

## Bushmeat Consumption and Fish Supply in Different Villages of Taninthayi Township, Myeik District

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### Abstract

The survey was intended to highlight the wildlife conservation in seven villages of Taninthayi Township, Myeik District, Taninthayi Region from 12-17, May 2016. The result found that Bushmeat species were distributed in three animal classes: mammals, birds and reptiles, approximately 53.6% of interviewed household consumed bushmeat. During the study period there were 11 species involved in live wildlife consumption in their food diet which composed of eight species of mammals, two species of birds, one species of reptiles. A total of five species of wildlife mammal species were exploited by keeping as pets. The common species involved in the consumption were Eurasian Wild Pig (37.2%), Sambar (20.9%) and Red Muntjac (18.6%), these species with a large volume of consumption were compared to that of other recorded species. Some species with a small volume of exploitation have not been found during the investigation because the survey time was short whereas some species have not been found in the survey because the species consumption changed with season. In addition, the association of their socioeconomic and demographic attributes of households in different villages of the selected study sites such as age of household head, education, occupation, etc. with their wildlife consumption and frequency were addressed.

**Keywords:** Bushmeat consumption, exploitation, socioeconomic, demographic, conservation

### Introduction

Myanmar is recognized as one of the most biodiversity countries in the world with wide range of habitats on landscapes, are home to a diversity of wildlife. Nevertheless, most of fauna and flora are being affected by habitat degradation which is primarily due to not only human activities but also the increasingly impacted by climate change as well. Among them, wildlife consumption is the greatest threat to the persistence of wildlife animals. Wildlife consumption refers to the use of wild animals and/or their products; for example, for food, traditional medicines and ornaments or as pets. Especially, some rural households depend on wild animals for protein, trees for fuel, and both wild animals and plants for natural cures as an important resource in most forested regions of poor nations. The animal wildlife is being endangered by consumption over the last decades. Many species of plants and animals are becoming as regional declines throughout the world that led to danger of becoming extinct.

The main reasons are the consumption demand and price for wildlife meat have also increased rapidly. In fact, a large number of species are acutely threatened, mainly because of illegal hunting pressure as overhunting of wildlife for meat consumption and their livelihoods that is causing population declines and local extinctions of numerous species. As a matter of fact that the present study was carried out a survey on consumption in live wild animals in different villages of Myeik District, Taninthayi Region by the following objectives: to categorize the major wildlife products in consumption by household, to estimate the effect on wildlife consumption by households with demographic and socioeconomic parameters of the households, to study the attitudes towards wildlife consumption and to recommend appropriate conservation measures.

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**Materials and Methods**

**Study area and study period**

The survey was conducted using interviews with the households in different villages of Tanintharyi Township, Myeik District, Taninthayi Region locating in south-eastern Myanmar at 14° 05' 2.98" N 98° 12' 5.67" E during the study period from 12-17 May, 2016 (Fig. 1). It is bounded by Mon State to the north, Thailand to the East and South, and the Andaman Sea to the West. The study area has a substantial dry season from November to April. The area has different types of habitats, which provide the favorable conditions for the diversity of wildlife species.

Table 1. Location of study villages and total numbers of households studied

| Name of villages | Coordinates    |                | Total households | No. of surveyed households (n = 84) |        |
|------------------|----------------|----------------|------------------|-------------------------------------|--------|
|                  | Latitude       | Longitude      |                  | Male                                | Female |
| Le-daungya       | 12° 4' 10.20"  | 98° 57' 14.04" | 300-400          | 3                                   | 16     |
| Tamok-chon       | 12° 1' 30.09"  | 99° 0' 18.83"  | 132              | 6                                   | 13     |
| Kan-ma-hlaing    | 11° 59' 51.00" | 99° 1' 21.00"  | 130              | -                                   | 12     |
| Shan-in-daw      | 11° 51' 16.56" | 99° 17' 44.88" | 120              | -                                   | 14     |
| Yebyu            | 11° 56' 7.114" | 99° 4' 24.431" | 280              | -                                   | 6      |
| Thein Kun        | 11° 52' 51.96" | 99° 9' 20.52"  | 300              | 1                                   | 6      |
| Chaug-la-mu      | 11° 51' 16.56" | 99° 17' 42.36" | 300              | -                                   | 7      |

**Data collection**

The present study sites were carried out in seven villages’ to census with randomly selected households (6-20 households) from each village. The location coordinates and the total number of households in respective village was shown in Table 1. Surveys were conducted in the home of each household and began with casual conversation to answer the questionnaires with one of the two household heads. It took from 20 –30 minutes to complete the standard questionnaires frames for wildlife consumption of dwellers in the selected villages (Fig. 1).

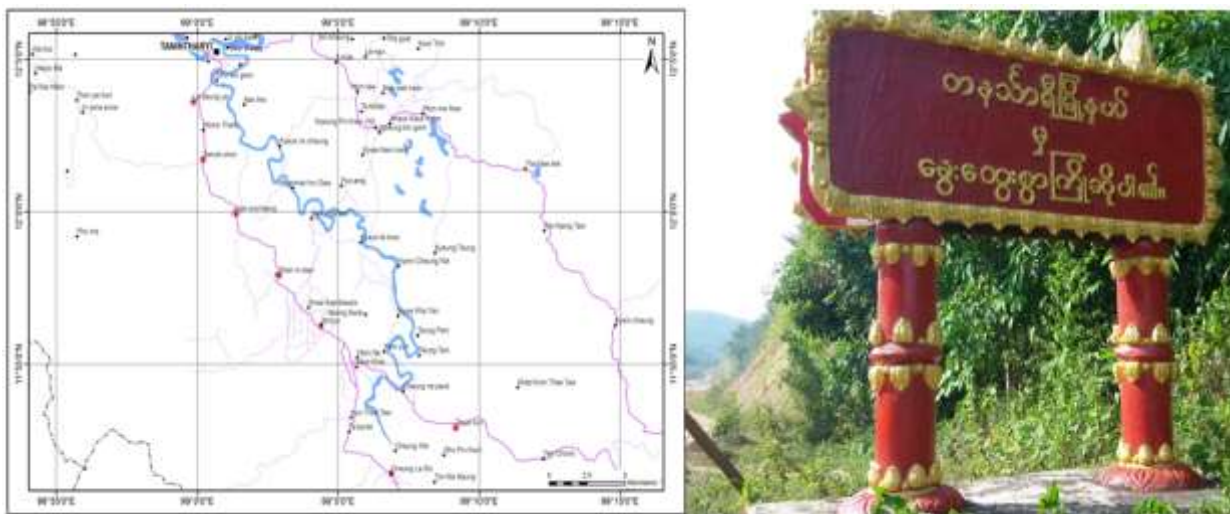


Fig. 1 Location map of study villages in Taninthayi Township, Myeik District

## Identification

Identification of animal species was followed after Tun Yin (1966), Rabinowitz (1993); Francis (2008), Parr (2003), Parr & Tin Than (undated), Win Maung & Win Ko Ko (2002), Tim & Inskipp (1999), Robson (2008).

## Data analysis

All complete data recorded in seven villages during the study period were gathered and analyzed. The panel included a total of about 383 people in 84 households (household's size  $4.56 \pm 1.75$ ). Statistical data analysis was done on the nonparametric data collected from the present surveys and the results were presented in numbers, frequencies and percentages. Microsoft Excel Programme and statistical 'R' packages version 2.15.3 were applied in analyzing the obtained data from different study sites.

## Results

### Demographic attitude of households in different villages

In the present 84 surveyed households in seven villages of Tanintharyi Township, there was a mean household size of  $4.56 \pm 1.75$  individuals (Total numbers of households: 383) with 62.92 % of the population being greater than or equal to 16 years of age. Most of the households' head were primary education 48.8% and followed by secondary school (20.2%), high school (19.0%), illiterate (9.5%) and graduated (2.4%). Most of households of occupation were agricultural cultivation (81.3%) and followed by shop seller (8.3%), government staff (5.2%), driver and hunting (2.1%) and fishing (1.0%) (Table 2).

A 59.0% of households owned livestock animals for the aid of family income and consumption. The livestock animals were chicken, duck, pig, goat, cow, and buffalo. Among them, the most common species of livestock was chicken in 38.5% of households. The rubber plantation 13.5%, orchard plantation 86.5% and 13.5% were in all study villages. The rearing of wildlife animals as pet Pig-tailed Macaque *Macaca nemestrina* (three individuals) were found in two of household in Kan-ma-hlaing and Shan-in-daw villages.

As the monthly family income, most of the households were 110,000-200,000 kyats/month income (35.7%) and >300,000 kyats (22.6%), 210,000-300,000 kyats (21.4%), <50,000 kyats (10.7%), 50,000-100,000 kyats (9.5%), respectively.

### Wildlife and fish consumption of households in the study area

Based on recorded of household consumption, a total of 11 species involved in consumption of local people. The value of wildlife meat consumed in the study area environs covered by the sample village surveys was estimated 53.6% of households. More than 44 % of households had consumed at least one wild animal in the past seven days but it was very sporadic among households who hunt wildlife whereas 26.7% of households had consumed over three times in their diets. Mean household consumption expenditure was  $0.27 \pm 0.07$  kg/capita for villages were combined. Of them, most of households employed of hunting (60.8%) for family consumption and buying 39.2% for consumption. The highest probable consumption was in the wet season and followed by the cool-dry season and the hot-dry season. The common species involved in the consumption were Eurasian Wild Pig (37.2%), Sambar (20.9%) and Red Muntjac (18.6%) and some species with a small volume of exploitation in the study area environs.

Most family consumed fish over three times (78.6%) during the days of survey. Marine fish were mostly consumed by local people with a percentage of 61.9 of the total examined households. The 58.3% of freshwater fish were consumed in the diets (Table 3-5).

Table 2. Different demographic attitudes of household in different study villages

| Parameter                   | Demographic characteristics | Villages    |            |               |             |          |           |              | TOTAL (%)    |
|-----------------------------|-----------------------------|-------------|------------|---------------|-------------|----------|-----------|--------------|--------------|
|                             |                             | Le daung ya | Tamok-chon | Kan-ma-hlaing | Shan-in-daw | Yebyu    | Thein-kun | Chaung-la-mu |              |
| Age                         | Head of household           | 24-75       | 22-65      | 23-65         | 20-60       | 23-48    | 33-58     | 22-53        | 84           |
| Education of household head | Illiterate                  | -           | 2          | 3             | -           | -        | 2         | 1            | 8 (9.5 %)    |
|                             | Primary                     | 7           | 8          | 7             | 11          | 1        | 5         | 2            | 41 (48.8 %)  |
|                             | Secondary                   | 5           | 5          | 1             | 1           | 3        | -         | 2            | 17 (20.2 %)  |
|                             | Highschool                  | 7           | 4          | 1             | 1           | 1        | -         | 2            | 16 (19.0 %)  |
|                             | Graduated                   | -           | -          | -             | 1           | 1        | -         | -            | 2 (2.4 %)    |
| Occupation                  | Agriculture                 | 18          | 16         | 12            | 14          | 4        | 7         | 7            | 78 (56.9 %)  |
|                             | Farming                     | 7           | 8          | 8             | 9           | 4        | 5         | -            | 41 (29.9 %)  |
|                             | Hunting                     | -           | 2          | -             | -           | -        | -         | -            | 2 (1.5 %)    |
|                             | Fishing                     | 1           | -          | -             | -           | -        | -         | -            | 1 (0.7 %)    |
|                             | Government staff            | 2           | 2          | -             | -           | -        | -         | 1            | 5 (3.6 %)    |
|                             | Shop seller                 | -           | 1          | 1             | 2           | 4        | -         | -            | 8 (5.8 %)    |
|                             | Driver                      | -           | -          | -             | 1           | 1        | -         | -            | 2 (1.5 %)    |
| Household size              | Numbers and ranged members  | 101 (3-10)  | 85 (3-10)  | 45 (2-6)      | 65 (2-8)    | 25 (3-5) | 26 (3-8)  | 36 (3-8)     | 383          |
| No. of (>16yr) age          | Numbers and ranged members  | 74 (2-9)    | 47 (2-4)   | 26 (2-4)      | 48 (2-5)    | 13 (2-3) | 16 (2-6)  | 17 (2-4)     | 241 (62.92%) |

Table 3. Socio-economic status of studied households in different villages

| Parameter                     | Status          | Villages (Households) |            |               |             |        |           |              | TOTAL (%)    |
|-------------------------------|-----------------|-----------------------|------------|---------------|-------------|--------|-----------|--------------|--------------|
|                               |                 | Le-daung-ya           | Tamok-chon | Kan-ma-hlaing | Shan-in-daw | Yebyu  | Thein-kun | Chaung-la-mu |              |
| Income (Kyats)                | <50,000         | 1                     | 1          | 5             | 1           | -      | -         | 1            | 9 (10.7%)    |
|                               | 50,000-100,000  | 3                     | 1          | 2             | 2           | -      | -         | -            | 8 (9.5%)     |
|                               | 110,000-200,000 | 7                     | 9          | 3             | 4           | 2      | 1         | 4            | 30 (35.7%)   |
|                               | 210,000-300,000 | 3                     | 3          | 2             | 4           | 3      | 2         | 1            | 18 (21.4%)   |
|                               | >300,000        | 5                     | 5          | -             | 3           | 1      | 4         | 1            | 19 (22.6%)   |
| Livestock farming             | Yes             | 8                     | 8          | 8             | 9           | 4      | 5         | 7            | 49 (59.0%)   |
|                               | No              | 10                    | 11         | 4             | 5           | 2      | 2         | -            | 34 (41.0%)   |
| Livestock & Wild animal       | Chicken         | 8                     | 2          | 4             | 7           | 2      | 3         | 6            | 32 (37.2%)   |
|                               | Duck            | 3                     | 2          | 3             | 3           | -      | -         | -            | 11 (12.8%)   |
|                               | Pig             | 5                     | 1          | 1             | 5           | 2      | 2         | 1            | 17 (19.8%)   |
|                               | Goat            | 1                     | -          | -             | 0           | -      | -         | -            | 1 (1.2%)     |
|                               | Cow             | 2                     | 3          | 2             | 2           | 1      | 4         | 1            | 15 (17.4%)   |
|                               | Ox              | -                     | 1          | 1             | 0           | -      | 2         | -            | 4 (4.7%)     |
|                               | Wild animal     | -                     | 2          | 2             | 2           | -      | -         | -            | 6 (7.0%)     |
| Agriculture (Acres/household) | Rubber          | 156 (6)               | 20 (2)     | -             | 20 (1)      | -      | -         | -            | 196 (13.5%)  |
|                               | Orchard         | 174 (15)              | 438 (19)   | 182 (11)      | 179 (12)    | 47 (6) | 55 (6)    | 182 (6)      | 1257 (86.5%) |

Wildlife keeping as pets: Tamok-chon - Eurasian Wild Pig, Red Muntjac

Kan-ma-hlaing - Dusky Langur, Binturong

Shan-in-daw - Pig-tailed Macaque

Table 4. Status of wildlife and fish consumption in different village

| Parameter                         | Status          | Villages (Households) |            |               |             |           |           |              | TOTAL (%)   |
|-----------------------------------|-----------------|-----------------------|------------|---------------|-------------|-----------|-----------|--------------|-------------|
|                                   |                 | Le-daung-ya           | Tamok-chon | Kan-ma-hlaing | Shan-in-daw | Yebyu     | Thein kun | Chaung-la-mu |             |
| Wildlife Consumption              | Yes             | 7 (36.8%)             | 11 (57.9%) | 7 (58.3%)     | 7 (50.0%)   | 4 (66.7%) | 5 (71.4%) | 4 (57.1%)    | 45 (53.6 %) |
|                                   | No              | 12                    | 8          | 5             | 7           | 2         | 2         | 3            | 39 (46.4%)  |
| Wildlife Consumption frequency    | One time        | 3                     | 3          | 4             | 5           | 2         | 3         | -            | 20 (44.4%)  |
|                                   | Two time        | 4                     | 3          | 2             | -           | 1         | 1         | 2            | 13 (28.9 %) |
|                                   | Over three time | -                     | 5          | 1             | 2           | 1         | 1         | 2            | 12 (26.7%)  |
| Household consumption expenditure | Mean ± SD       | 0.20                  | 0.30       | 0.24          | 0.31        | 0.16      | 0.3       | 0.34         | 0.27        |
|                                   | (kg/capita)     | ±0.10                 | ± 0.14     | ± 0.10        | ± 0.05      | ± 0.04    | 6± 0.11   | ± 0.09       | ± 0.07      |
| Source of wild consumption        | Buy             | 3                     | 4          | 1             | 5           | 3         | 3         | 1            | 20 (39.2%)  |
|                                   | Hunting         | 4                     | 7          | 8             | 6           | 1         | 2         | 3            | 31 (60.8%)  |
| Most wildlife consumption season  | Wet season      | 6                     | 10         | 11            | 8           | 3         | 3         | 4            | 45 (68.2%)  |
|                                   | Cool-dry season | 2                     | 4          | -             | 1           | 2         | 1         | 2            | 12 (18.2%)  |
|                                   | Hot-dry season  | 4                     | -          | 1             | 2           | -         | 1         | 1            | 9 (13.6%)   |
| Fish consumption frequency        | One time        | 4                     | -          | -             | -           | -         | -         | -            | 4 (4.8%)    |
|                                   | Two time        | 3                     | 4          | 3             | -           | -         | 1         | -            | 11 (13.1%)  |
|                                   | Over three time | 11                    | 15         | 9             | 14          | 5         | 5         | 7            | 66 (78.6%)  |
|                                   | No eaten        | 1                     | -          | -             | -           | 1         | 1         | -            | 3 (3.6%)    |
| Kind of Fish                      | Freshwater fish | 9                     | 15         | 6             | 6           | 5         | 6         | 2            | 49 (58.3%)  |
|                                   | Marine fish     | 10                    | 12         | 10            | 9           | 2         | 3         | 6            | 52 (61.9%)  |

Table 5. Threats of wildlife in different village

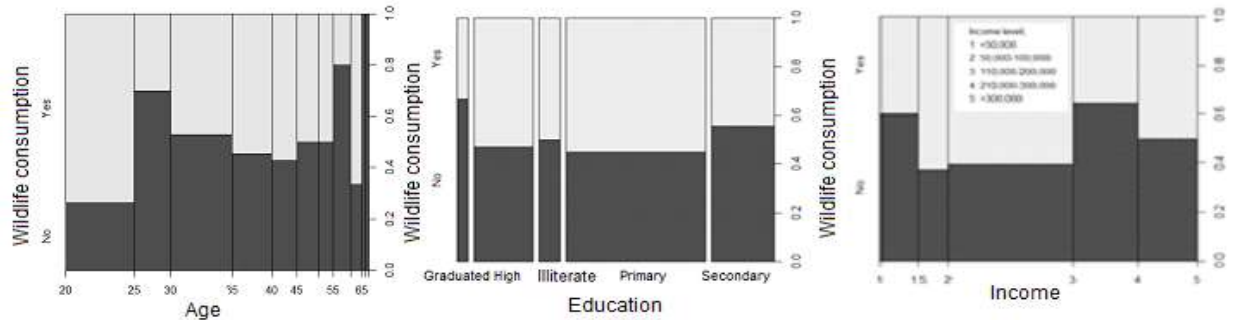
| Parameter  | Status                         | Villages (Household) |    |     |    |   |    |           | TOTAL (%)   |
|--|--------------------------------|----------------------|----|-----|----|---|----|-----------|-------------|
|  |                                | I                    | II | III | IV | V | VI | VII       |             |
| Wildlife species involved in consumption                                 | Eurasian Wild Pig              | 5                    | 6  | 7   | 5  | 1 | 5  | 3         | 32 (37.2%)  |
|  | Sambar                         | 3                    | 6  | 1   | 2  | 2 | 2  | 2         | 18 (20.9 %) |
|  | Red Muntjac                    | 1                    | 4  | 1   | 3  | 4 | 1  | 2         | 16 (18.6 %) |
|  | Greater Oriental Chevrotain    | -                    | -  | 1   | 1  | 2 |    | 1         | 5 (5.8 %)   |
|  | Jungle cat                     | -                    | -  | -   |    |   |    | 1         | 1 (1.2 %)   |
|  | Asiatic Brush-tailed Porcupine | -                    | 2  | -   |    |   |    |           | 2 (2.3 %)   |
|  | Dasky Langur                   | -                    | 2  | 1   |    |   |    | 2         | 5 (5.8 %)   |
|  | Eastern Mole                   | -                    | -  | 1   |    |   |    |           | 1 (1.2 %)   |
|  | Asiatic Soft shell Turtle      | -                    | 1  | -   |    |   |    |           | 1 (1.2 %)   |
|  | Red Jangle fowl                | 1                    | -  | -   | 1  |   | 1  | 1         | 4 (4.7 %)   |
| Eagle  |                                |                      | 1  |     |    |   |    | 1 (1.2 %) |             |
| Wildlife species involved in disturbance to agriculture land & livestock | Eurasian Wild Pig              | 1                    | 3  | 1   | 2  | 1 | -  | -         | 8 (5.2 %)   |
|  | Sambar                         | -                    | -  | -   | -  | 1 | -  | -         | 1 (0.6 %)   |
|  | Red Muntjac                    | 1                    | -  | -   | -  | 1 | -  | -         | 2 (1.3 %)   |
|  | Jungle cat                     |                      |    |     |    | 1 | -  | -         | 1 (0.6 %)   |
|  | Asiatic Brush-tailed Porcupine | 3                    | 12 | 11  | 8  | 3 | -  | 2         | 39 (25.3 %) |
|  | Squirrel                       | 13                   | 16 | 12  | 14 | 5 | 6  | 6         | 72 (46.8 %) |
|  | Bamboo rat                     | 2                    | 7  | 5   | 8  | 1 | 2  | 3         | 28 (18.2 %) |
|  | Mongoose                       | -                    | 1  | -   | -  | - | -  | -         | 1 (0.6 %)   |
|  | Eastern Mole                   | -                    | -  | -   | -  | 1 | -  | -         | 1 (0.6 %)   |
|  | Elephant                       | -                    | -  | -   | 1  | - | -  | -         | 1 (0.6 %)   |
| Awareness of household on wildlife depletion                             | Habitat loss                   | 13                   | 15 | 11  | 11 | 5 | 6  | 4         | 65 (63.7 %) |
|  | Hunting pressure               | 10                   | 7  | 1   | 6  | 3 | 4  | 6         | 37 (36.3 %) |
| Presence of wildlife buyers from neighbor villages                       | Yes                            | 3                    | 8  | 7   | 9  | 2 | 1  | 7         | 37 (72.5 %) |
|  | No                             | 2                    | 1  | 5   | 2  | 1 | 1  | 2         | 14 (27.5 %) |
| Hunting methods  | Snare                          | 2                    | 4  | 3   | 4  | 2 | 2  | 2         | 19 (76.0%)  |
|  | Gun                            | -                    | 2  |     | 1  | 1 | 1  | 1         | 6 (24.0%)   |

\*\*Note: Le daung ya (I), Tamok-chon (II), Kan ma haling (III), Shan-in-daw (IV), Yebyu (V),  
Thein kun (VI), Chaung-la-mu (VII)

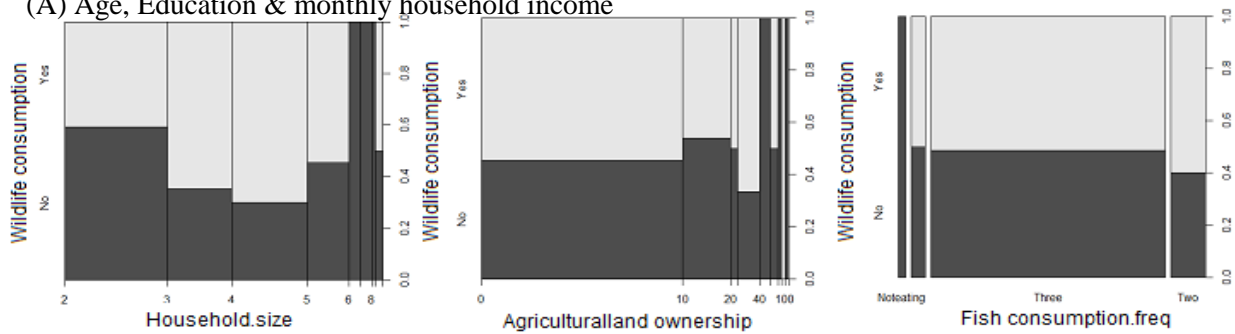
Table 6. Comparative local price of some wildlife species selling in different village

| Species                         | Villages (Kyats/viss) |               |               |               |             |             |                      |
|---------------------------------|-----------------------|---------------|---------------|---------------|-------------|-------------|----------------------|
|                                 | Le-daungya            | Tamok-chon    | Kan-ma-hlaing | Shan-in-daw   | Yebyu       | Thein-kun   | Chaung-la-mu         |
| <i>Sus scrofa</i>               | 5,000-8,000           | 5,000-6,000   | 4,500-5,000   | 4,000-5,000   | 5,000       | 4,000-6,000 | 4,500-7,000          |
| <i>Rusa unicolor</i>            | 9,000-10,000          | 6,000-9,000   | 6,000-8,000   | 5,000-8,000   | 8,000       | 6,000       | 5,000-9,000          |
| <i>Muntiacus muntjak</i>        | 5,000                 |               | 5,000         | 5000          | 5,500-7,500 |             | 5,000-9,000          |
| <i>Capricornis sumatraensis</i> |                       | 4,000-5,000   | 3,000-5,000   | 4,000-5,000   | 5,000       |             | 3,000-6,000          |
| <i>Trachypithecus obscurus</i>  |                       | 20,000/animal |               | 15,000/animal |             |             | 10,000-15,000/animal |
| <i>Felis chaus</i>              |                       | 3,000         | 3,000         | 5,000         |             |             | 3,000                |
| <i>Atherurus macrourus</i>      |                       | 5,000-6,000   | 3,000-4,000   | 5,000         |             |             | 3,500-5,000          |
| <i>Talpa micrura</i>            |                       |               |               |               |             |             | 8,000                |
| <i>Amyda cartilaginea</i>       |                       |               |               | 4,000         |             |             |                      |
| <i>Gallus gallus</i>            |                       |               |               | 4,000         |             |             |                      |

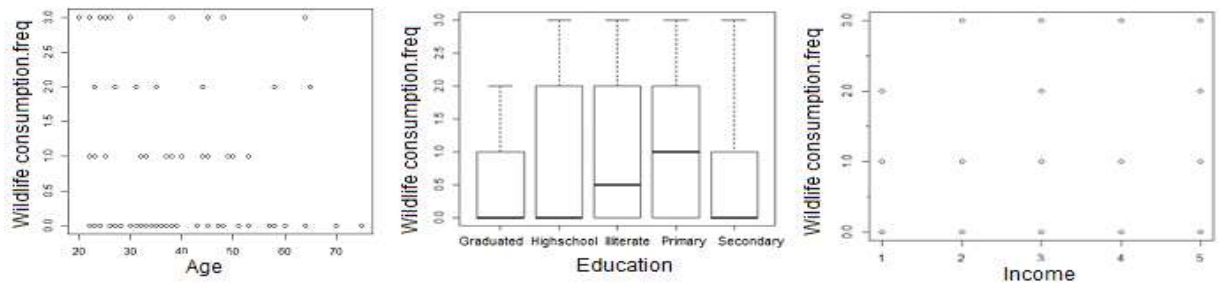




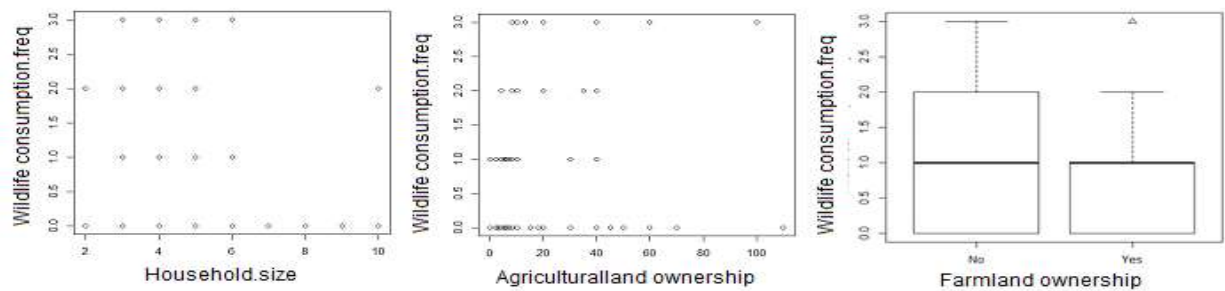
(A) Age, Education & monthly household income



(B) Household size, Agricultural-land ownership & Fish consumption frequency



(C) Age, Education & Income



(D) Household size, Agricultural land ownership & Farmland ownership

Fig.2 Association of wildlife consumption and consumption frequency with demographic and socioeconomic parameters of households

**Impacts and threats of wildlife animals**

In the present records, a total of 10 species were in disturbance on agriculture land & livestock of local peoples. Among them, three of species were mostly recorded *viz.* squirrels 46.8%, porcupine (25.3%) and rats (18.2%) and followed by some species with a small percentage of disturbances in the study area. According to the information of personal communication with local people noted that the impacts of porcupine was mostly between Le daung ya and Kan ma haling villages among villages. The disturbance of that species was reduced through from Shan-in-daw and other studied villages. The disturbance of wild

elephants in agriculture lands were in Shan-in-daw village. Most of the households used snare for hunting wildlife animals. Few percentage of households used gun for hunting. Also they used active hunting by dogs tracking the sense of animals and opportunistic hunting in their agricultural lands (Appendix IV). The market prices of recorded wildlife species was varied among the villages. The highest price of wildlife species was Dasky Langur *Trachypithecus obscurus* by a ranged of value 10,000 - 20,000 kyats/ animal as compare as other wildlife species in the study villages (Table 6).

### **Association of wildlife consumption with demographic and socioeconomic attitudes**

Regarding to the association of wildlife consumption with the different demographic and socioeconomic attitudes of household's head, most frequency of wildlife consumption was recorded of the ranged of household's head (20-30 years of age). The consumption was staidly decreased to older age of household's head. Especially, high school and primary education level of households was mostly on wildlife bushmeat consumption in the diets. Incomes of households have an important influence on the frequency of bushmeat consumption, but not with family size. The families earned within 50,000-200,000 kyats per month income, mostly consumed in wildlife meat and followed by that of family income > 300,000 kyats and 210,000-300,000 kyats. The few households of lower income (<50,000 kyats) consumed wild meat. The frequency of wildlife consumption was negative relative with fish consumption of the households (Fig. 2).

### **Conservation and population status of recorded wildlife consumed in the study area**

As the conservation status of the recorded wildlife fauna which were consumed in the study area with the reference of IUCN Red List (2016), four species Sambar, Binturong, Asiatic Soft-shell Turtle and Pig-tailed Macaque were listed as Vulnerable (VUL); one species Dasky Langur, was listed as Near threatened (NT) and nine species such as Eurasian Wild Pig, Red Muntjac, Greater Oriental Chevrotain, Jungle Cat, Asiatic Brush-tailed Porcupine, Eastern Mole, Red Jungle fowl, Pallas's Squirrel and Myanmar Striped Squirrel were listed as Least concern (LC) in IUCN red list. Of the recorded species, Dasky Langur, Jungle Cat, Pig-tailed Macaque, Asian Soft-shell Turtle were listed in Appendix II and Binturong was listed in Appendix III of CITES.

### **Discussion**

The present study deals with the household surveys used to identify the group of household wildlife consumption across seven villages covering Taninthayi Township, Myeik District. During the survey, a total of 84 respondents were interviewed and data collected through door-to-door interviews using a structured questionnaire standard frame. The results showed that there were 11 species of wildlife involved in the household consumption including nine species of mammals, two species of birds, one species of reptiles. Many of them were species listed on IUCN Red Lists Data Book and Appendices I, II & III of CITES, also on Myanmar Wildlife Protection list (1994).

According to Nasi *et al.* (2008) noted that increases in human population density generally lead to increased pressure on bushmeat resources. Based on the result of present survey, more than 53 % of households (96% of family members) had consumed wildlife within the study period. And a total of six households in three villages such as Tamok-chon, Kan-ma-hlaing and Shan-in-daw villages were exploited wildlife species as alive keeping as pets. The present survey investigated that a total of 60.8 % of wildlife harvest being directed by local people from all villages to subsistence their family consumption and not for sale. The consumption was highest in Thein chon village and followed by Yebyu, Kan-ma-hlaing, Tamok-chon, Chaung-la-mu, Shan-in-daw and Le-daung-ya, respectively. The households in

settlements close to harvestable wildlife populations consume significantly more bushmeat than those households farther away. The effect was variables on the demand for wildlife consumption among local people.

The present study analyzed with the household monetary income and household consumption of wildlife. The result found that the association between higher income groups and consumption of wildlife was related to occupation rather than either family size. The consumption rate was less in the lower income families, extreme poverty. They cannot afford the equipment necessary to hunt meat nor the disposable income necessary to purchase because there are relatively few alternative sources for monthly income. It suggests that family income was positively correlated to wild meat consumption amongst local consumers.

The age of the household head and education were significantly relationship with the wildlife consumption. Therefore, the result highlights the need to use education to encourage local people to stop consuming illegal wildlife products. According to the result of multiple regressions analysis was used to estimate the association between wildlife consumption and monetary income and farmland ownership of each household. The results found the households who possessed a small farmland (acres) in size for agriculture as the main occupation. It suggested that wildlife consumption bore a positive association with the level of household wealth. Food consumption typically reflects the role of both income and wealth, or temporary and permanent income (Deaton, 1997).

In addition, fish consumption was positive impact on wildlife consumption. The people consumed fish by most frequency in their diet who had less consumption on wild meat in their diet. Some species with a large volume of hunting pressure in all villages. Especially, the meat of wild pig and deer species are species commonly eaten in the study area. Among these species, the price of Sambar meat was slightly more than Red Muntjac and followed by Wild Pig. The price of bush meat relatively increased at the place where was with few hunting activities and distances from hunting areas, as increase with proximity to urban areas. Thus, the geographic location also played a role in how wildlife was used in the region. The consumption of wild meat is sensitive to the price of meat from livestock and fish, their consumption rate curtail. Most of wildlife consumption was done by self-hunting activities (60.8%) in all villages.

Suppose to the previous literatures, hunting wildlife for human consumption is considered one of the major threats to biodiversity conservation (Milner-Gulland *et al.* 2003). In addition, overhunting has led to the local and/or global extinction of many species (Bennett, 2002, Jerolimski & Peres 2003). In addition, forest degradation in the natural environment as agricultural area expansion and urbanization are major threats to the biodiversity in the study area environs that lead to be loss of natural habitats for wildlife animals and consequently conflict between wild animals and local people. Because of some wildlife species invaded into the agricultural land of the local peoples. It might be due to the loss of natural habitats for wildlife animals.

Indeed, the present survey highlights the threats caused by anthropogenic impacts as deforestation for agricultural expansion and poaching activities lead to decrease many of wildlife species for the population and distribution in their terrestrial ecosystems. The conservation measures should be widely considered in the future diversity implementation and management strategies.

### Conclusion and Recommendation

The concluded findings of the study are as follows:

1. A total of 11 species of wildlife fauna including 8 species of mammals, one species of reptile and two species of birds were involved in wildlife consumption of households in seven villages during the hot dry season.
2. Bushmeat consumption was the greatest exploitation in the study area than other exploitation purposes. The most consumption species was *Sus scrofa* and followed by *Cervus unicolor*, *Muntiacus muntjak* and some species were lower percentage of consumption.
3. Most of the wildlife species are under considerable pressure by the anthropogenic impacts as habitat loss, hunting and butchering activities should be considered. The adequate seasonal measures for its regulation are also required for future local conservation planning and managements in the future.

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### References

- Bennett, E. L., 2002. Is there a link between wild meat and food security? *Conservation Biology*. **16** (3): 590-592.
- Deaton, A., 1997. *The analysis of household surveys: a microeconomic approach to development policy*. Baltimore: Johns Hopkins University Press.
- Francis, C. M., 2008. *A Field Guide to the Mammals of Thailand and South-East Asia*. Asia Books Co. Ltd., Bangkok.
- Jerozolinski, A., Peres, C. A., 2003. Bringing home the biggest bacon: a cross-site analysis of the structure of hunter-kill profiles in Neo-tropical forests. *Biol. Conserv.* **111**:415-425.
- Milner-Gulland E. J., Bennett, E. L., SAMWM Group, 2003. Wild meat: the bigger picture. *Trends Ecol. Evol.* **18**:351-357.
- Nasi, R., Brown, D., Wilkie, D., Bennett, E., Tutin, C., van Tol, G. and Christophersen, T., 2008. *Conservation and use of wildlife based resources: the bushmeat crisis*. CBD Technical Series 33. Secretariat of the Convention on Biological Diversity, Montreal, Canada, and Center for International Forestry Research, Bogor, Indonesia.
- Parr, J. W. K., 2003. *A Guide to the Large Mammals of Thailand*. Sarakadee Press, Thailand.
- Parr, J. W. K., and Tin Than, Undated. *Large Mammals of Myanmar*. Stars Empire Printing Service, Yangon.
- Rabinowitz, A., 1993. *Wildlife Field Research and Conservation Training Manual*. Paul-Art Press Inc., New York.
- Robson, C., 2008. *Field guide to the birds of Southeast Asia and Thailand*, New Holland. Publishers Ltd.UK.
- Tim, R. G., and Inskipp, C., 1999. *Birds of India, Pakistan, Nepal, Bangladesh, Bhutan, Sri Lanka and the Maldives*.
- Tun Yin, 1967. *Wild Animals of Burma*. Rangoon.
- Win Maung and Win Ko Ko, 2002. *Turtles and Tortoises of Myanmar*.