-sha       | <i>Oroxylum indicum</i>             | -   | -  | -  | 2  | 2   |  |
| 25 | Kyetmauk         | <i>Nephelium lappceum</i>           | 13  | 5  | -  | -  | 18  |  |
| 26 | Kyetyo           | <i>Vitex canescens</i>              | 2   | 1  | 4  | -  | 7   |  |
| 27 | Kyi-pin          | <i>Barringtonia cymosa</i>          | 22  | 10 | 24 | 12 | 68  |  |
| 28 | Kyun             | <i>Tectona grandis</i>              | 305 | 21 | -  | -  | 326 |  |
| 29 | Kywe-danyin      | <i>Helicia excelsa</i>              | 17  | 4  | 28 | 9  | 58  |  |
| 30 | Letpan           | <i>Bombax ceiba</i>                 | 2   | -  | -  | -  | 2   |  |
| 31 | Lon-mani-ingyin  | <i>Shorea robusta</i>               | 7   | -  | -  | -  | 7   |  |
| 32 | Magyi            | <i>Tamarindus indica</i>            | 4   | -  | -  | -  | 4   |  |
| 33 | Mahogany         | <i>Swietenia macrophylla</i>        | 270 | -  | -  | -  | 270 |  |
| 34 | Mani-awga        | <i>Corallia brachiata</i>           | 14  | 2  | 4  | 3  | 23  |  |
| 35 | Ma-u-kadon       | <i>Nauclea orientalis</i>           | -   | -  | -  | 1  | 1   |  |
| 36 | Ma-u-lat-tan-she | <i>Anthocephalus morindaefolius</i> | -   | 1  | 1  | -  | 2   |  |
| 37 | Mayan            | <i>Bouea burmanica</i>              | 164 | 35 | 1  | 19 | 219 |  |
| 38 | Mingut           | <i>Garcinia mangostana</i>          | 11  | -  | -  | 1  | 12  |  |
| 39 | Mot              | <i>Helicia robusta</i>              | 2   | -  | -  | -  | 2   |  |
| 40 | Myauk-lok        | <i>Artocarpus lakoocha</i>          | 7   | -  | 6  | 1  | 14  |  |
| 41 | Mya-yar          | <i>Microcos paniculata</i>          | 55  | 3  | 6  | 5  | 69  |  |
| 42 | Nabe             | <i>Lannea coromandelica</i>         | -   | -  | -  | 1  | 1   |  |
| 43 | Nagye            | <i>Pterospermum semisagittatum</i>  | 1   | -  | 14 | -  | 15  |  |
| 44 | Nasha-gyi        | <i>Cinnamomum nitidum</i>           |     | -  | 1  | -  | 1   |  |
| 45 | Natha-ni         | <i>Pterocarpus santalinus</i>       | 8   | -  | -  | -  | 8   |  |
| 46 | Natthami         | <i>Saraca lobbiana</i>              | 3   | -  | -  | -  | 3   |  |
| 47 | Ngu              | <i>Cassia fistula</i>               | 3   | -  | -  | -  | 3   |  |
| 48 | Nyaung-pan       | <i>Ficus glabella</i>               | 2   | 2  | -  | 2  | 6   |  |
| 49 | Ohn              | <i>Cocos nucifera</i>               | 71  | -  | -  | -  | 71  |  |



|    |                 |                                  |     |   |    |    |     |
|----|-----------------|----------------------------------|-----|---|----|----|-----|
| 50 | Okhne           | <i>Streblus asper</i>            | 4   | - | -  | -  | 4   |
| 51 | Okshit          | <i>Aegle marmelos</i>            | 2   | - | -  | -  | 2   |
| 52 | Pan-padauk      | <i>Pterocarpus indicus</i>       | 1   | - | -  | -  | 1   |
| 53 | Peinne          | <i>Artocarpus heterophyllus</i>  | 172 | 3 | 11 | 23 | 209 |
| 54 | Phet-than       | <i>Heterophragma adenophylla</i> | 68  | 2 | 11 | 14 | 95  |
| 55 | Phet-wun        | <i>Macaranga denticulata</i>     | 7   | 3 | 6  | 2  | 18  |
| 56 | Pinle-kathit    | <i>Erythrina variegata</i>       | 3   | - | -  | -  | 3   |
| 57 | Pon-nyet        | <i>Calophyllum inophyllum</i>    | 3   | - | -  | -  | 3   |
| 58 | Pyinkado        | <i>Xylocarpus xylocarpa</i>      | -   | 1 | 1  | -  | 2   |
| 59 | Pyinma          | <i>Lagerstroemia speciosa</i>    | 10  | 1 | 1  | 1  | 13  |
| 60 | Pyinma-ywet-gyi | <i>Lagerstroemia macrocarpa</i>  | 5   | - | -  | -  | 5   |
| 61 | Sanse           | <i>Linociera terniflora</i>      | 1   | - | -  | -  | 1   |
| 62 | Saukyo          | <i>Ilex umbellulata</i>          | 3   | - | 1  | -  | 4   |
| 63 | Seik-che        | <i>Bridelia ovata</i>            | 1   | 3 | 2  | 1  | 7   |
| 64 | Sha             | <i>Acacia catechu</i>            | -   | 1 | -  | 4  | 5   |
| 65 | Sit             | <i>Albiza procera</i>            | 2   | 1 | 1  | 2  | 6   |
| 66 | Swe-daw         | <i>Bauhinia acuminata</i>        | 1   | 1 | -  | -  | 2   |
| 67 | Taung-htan      | <i>Livistona rotundifolia</i>    | 5   | 1 | -  | -  | 6   |
| 68 | Taung-mayo      | <i>Alstonia scholaris</i>        | 7   | 1 | -  | -  | 8   |
| 69 | Taung-peinne    | <i>Artocarpus chaplasha</i>      | 4   | - | -  | 4  | 8   |
| 70 | Taung-tamar     | <i>Cedrela serrata</i>           | 3   | - | -  | 3  | 6   |
| 71 | Taung-thale     | <i>Garcinia cowa</i>             | 3   | 1 | -  | 1  | 5   |
| 72 | Taung-thayet    | <i>Irvingia oliveri</i>          | 4   | 1 | 8  | 2  | 15  |
| 73 | Taw-kyet-mauk   | <i>Acilepis squarrosa</i>        | 7   | - | 4  | -  | 11  |
| 74 | Taw-thabye      | <i>Syzygium fruticosum</i>       | 7   | 7 | 1  | 2  | 17  |
| 75 | Thabye-gyi      | <i>Syzygium thumra</i>           | 2   | - | 2  | -  | 4   |
| 76 | Thabye-ni       | <i>Syzygium zeylanicum</i>       | -   | - | -  | 1  | 1   |
| 77 | Thaphan         | <i>Ficus glomerata</i>           | 1   | 3 | -  | 2  | 6   |

|    |             |                                |      |     |     |     |      |              |
|----|-------------|--------------------------------|------|-----|-----|-----|------|--------------|
| 78 | Thayet      | <i>Mangifera indica</i>        | 101  | 4   | -   | 3   | 108  |              |
| 79 | Thetyin     | <i>Croton robustus</i>         | -    | -   | 1   | -   | 1    |              |
| 80 | Thetyin-gyi | <i>Croton wallichii</i>        | -    | -   | -   | 1   | 1    |              |
| 81 | Thingan     | <i>Hopea helferi</i>           | 35   | 4   | 3   | 34  | 76   |              |
| 82 | Thit-cha    | <i>Lithocarpus grandifolia</i> | -    | -   | 2   | 9   | 11   |              |
| 83 | Thit-kado   | <i>Toona ciliata</i>           | 5    | -   | 2   | -   | 7    |              |
| 84 | Thit-mae    |                                | -    | -   | 19  | 9   | 28   | Unidentified |
| 85 | Thitmin-po  | <i>Podocarpus neriiifolius</i> | 1    | -   | -   | -   | 1    |              |
| 86 | Thit-ni     | <i>Manilkara littoralis</i>    | 1    | 1   | 2   | 2   | 6    |              |
| 87 | Thitpok     | <i>Tetrameles nudiflora</i>    | 2    | 2   | 1   | -   | 5    |              |
| 88 | Thitsi      | <i>Melanorrhoea usitata</i>    | 2    | -   | -   | -   | 2    |              |
| 89 | Thitto      | <i>Sandoricum koetjape</i>     | 16   | 10  | 3   | 4   | 33   |              |
| 90 | U-ca-lit    | <i>Euclyptus camaldulensis</i> | 4    | -   | -   | -   | 4    |              |
| 91 | Wet-thitcha | <i>Lithocarpus wrayi</i>       | 7    | 1   | -   | 1   | 9    |              |
| 92 | Rubber      | <i>Hevea brasiliensis</i>      | 705  | 2   | 6   | 2   | 715  |              |
| 93 | Yemane      | <i>Gmelina arborea</i>         | 8    | 2   | 1   | 2   | 13   |              |
| 94 | Ye-thaphan  | <i>Ficus glomerata</i>         | 5    | -   | -   | -   | 5    |              |
| 95 | Yingat      | <i>Gardenia sootepensis</i>    | 2    | -   | 1   | 1   | 4    |              |
| 96 | Zi          | <i>Ziziphus jujuba</i>         | 2    | 1   | -   | -   | 3    |              |
| 97 | Zibyu       | <i>Embllica officinalis</i>    | 6    | 1   | -   | 1   | 8    |              |
| 98 | Zin-byun    | <i>Dillenia paviflora</i>      | -    | -   | 1   | 1   | 2    |              |
|    | Total       |                                | 2614 | 190 | 220 | 247 | 3271 |              |

**Annex (12): List of commercially marketed fruits and leaves from Kelatha Wildlife Sanctuary**

| Sr.No | Myanmar Name      | Common English Name    | Scientific Name                | IUCN Status | Remarks                                                                                |
|-------|-------------------|------------------------|--------------------------------|-------------|----------------------------------------------------------------------------------------|
| 1     | Duyin             | Durian                 | <i>Durio zibethinus</i>        | Not Listed  | All fruits are marketed to Yangon and Kyaikhto as fresh fruits and preserved delicacy. |
| 2     | Kyetmauk          | Rambutan               | <i>Nephelium lappaceum</i>     | LC          |                                                                                        |
| 3     | Thayet            | Mango                  | <i>Mangifera indica</i>        | DD          |                                                                                        |
| 4     | Mayan             | Marian                 | <i>Bouea burminica</i>         | Not Listed  |                                                                                        |
| 5     | Peinne            | Indian jack fruit      | <i>Artocarpus hetrophyllus</i> | Not Listed  |                                                                                        |
| 6     | Mingut            | Mangostean             | <i>Garcinia mangostana</i>     | Not Listed  |                                                                                        |
| 7     | Nget Pyaw         | Banana                 | <i>Musa sapietum</i>           | Not Listed  |                                                                                        |
| 8     | Kanazoe           | Burmease grape         | <i>Baccaurea sapida</i>        | Not Listed  |                                                                                        |
| 9     | Nanat             | Pine apple             | <i>Ananas sativa</i>           | Not Listed  |                                                                                        |
| 10    | Thit-to           | -                      | <i>Sandoricum hoetjape</i>     | Not Listed  |                                                                                        |
| 11    | Dan Tha Lon       | Drum-stick             | <i>Moringa oleifera</i>        | Not Listed  |                                                                                        |
| 12    | Danyin            | Soap bark              | <i>Pithecellobium labatum</i>  | Not Listed  |                                                                                        |
| 13    | Kadut             | Fig tree               | <i>Ficus cunia</i>             | Not Listed  |                                                                                        |
| 14    | Kun Thi           | Betel nut              | <i>Areca catechu</i>           | Not Listed  |                                                                                        |
| 15    | Kun Ywet          | Betel vine             | <i>Piper betel</i>             | Not Listed  |                                                                                        |
| 16    | Ohn Thi           | Coconut                | <i>Cocos nucifera</i>          | Not Listed  |                                                                                        |
| 17    | Sindon manwe      | Heart-leaved moon seed | <i>Tinospora coedifolia</i>    | Not Listed  |                                                                                        |
| 18    | Kywe-gaw          | Pummelo                | <i>Citrus grandis</i>          | Not Listed  |                                                                                        |
| 19    | Tea leaves        | -                      | <i>Camella thea</i>            | Not Listed  |                                                                                        |
| 20    | Taung-htan leaves | -                      | <i>Livistona specivsa</i>      | Not Listed  |                                                                                        |

Note: NE=Not Evaluated, DD= Data Deficient, LC=Least Concern

## References:

### **ORNITHOLOGY**

CITES, 2013. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendices I, II and III.

<https://myanmarbiodiversity.org/key-biodiversity-areas/>

Istituto Oikos & BANCA. 2011. Myanmar Protected Areas, context, current status and challenges.

IUCN. 2015-4. IUCN Red List of Threatened Species. Version 2015.4 (Online). Available: [www.iucnredlist.org](http://www.iucnredlist.org).

Robson, C. 2015. A Field Guide to the Birds of Thailand and South-east Asia.

### **ENTOMOLOGY**

CITES, 2013. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendices I, II and III.

IUCN. 2015-4. IUCN Red List of Threatened Species. Version 2015.4 (Online). Available: [www.iucnredlist.org](http://www.iucnredlist.org).

Kehimkar, I. 2013. The book of indian butterflies. Published by Bombay natural history society. pp. 497

Kinyon, S. 2004. An illustrated checklist for the butterflies of Myanmar .Zoology Department of Yangon University.

Mimeograph for the Forestry Department of Bago region (2003).(Personal communication).

Singh, A, P. Butterflies of India. Printed in India (2011). pp. 183

Laurence G. Kirton, A Naturalist's Guild to the Butterflies of Thailand and Southeast Asia.

Martin walters , The complete illustrated world encyclopedia of insects.

### **HERPETOLOGY**

Chan-ard, T.2003. A photographic guide to Amphibian in Thailand. Se-education Public Company Limited. Thailand. pp 176.

CITES, 2015. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendices I, II and III.

Cox, M.J, Dijk, P.P.V, Nabhitabhata, J and Thirakhupt, K.2006. A photographic guide to Snakes and other Reptiles of Thailand and South-East Asia. Asia books Co., Ltd. Thailand.

Das, I.2010. A field guide to the Reptiles of Thailand & South-East Asia. Asia books Co., Ltd. Thailand. pp 376.

IUCN. 2015. IUCN Red List of Threatened Species. Version 2015.3 (Online). Available: [www.iucnredlist.org](http://www.iucnredlist.org).

Kalyar, Platt. S. G, Win Ko Ko, Khin Myo Myo, Kyaw Moe and Me Me Soe.2012. Photographic guide to the freshwater Turtles and Tortoises of Myanmar. Turtle Conservation Team for Educational Purposes.pp 54.

#### **MAMMALOLOGY**

John W. K. Parr., U Tin Than., 2000 . *A Field guide to the Large Mammals of Myanmar*. Yon Kyi Chat Sarpe Publisher, Myanmar, 274 pp.

Bhushan, B., Fry, G., Hibi, A., Mundkur, T., Prawiradilaga, D. M., Sonobe, K., Usui, S., Taniguchi, T. 1993. *A Field guide to the water birds of Asia*. The Wuld Bird Society Publisher, Japan, 224 pp.

IUCN 2015. *The IUCN Red List of Threatened Species. Version 2015.2*. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on **03 September 2015**.

#### **FLORA**

Kress.W.J, DeFilipps.R.A, Farr.E, Kyi, Y.Y (2003). Checklist of the Trees, Shrubs, Herbs, and Climbers of Myanmar, *Department of Systematic Biology-Botany National Museum of Natural History Washington, DC*.

Flora of British India Vol.II by Sir.J.D.Hooker (1879).

Trees, Shrubs, Herbs and Principal Climbers, etc. by Mr. Hundly and U Chit Ko Ko (1961).

## Group meeting at BANCA base camp (Thein Ngu)



Survey members



Meeting and discussion at Winka Village



# Socio - Survey



Recording information data at Taunggyi



Discussion with people at Taung Zun



Meetin with people at Kyibin



Interviewing people at Taungalay



# Birds



Oriental Honey-Buzzard  
(*Pernis ptilorhynchus*)



Coppersmith Barbet  
(*Megalaima baemaccephala*)



Olive-backed Sunbird  
(*Cinnyris jugularis*)



Brown Shrike  
(*Lanius cristatus*)



Lineated Barbet  
(*Megalaima lineata*)

## Insects



*Troides aeasus* (Golden Birdwing)  
(Rarest species of Myanmar)



*Lamproptera megmes* (Green Dragontail)



*Drupadia ravindra* (Common posy)



*Euploea Core*



## Reptiles and Amphibians



*Boiga multomaculata*



*Hylarana macrodaetyla*



*Draco taeniopterus*



*Extropis macularia*



*Calotes versicolor*



# Mammals



Flying Foxes



Long-tailed mecaque



Tails of Phayre's Squirrel



Palm civet



Pacific Rat



# Flora



Thaw ka-Gyi



Thingan



Duyin



Thaw ka-Lay



Kanyin



## Fruits and Leaves



Thaphan



Taung-htan



Nanat



Thayet



Kanazo



Kyet-mauk



## Produce of Kelatha



Kadut



Duyin



Peinne



Mayan



Danyin



# Threats



Logging with 'Sting'



Mining



Extraction of soil



Charcoal burning



Extraction of granite



Trap



# Archiological Finds



Controversial tomb of King Alaung paya



Restored archaeological site

Entrance to archiological finds Winka



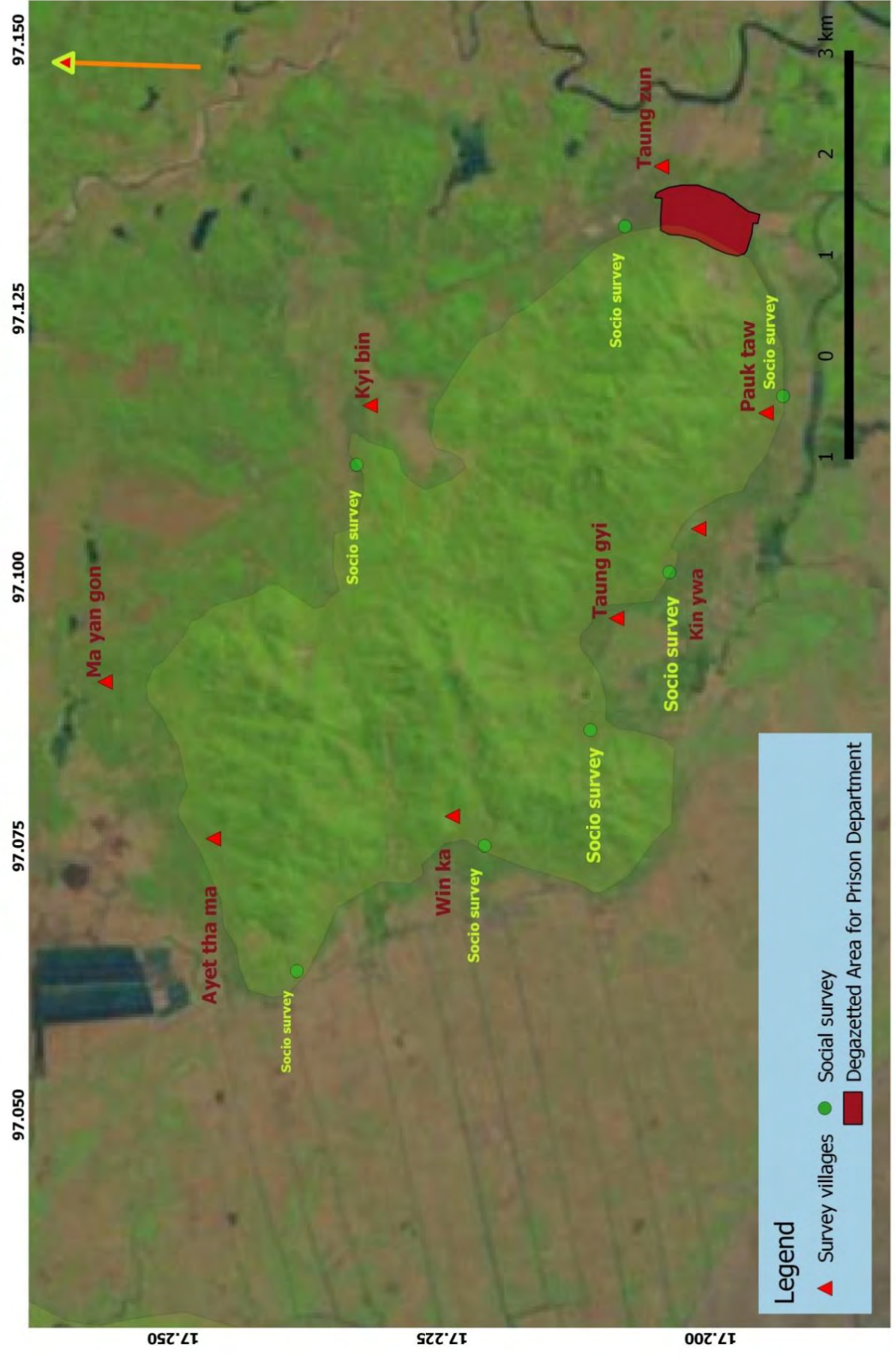
# Perennial springs of Winka



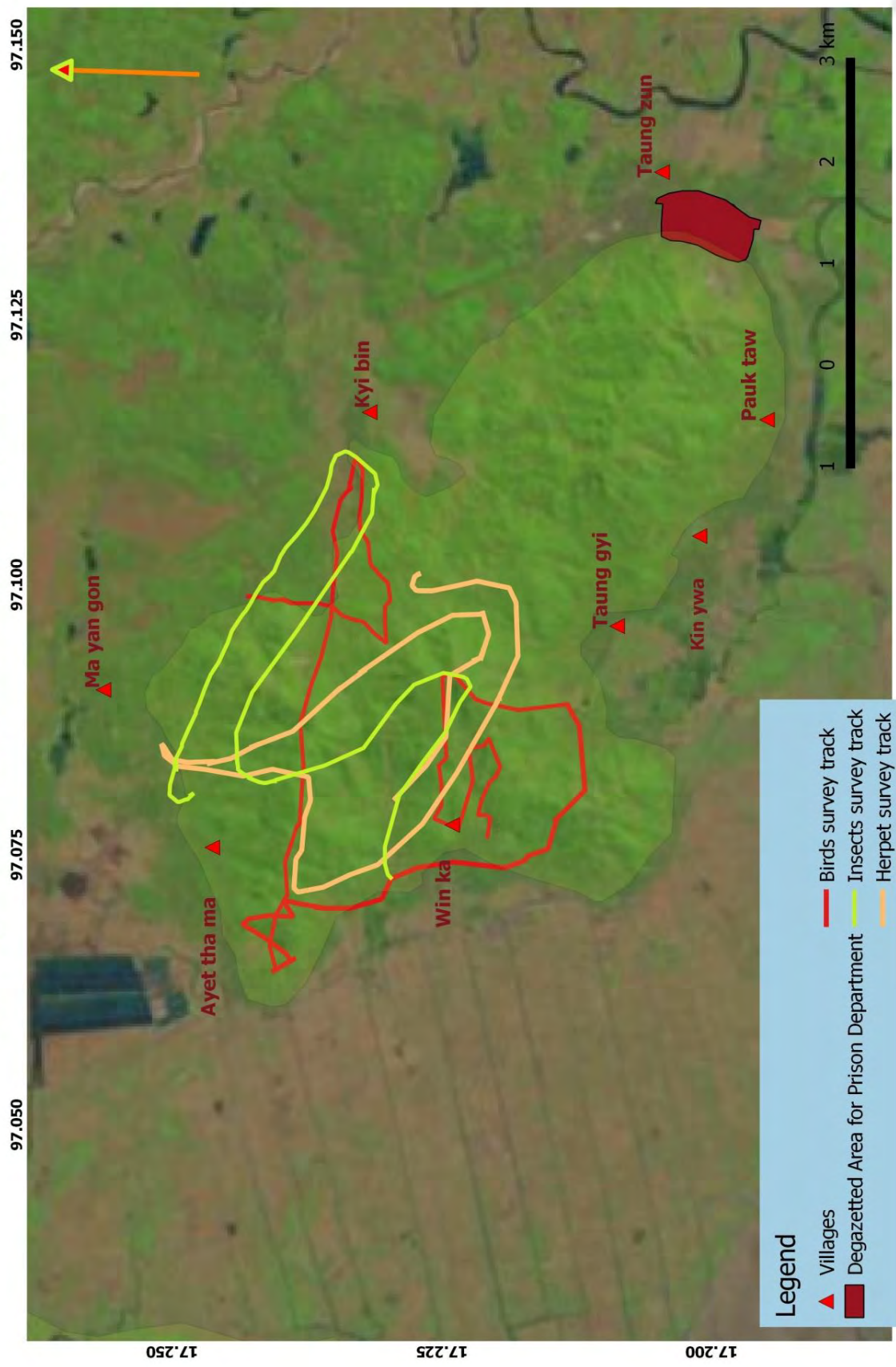


# Survey Areas

## Location of socio survey in Kelatha

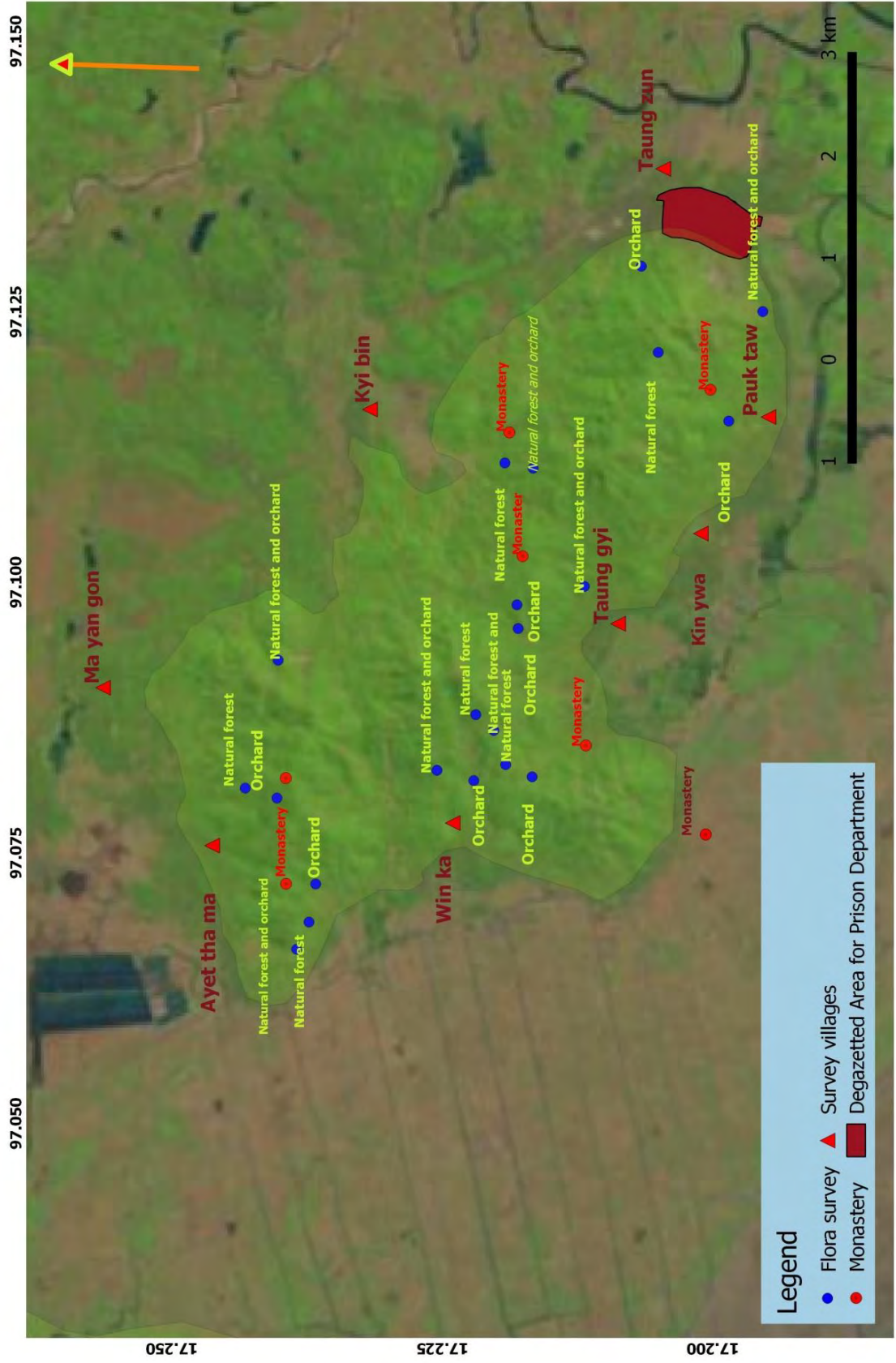


# Survey tracks in Kelatha(herpet,ento and birds)



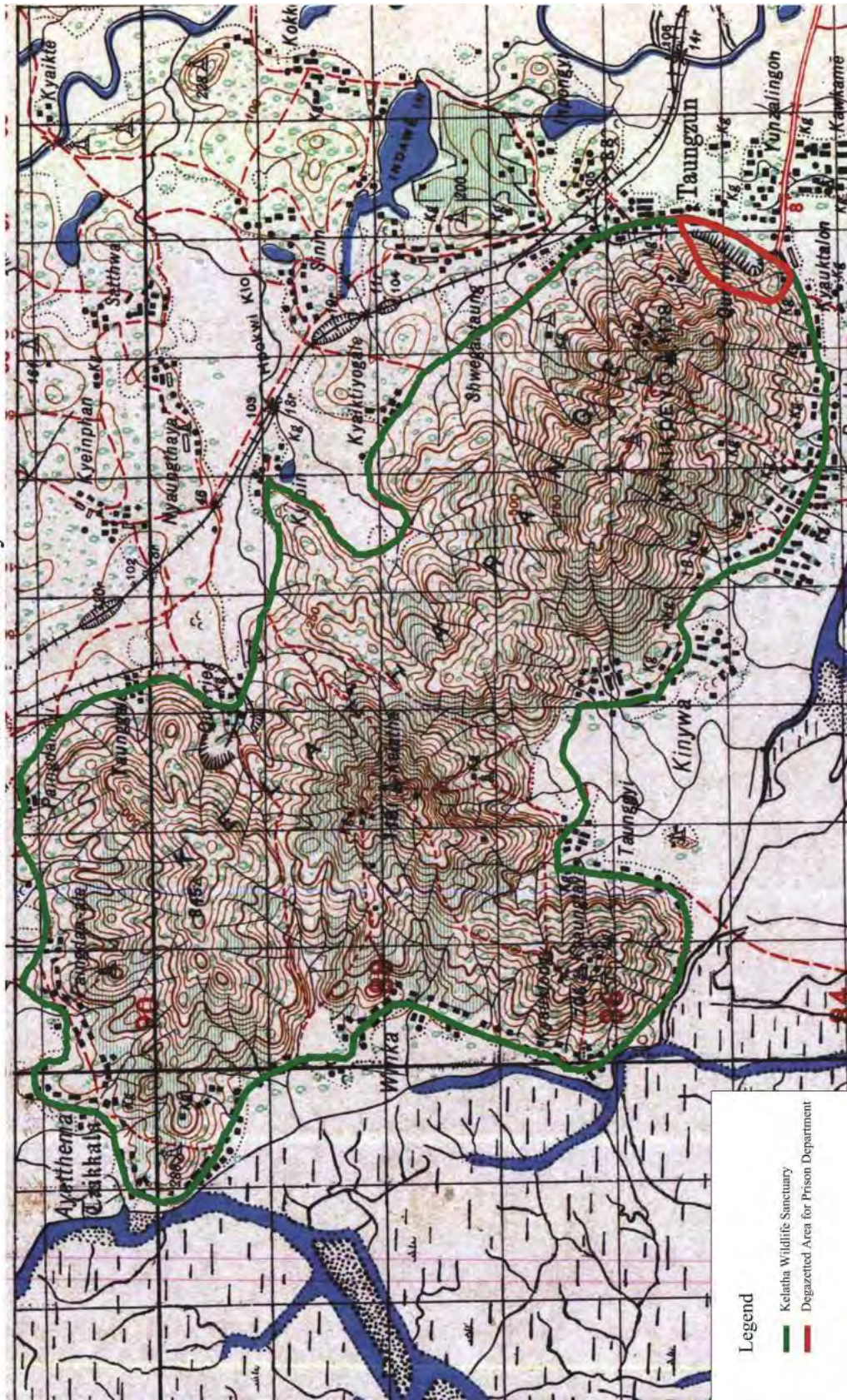


# Location of Flora survey in Kelatha





# Kelatha Wildlife Sanctuary





*“Kelatha Forever” or (Kelatha Htawara)*



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