
# Combating illegal trade of scaly giants through community participation in Manipur, India

**Final report submitted**

**To**

**Rufford Small Grant Foundation**

**By**

**Principal Investigator**

**Dr Janmejay Sethy**

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**Summary**

'Pangolin' which means 'rolling ball' (in Malay) is one of the most solitary, secretive and rare species to be observed in the wild. All species of pangolin found on the planet are either categorized as Endangered or critically endangered by IUCN owing to the large number of illegal trade and poaching cases across their home range making it the most illegal trafficked mammal in the world. Chinese pangolin (*Manis pentadactyla*) once distributed throughout Southeast Asia is currently limited to few countries due to traditional medicine usages, meat considered to be a delicacy and high income value and in India it is only found towards the North-eastern part. As evident that interaction with species, fundamental values and knowledge about the species greatly influence human attitudes towards wildlife conservation, the study was focused on determining the distribution and trade of Chinese Pangolin (CP) in the state of Manipur, India. General hunting patterns and trends were also studied in Ukhrul and Tamenglong district of Manipur for greater understanding of drivers and methods for hunting in the region. Standard ecological methods, questionnaire surveys accompanied with modern software like QGIS and SPSS were used for the study.

A total 137 respondents were interviewed for understanding the perception of local community, trends and threats of Chinese pangolin in the region. Respondents comprised of 113 males and 24 females, of which 65% had sighted a pangolin > once, 19% only once and 16% had never seen. The best time of sighting a pangolin was at dusk (47 %) and during the summer season (52.6%). Various tools and techniques were used for hunting pangolin ranging from digging of burrows (45.5%), traps (30.7%) and hunting dogs (0.5%), etc. Population of CP in Ukhrul was found to have a declining trend as 85.4% have confirmed a sharp decline in its population. For understanding the general trends in hunting a total of 51 questionnaires were carried out in interview format. Hunter's population in the study area was found to be as 64.7% active and 35.3% as former hunters. The main drivers for hunting in the region was meat source (82.4%) followed by hobby (31.4%), source of income (25.5%), medicine (9.8%), etc. Several animals were hunted for different medicinal purposes such as skin disease, high blood pressure, kidney stones etc. Preferred hunting season was reported to be winter (40%) as farming related activity was low in that time. The average distance travelled for a hunt was 15.2 Km (±1.83). The average frequency of hunting was found to be 9 times per month (±0.80=SE, 5.64=SD) but it differed between village. No significant drift was observed in hunting frequency between Tangkul and Rengma tribe. An average of 4.2 days (±0.43=SE, 3.08=SD), were spent on a single hunt with Kartoos (single barrel

12 bore hunting rifle) being the major weapon (94.1%) used during hunts. Conservation attitude and perception of local communities towards Chinese pangolin shows that 77.4% of locals supported conservation of the species, suggesting a ban on sale and trade of scales as a preventive measure. Most of the respondents were positive towards conservation and protection of species because of recent decline in the population but also mentioned hunting of species as an alternative source of income in the area. Thus, establishment of multi-level government framework is suggested to fill the gap between national and international policy and grass-root level governance and conservation of the species.

## 1. Introduction

The word pangolin is a Malayan phrase which means 'rolling ball'. Pangolins are generally very elusive, nocturnal, solitary and burrowing animals (Gaubert, 2011). Across the globe, there are eight species of pangolin *namely* Chinese/ Formosan pangolin (*Manis pentadactyla*) (Critically Endangered), Malayan or Sunda pangolin (*Manis javanica*) (Critically Endangered), Indian or thick tailed pangolin (*Manis crassicaudata*) (Endangered), Palawan or Philippine pangolin (*Manis culionensis*), (Endangered), African- Tree or African White bellied Pangolin (*Phataginus tricuspis*), (Vulnerable), Giant ground pangolin (*Smutsia gigantea*), (Vulnerable), Cape or Temminck's ground pangolin (*Manis temminckii*), (Vulnerable), Long tailed or Black bellied pangolin (*Uromanis tetradactyla*), (Vulnerable), of which four species are found in Africa and four species in the Asian sub-continent (IUCN, 2015). In India, two species on pangolin are found *i.e.* The Indian pangolin (*Manis crassicaudata*) and the Chinese pangolin (*Manis pentadactyla*). Among all the pangolin species distributed in Africa and Asia, Balck bellied pangolin is the smallest measuring 80 cm including their tail and Giant ground pangolin is the largest pangolin measuring 1.8m. Most species of pangolin are categorized as a critically endangered, Endangered and Vulnerable species by the International Union for Conservation of Nature (IUCN), owing to its high number of illegal trading and poaching cases across the globe as it is the most illegally trafficked mammals in the world.

Chinese pangolin (*Manis pentadactyla* Linnaeus, 1758), is a mammalian species belonging to the monotypic Order: Pholidota, Family: Manidae and Genus: Manis (IUCN, 2015). The term Pholidota is derived from a Greek word which means 'scaled animals'. Chinese pangolin is carnivorous and stenophagy in nature feeding only on several species of ants and termites. It is listed as critically endangered in International Union for Conservation of Nature (IUCN) and also as Appendix I species of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) due to rapid decline in population (CITES, 2016; (IUCN, 2014). Once abundant in several parts of Africa and South-east Asia like Taiwan, Hainan, Hong Kong, Southern China, Himalayan foothills of Eastern India, Eastern Nepal, Bhutan, north-eastern Bangladesh, Myanmar, Northern Lao PDR, Northern and Central Vietnam and in northern and northeastern Thailand, currently its population is limited to few countries such as Nepal, Bhutan, Vietnam, Myanmar, Northern Lao and North-east India (Nijman et al., 2016; Baillie et al., 2014; Mohapatra et al., 2015; Challender et al., 2014; Challender and Hywood., 2012). In India, the species has been recorded from northeastern India in Arunachal Pradesh, Assam, Meghalaya,

Nagaland, Manipur, Tripura, Mizoram, Sikkim and the northern parts of West Bengal (Srinivasulu and Srinivasulu 2012; Tikader 1983; Zoological Society of India, 2002).

Descriptively, an adult Chinese pangolin weighs about 2-7 kg, very long claws with a body length of 54-80 cm and tail length of 26-34cm and scale colour of yellow to brown. Pangolin are one the most unique mammals feeding on ants and termites with their long sticky tongue as they lack teeth. Pangolin usualy breed during spring season and gives birth to a single off-spring at a time. Due to low reproductive rate and poor self-defense pangolins require strict and reclusive habitat (Wu *et al*., 2004). Chinese Pangolins can be found in different habitats such as the primary and secondary tropical forests, bamboo forests, limestone forests, broadleaf forests, coniferous forests, agricultural fields and grasslands (Mohapatra et al., 2015; Katuwal *et al*., 2015).

Pangolin's play an important ecological role in maintaining termite and ant population in different ecosystems. They are important as they keep away termites and protect plants, help in aeration of soil and increases soil fertility. Abandoned burrows can also be used by other animals like snakes, rats for their shelter (Roberts, 1997; Fairhead et al., 2003). However, conservation practices and monitoring of species has been hampered remarkably due to lack of information on their distribution, habitat preference and current status. The species may have been locally extinct from many parts of its current home range, because of high level of historical exploitation but the limits of extinction cannot be known. Rapid decline has been noted in Chinese Pangolin population in the recent decade largely due to poaching, hunting, trade in global market and also habitat destruction (Challender et al., 2014). The main reason for poaching and trade is due to high value of pangolin scales since it is use in traditional medicine and also because pangolin meat in many countries is considered as a delicacy (Newton et al., 2008). Despite National and international laws and policies for conservation of pangolin (WPA, 1972, CITES etc.) yet they are widely exploited mainly for local consumption use and international trade of pangolin scales and remain a species of concern that requires urgent fortification measures in all its home ranges (Baillie et al., 2014).

Biodiversity has depleted severely in the Asian tropical forests due to high rate of hunting owing to high demand and low supply of domesticated meat sources. Sharp trends in hunting of animals is also contributed to the market value of wildlife products that has escalated in recent times and serving as excellent sources of income in low land trible areas (Bennett et al., 2002, Fa et al., 2002; Corlett, 2007; Robinson et al., 2004; Sterling et al., 2006). Development of infrastructure and roadways near forest areas have also led to easily accessible and increasing in number of hunting cases as they can easily sell the hunted meat in local markets. Generally in places where human settlements are close to wildlife reserves, conservation of wildlife depends largely on attitude of

people towards wild species (Kellert et al., 1996; Mishra, 1997; Shelley et al., 2012). Interaction with species, fundamental values and knowledge about the species greataly influence human attitudes towards wildlife (Kellert, 1991; Kaltenborn and Bjerke, 2002; Vaske et al., 2009). Hunting of wild animals for sport or custom also forms beliefs regarding preservation and utility of wildlife leading to a banned on hunting of animals particularly during gastrulation period (Parry and Campbell, 1992).

People perceive wildlife as intolerable when human–wildlife interactions results in death, physical injury or economic loss due to material and crop damage (Chhangani and Mohnot, 2004). Mitigation of ecological and economic problems where hunting is prevalent requires information and understanding of hunting patterns and factors that drive hunting (Bennett et al., 2000). Studies and information on hunting is very low in Asia and are mainly focused on trade (Banks et al., 2006; Corlett, 2007). In India knowledge of indigenous hunting is even lower, even though many communities across the country particularly in North-east India practice wildlife protection as a tradition (Rangarajan, 2001; Datta, 2007). Hence, the focus of this study is mainly on the distribution, as well as hunting and trade of Chinese Pangolin in Ukhrul and Tamenglong district of Manipur state in India which lies in the north-eastern part and is a biodiversity hotspot. Since there are no studies on the amount of hunting in the area, the study also tries to understand hunting patterns, trends and factors that generally drive hunting in the area.

### 1.1 Pangolin hunting, trade and perception

Pangolins have been hunted historically as a meat source and also for traditional medicines and others uses such as spiritual and ritualistic at local levels (Anon. 1992, CITES 2000). Based on CITES and customs data pangolins have been traded internationally mainly for their scales, skin and traditional medicine made from their scales mainly after 1950's (Broad *et al.* 1988; Zhang et al. 2008). High level of unrecorded illegal international trade of live pangolins and pangolin body parts has occurred between China and Southeast Asia (Li and Li 1998, Newton *et al.* 2008, Wu and Ma 2007), mainly after 1995 following the commercial extinction of pangolins in China (SATCM 1996). CITES has introduced a zero export quota for wild-caught pangolins which are mainly traded for commercial purposes still trade continues due to high market demands in China, mainly live animals and scales are exported illegally from Southeast and South Asia in spite of a number of national and international laws (Challender 2011, Challender *et al.* 2014, Wu and Ma 2007). Pangolins are still used locally but evidence suggests that local use is neglected over selling the animal for trade most of which is used in China (Newton *et al.* 2008). Affluent consumers pay a very high price for consuming Pangolin meat which is considered a delicacy and are served in high end restaurants in China as well as in Viet Nam. Scales of the species is used in Chinese and

Vietnamese traditional medicine system for treatment of various ailments such as skin disease, in lactating women to stimulate milk secretion and to improve blood circulation (Ellis 2005). Through many designated outlets (also hospitals) and also through traditional medicine retailers (Vietnam) pangolin scales are still prescribed in China for treatment of other disease (Yue 2008). It is largely believed that possessing these scales increases wealth and incomes. Due to this belief in China and in Vietnam the species has been exploited significantly in the last few decades (Challender and Hywood, 2012; Chin and Pantel, 2009). In China scales can be used in Traditional medicine if the scales are from the stock maintained by SFA (State Forestry Administration) and if labelled properly, and can be sold in 700 designated hospitals (CSFA, 2007). Due to decline in this species especially in China to determine whether the scales that are sold today are from the stock maintained by SFA (State Forestry Administration) in China is difficult. It has been found that pangolin scales are sold and traded in the market illegally. 62 % of the TCM retail shops and 35% of TCM markets are found to be selling pangolin scales (Xu et al., 2016). Pangolin has become one of the most illegally traded wildlife transnationally along with elephants, Rhinos and Tigers. Formerly pangolins belong to lesser known taxa and had very little conservation importance. The most significant threat for the conservation of pangolins is recognized as their international trade and domestic trade (less extend) (Sutter, 2016; Actman, 2016). Poaching for local consumption, hunting, as ingredient in traditional medicine and International trade are the major threat to pangolins in India (Challender et al., 2014; Challender, 2011; Baillie et al., 2014). Pangolin hunting in India has been recorded from different places - Andhra Pradesh, Kerala (Periyar Tiger Reserve), Western Ghats, Mizoram, Tamil Nadu, Tripura, West Bengal Arunachal Pradesh, Orisha and North- Eastern states (Mitra, 1998; Mishra et al., 2011; Gubbi and Linkie, 2012). Chinese Pangolins are protected in most of their range including India but current ongoing trade violates both national and International laws (i.e. Wildlife protection act 1972, CITES)

550 kg of scales was seized on 16th June 2010 from Guwahati International Airport (Sharma, 2014). These were most likely smuggled to Myanmar through Moreh which is in Manipur according to Wildlife Crime control Bureau, India. 85 kg of scales was seized on 17$^{th}$ July 2013 in Guwahati, Assam (Sharma, 2014) which was likely bound to China via Myanmar. However, there is no study on the trade route used for smuggling Pangolin products between India and Myanmar. 5913 kg of Scales and two pangolins were seized between the period of 2009 to 2014 from multiple states in India. Pangolin and pangolin parts were seized from 10 states in India. Highest seizure took place in Manipur (25) followed by Assam and Mizoram (5), Karnataka (3), West Bengal (3) , Uttarakhand (2), Tamil Nadu (2), Karnataka (3), Uttar Pradesh (2), Odisha (1) and Chhattisgarh (1) (Sharma, 2014). Pangolin scales are sold to middlemen from Kolkata,

Chennai and from towns near the border such as Moreh in Manipur, Siliguri in west Bengal, Aizwal in Mizoram and Shillong in Meghalaya, from these places they are smuggled to China through Myanmar and Nepal. The protected status of Asian pangolins in most of their range States, including India, indicates that current trade violates both national regulations, e.g., the *Wildlife (Protection) Act, 1972*, and contravenes CITES where trade is international in nature. Reported seizures involving pangolins occurred in multiple States in India during the six-year period (2009–2014; see Table 1). They comprised more than 5913 kg of scales and two whole pangolins. Seizures took place in 10 States, with the majority taking place in Manipur (25), followed by Assam (5), Mizoram (5), West Bengal (3), Karnataka (3), Tamil Nadu (2), Uttarakhand (2), Uttar Pradesh (2), Chhattisgarh (1) and Odisha (1) (Fig. 3). While pangolin meat is typically consumed or sold in local markets, scales are delivered to middlemen from Kolkata, Chennai and from border towns such as Siliguri in west Bengal, Moreh in Chandel district, Manipur, Shillong in Meghalaya and Aizwal in Mizoram (Sharma, 2014), and from where they are typically destined for China via Myanmar and Nepal. An investigation done by TRAFFIC India in the North Eastern states of Manipur, Mizoram and Tripura indicated that meat and scales of Chinese pangolin are collected regularly from many different areas in the region. These are then sold to Bishnupur, Imphal and Moreh in Manipur. 80% of which is smuggled into Myanmar. It has also been reported to have been supplied into Nepal through Dimapur (Nagaland) (Misra, 2000). Usually local tribes are the main traders in all the states. Middlemen or agents usually are not involved in hunting, they buy the products from the tribal communities in rural areas who are involved in hunting.

Study done by Newton et al. in Vietnam that the Methods used to catch pangolins depended on the site and species. *M. pentadactyla* being mostly terrestrial is hunted more than *M. javanica* which are more arboreal. Ecological study methods and conservation practices can be developed more effectively by applying the knowledge of local hunters. Tracking is used by hunters to locate both species. Diggings used for feeding is the most commonly reported field sign. Pangolin burrows are unmistakable signs since they have uniquely rounded entrance, porcupine use rock crevices and natural holes and burrows of rodents are significantly smaller. These field signs can be used by researchers to confirm occupancy of pangolins. Pangolin diggings and burrows can be used as alternative measure of pangolin density. Territory size, rate of new burrow diggings are required for more accurate results. Relative burrow density has been used by many researchers as population parameters (Bhandari et al, 2014).

There are very few studies done on wild population of Asiatic species (e.g. Wu et al., 2004, Lim & Ng 2008). Study done by Newton et al. found that recording pangolin presence is rarely

successful by using current biodiversity monitoring methods and knowledge of local hunters are mostly used to derive information about pangolin distribution. This research found 4 main methods used by hunters for catching pangolins in the 3 study sites that are as follows: use of hunting dogs, tracking of signs, nonselective traps and pangolin-specific traps.

Pangolins are very elusive and thus hunters use different techniques, when sighted they are usually caught with bare hands, if pangolins are in burrows then digging is used, smoking of burrows, flushing using water, pitfall traps and use of hunting dogs are used to trap and hunt pangolins (Kumara, 2007; Gubbi and Linkie, 2012). The captured animals are killed by using boiling water of by hitting them with a club (Mohanty, 2011), after this the scales are skinned or peeled off (Misra, 2000).

In India despite regulations and legislative protection poaching, hunting of pangolins and illicit trade in pangolin body parts continue to occur, this is having an adverse effect on pangolin population (Baillie et al., 2014). Many tribal communities in India have been using pangolin body parts traditionally, hunting of pangolin for these purpose is now illegal. Despite the legal protection pangolins are still used in traditional ways throughout India (Mitra, 1998). Communities such as *Paaudi Bhuanya* (Odisha), *Biate* (Assam), *Katkaris* (Maharashtra), *Gond* (Madhya Pradesh), *Mizo* ethnic group (Mizoram), and the *Nyishi* and *Galo* tribes (Arunachal Pradesh) still use meat, bile, scales and claws of pangolins. Since very little research is done in India to know the exact population status of pangolin it is hard to determine if these practices are sustainable.

### 1.2 Hunting

Hunting and local perception towards conservation of imporatnt and rare species has always been a controversial issue in different parts of the world. In India it is a major debat on imposing restriction on hunting and at the mean time respecting and protecting the tradition and cultural dignity of the tribal communities who shares the most with forest resources. The following literatures are some of the important articles addressing the problem and searching for an interdisciplinary approach for the same.

Study done by Corlett in 2007 found that in recent decades hunting as a practice for subsistence has been replaced by hunting for income in the South- East Asian Forests. Many large seed disperser mammals have decreased in population due to high rate of hunting while seed predators are hunted less. In the last 5 decades regional population of a number of species has decreased rapidly due to hunting. The study highlights the importance of reducing hunting to increase the

carrying capacity of animals. Immediate reduction in hunting pressure is needed in the tropical and sub-tropical forests of Asia for conservation of threatened and endangered species.

Aiyadurai et al., (2011), a well-crafted research article addresses wildlife hunting and conservation in Northeast India, which is a biodiversity hotspot in the country and at the mean time is also home several tribal communities that have been practicing shifting cultivation and hunting since their ancestral times. Although, the practice of wildlife hunting significant contributes for population decline of several wildlife species it also has a larger socio-cultural link that they shares with Mother Nature. The paper highlights the challenge of conservation drives in the region and also suggests that an integrated anthropological, socio-economic and ecological approach are necessary to be taken up that genuinely respects the integrity of the tribals.

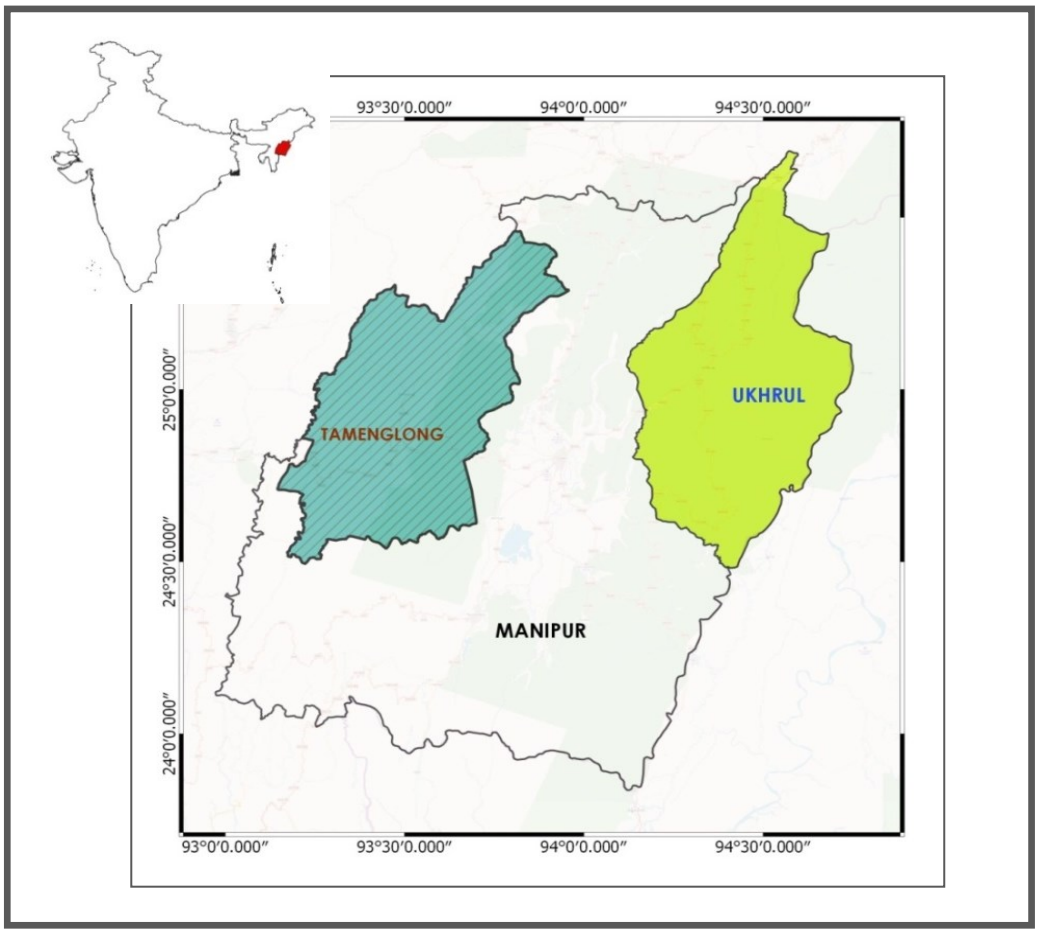
Aiyadurai et al., (2010) in another research article determines and evaluates the different social cultural and economic factors that mold the perception of a hunter towards hunting and conservation of wildlife. She documented the importance of ritualistic hunting by some tribes in additional to estimate off take and consumption rates of wild meat in the region. Factors such as age, religion, education, availability of hunting resources were found to play significant roles in hunting practices. The importance of conservation awareness and community based conservation projects were also highlighted in the paper.

Another imperative work in north-east India was carried out by Naro et al., year in which the lack of limited information available on wildlife and its importance for mankind has been address as prime factor for decline in wildlife population. It also evaluates the past and present reasons cited by hunters for hunting in the region (Nagaland) where respect, culture prestige and preference for wild meat over domesticated meat and therapeutic use of wild animals has been the motivating factor for hunting.

Devi et al., 2013 in her research on attitudes towards primates and primate conservation in Manipur highlights how informant-based surveys of indigenous communities living in and near forest areas proves to yield valuable ecological information about animal distribution and abundances, wildlife declines and change and loss in forest cover over long periods of time. The results from her study indicate the trend that influence attitudes towards hunting animals and wildlife conservation as people in the hilly districts are more likely to go for hunting than those in the valley districts. It also suggests that indigenous tribes on hills views wildlife as an inexhaustible resource that remains unaffected by hunting pressures and only a very nuanced understanding of hunting as a cultural practice can aid in working towards solutions that address this very crucial threat to primate populations in Northeast India.

## 2. Study Area

The state of Manipur, situated in the North-eastern part of the country lies between 23°80' to 25°68' N and long 93°03' and 94°78' E. Manipur is bordered by the states of Nagaland Mizoram and Assam in the North; South-West and West respectively and also shares a 352 kms of international border with Mynamar in the East and South. Its geographic area is about 2.23 million ha which constitutes 0.7% of the total land surface of India. The state of manipur can be broadly divided into two topographical zones *i.e.* The 'Hills' consisting of 5 districts *viz* Chandel, Ukhrul, Tamenglong, Churachandpur, Senapati and the 'Valleys' formed by 4 districts *namely* Imphal east, Imphal west, Bishnupur and Thoubal (Economic Survey of Manipur, 2011). The Valleys regions have sub-tropical to tropical and sub-temperate climate while the hills generally experience a sub-temperate climate with an average altitude of 3000 meters and above.




**Map 1: Map of study Area**

Of the total geographical area, 0.2 million ha constitute for alluvial valley and 2.3 million ha for hill territory. The recorded forest area of the state is 17, 418 km, which is 78.01% of the geographical area of the state. By legal status the state's Reserve forest constitute 8.42%, Protected forest of 23.95% and Un-classified forest 67.63. The Major forest type's occuring in the states are

tropical semi-evergreen, Sub-tropical pine, and Montane wet temperate forests (State Forest Report, 2005). The average rainfall recorded in the state is 1436mm. The state is gifted with rich flora and fauna. There are varieties of trees, flowering plants, orchids of enumerable hues and kinds, epiphetic ferns, varied species of plants and shrubs. The faunal diversity of the state includes elephant, leopard, Bear, Bishon or Mithun, Crested Porcupine and Pangolin, Jungle Cat, Boar, Stag, etc. The primate family such as slow loris and gibbons can be seen in scattered pockets on the hills (Devi and Radhakrishna, 2013).

Manipur is a land of great diversity with combination of different types, castes, customs and tradition that includes the Meiteis, nagas, Kukis and the meiteis pangals. It also has 39 scheduled tribes and 7 scheduled caste (Shimray, 2001). Shifting cultivation is widely practised in the state with about 70% of the population depending on agriculture practices (*Shifting cultivation*) for their livelihood.

Upon preliminary surveys two districts of the state *i.e.* Ukhrul and Tamenglong were selected for undertaking further study **(Map 1)**. Ukhrul district, with a total geographical area of 4,544 $Km^2$ lies between 24°28' and 25°41'N latitudes and 94°45' and 94°80' E longitudes. The district of Ukhrul is divided into four blocks *viz* Chingai, Ukhrul, Kasom Khullen, Kamjong Chasad and Phungyar phaisat (District census handbook, Ukhrul, 2011). Tangkhul Nagas constitute the major bulk of the population while other communities include small percentage of the Kukis, the Nepalese and other Non-tribals (BSMCD, Ukhrul, 2016; Economic Survey of Manipur, 2011).

Tamenglong, the western-most district of Manipur is located at an altitude of 1,290 m and covers about 4,391 $Km^2$. It lies between 24°30'N and 25°27'N latitudes and of 93°10'E and 94°54'E longitudes. The district is bounded by Nagaland in the North, Churachandpur district in the South, Senapati district in the East and in the West by the state of Assam. The district is divided into four blocks namely Tamenglong- Tamai, Tousem, Tamenglong, Nungba.The main tribes of the district are Zeliangrong Nagas (with different sub-tribes- Rongmei, Liangmai, Zeme, and Puimei) and Kukis besides minority Hmars, Chirus and Khasis (BSMCD, Tamenglong, 2016; Economic Survey of Manipur, 2011). The district has a forest cover over 90% its geographical area and has a profound floral and faunal diversity. All the villages where the questionnaire and other field survey were conducted during the study period are listed in Table below;

**Table 1: GPS coordinates and altitude of the villages surveyed.**

| Sl No. | Name of Village | Latitude | Longitude | Altitude |
|---|---|---|---|---|
| | **Ukhrul** | | | |
| 1 | Chingai | 25° 18' 46.78" | 094° 24' 57.75" | 1564m |
| 2 | Khamasom (Khullen) | 25° 11 44. 75" | 094° 30' 01.51" | 1886 m |
| 3 | Khamasom (Phungyar) | 25° 12' 49. 01" | 094° 32' 25.73" | 1488m |
| 4 | Kamjong | 24° 51' 35.15" | 094° 29' 12.25" | 1283m |
| 5 | Yeasom | 24° 41' 27.66" | 094° 10' 12.56" | 1022m |
| 6 | Shiroi | 25° 07' 34.27" | 094° 26' 10.42" | 1941m |
| 7 | Zingsui | 25° 05' 20.11" | 094° 32' 02.51" | 1706m |
| | **Tamenglong** | | | |
| 8 | Bhalok | 24° 58' 36.01" | 093° 33' 23.75" | 750m |
| 9 | Khoulong | 24° 54' 42.67" | 093° 29' 12.23" | 1161m |
| 10 | Old Tamenglong | 24° 58' 30.62" | 093° 31' 33.60" | 1203 |

## 3. Objectives

1. Understanding reasons for hunting pangolin and social-economic status of communities surrounding habitats of pangolin

2. Identify the degree of trading and trade routes in the state

3. Conduct awareness campaigns for community participation to restrain illegal trade of pangolin in the state

## 4. Methodology

For the successful completion of the study different sets of methods were adopted such as ecological survey techniques, questionnaire surveys, hunting trends etc. The methods used are discussed in brief below;

### 4.1 Assessment of conservation threats of Chinese Pangolin and perception of local community.

Threats to pangolin usually comprises of abiotic pressure in the form of hunting, poaching and illegal trading, bush meat and other medicinal uses. Conservation threats was determined through informal consultations on the trade and status of the species with different section of the society such as local forest officials, *Gaon buras* (village heads), former hunters, local communities and

from log books. Following initial questions to collect background demographic information, respondents were shown coloured photographs of different pangolin species to identify the species and their existence in the area. Community-based surveys was conducted in different villages *namely* Shiroi, Zingsui, Khamasom (Khullen), Bhalok, Old Tamenglong and Khoulong. A standard semi-structured questionnaire was used to record the knowledge of locals on pangolin ecology, hunting status, capturing techniques, uses of pangolin parts, trade and conservation issues (Wu et al., 2004; Wu et al., 2002; Nash et al., 2016). The sampling strategy aims to ensure that data would be representative of wider patterns of local knowledge awareness and attitudes for communities around each study site. Only one respondent was interviewed per household to ensure independence of responses; respondents of both genders and any reported occupation was interviewed. Local markets were also visited regularly to gather information on sale and trading of pangolin or its parts.

### 4.2 Assessment of hunting pattern and trends

Snowball sampling technique was followed and semi structured interview format with individual hunters was used to collect data. Different sets of questions were put before the hunters such as: species hunted, number of animals preferred hunting season, purpose of hunting, distances travelled to hunt in past and present, group size of hunters, time of hunting, duration, etc. Villages and households within each village were selected based on information from key informants (village headmen and former hunters). Interviews were conducted with the aid of field assistants who belonged to the tribe and spoke the local dialect. Each interview lasted 30-45 minutes. Pictures were used to confirm the identity of particular species hunted (Aiyadurai et al., 2010).

The questionnaire interview contained questions related to i) household socio-demographics, ii) natural resource use, and iii) awareness of illegal hunting practices, hunting seasons, and legal hunting practices. Respondents were also asked about their perceptions of law enforcement against illegal hunting in the local area.

Information on household characteristics proved unproblematic to gather, while information on illegal hunting proved more sensitive and required some probing and assurances of confidentiality from the interviewer. Despite the assurance of confidentiality, specific non-responses to sensitive questions were observed. The use of a large sample size and inclusion of a wider range of factors to assess awareness were used to increase the strength of the information obtained.

## 5. Result

### 5.1 Understanding reasons for hunting pangolin and social-economic status of communities surrounding habitats of pangolin

For determining the conservation threat and general perception of local communities towards Chinese pangolin, semi-structured questionnaire survey was conducted in 6 villages *i.e.* Chingai, Khamasom (Khullen), Khamjong, Shiroi, Yeasom and Zingsui following a set of predetermined questions. However, due to the request from the headmen (*Gaon buras*), the data from Yeasom are not included in the threat analysis. During the survey, 137 respondents were interviewed comprising of 113 males and 24 females (**Fig. 1**). The respondent consists of various occuppational backgrounds such as farmer, business, teachers, religious job or pastoralism, Govt. sector, students, house wife and others (**Fig. 2**). Highest numbers of respondents were farmers (63.5%), followed by Govt. Job (6.6%), pastoralism (5.1%), others (5.8%). Students were found to be lowest in number, which may be due to the fact that most of the students stays out from villages for study purposes.

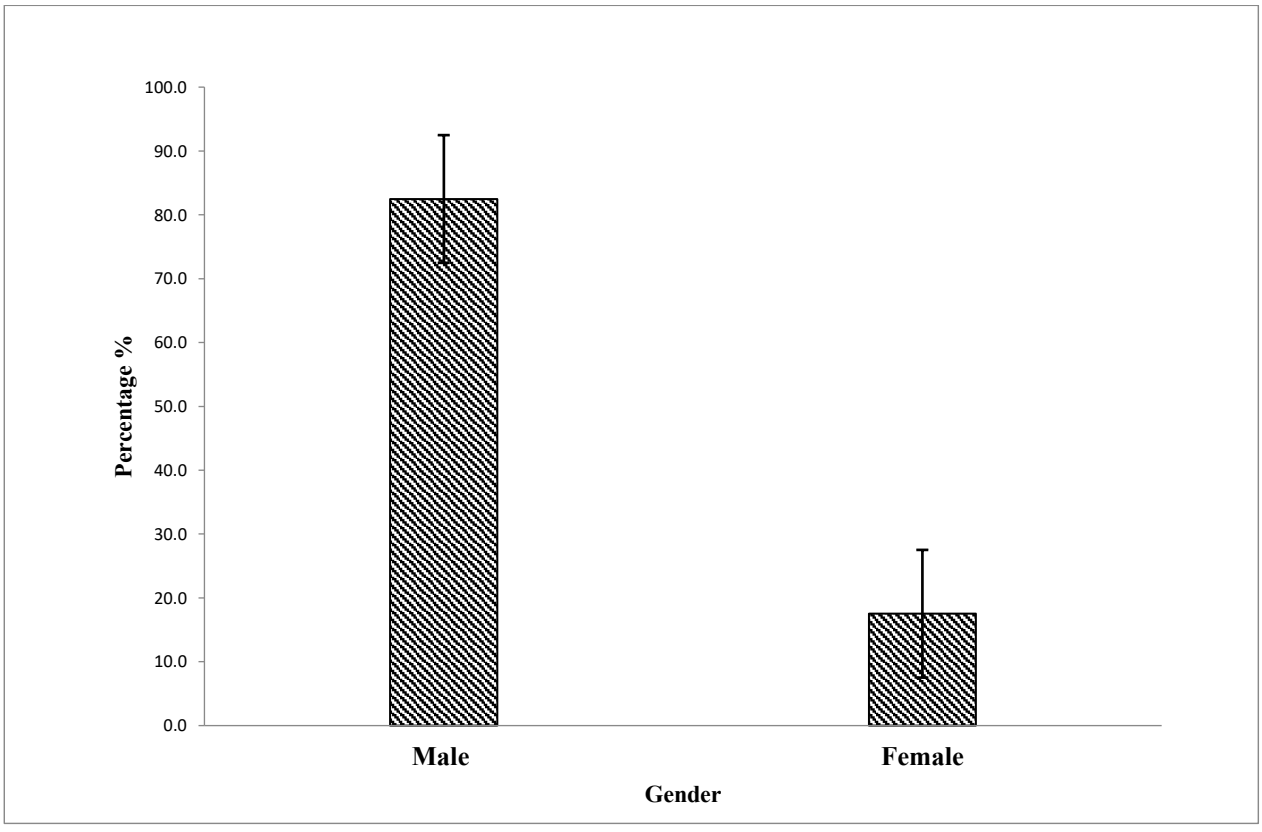



**Figure 1: Gender categorization of respondent**

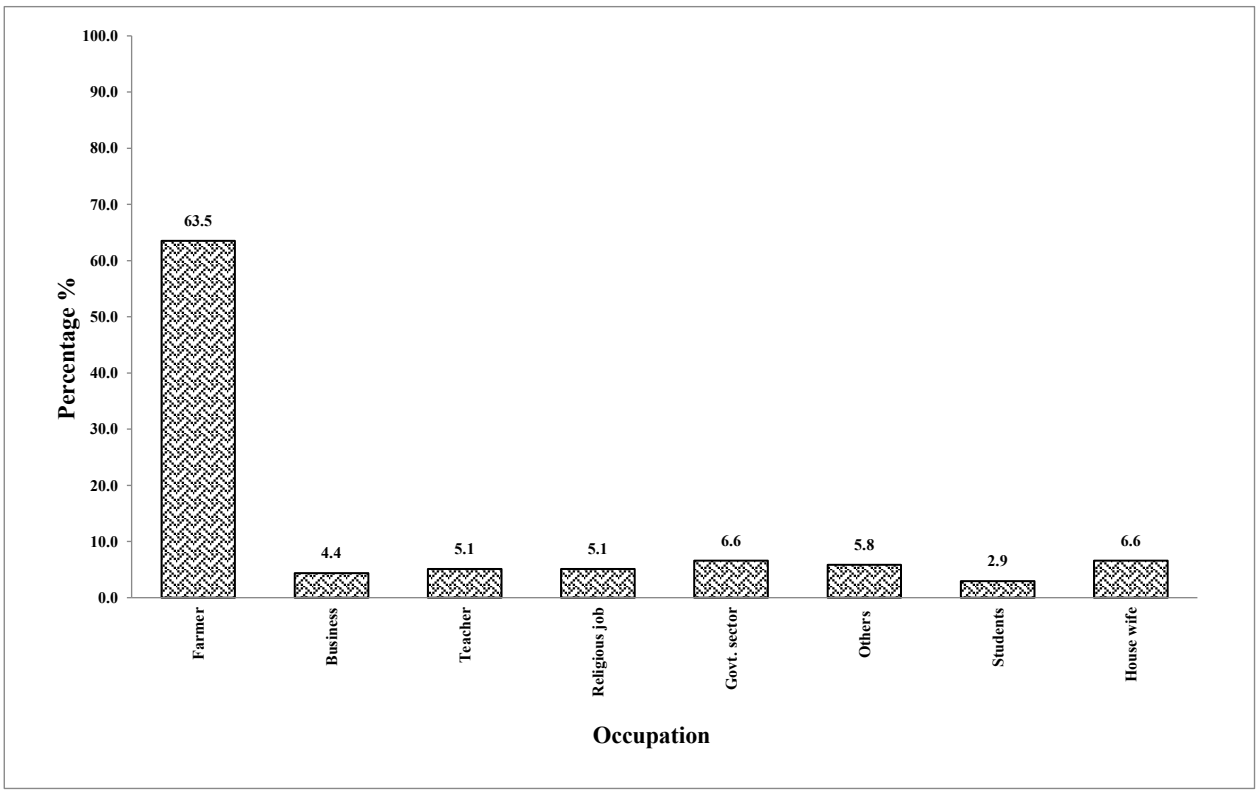



**Figure 2: Occupation of respondent**

The education levels of the respondents were categorized as No (illiterate), basic (up to 5$^{th}$), secondary (6$^{th}$ to 10$^{th}$) and post secondary. 44.5% of persons were found to have studied till secondary level, 35.8% post-secondary followed by basic (16.8%) and illiterate (2.9%) (**Fig. 3**).

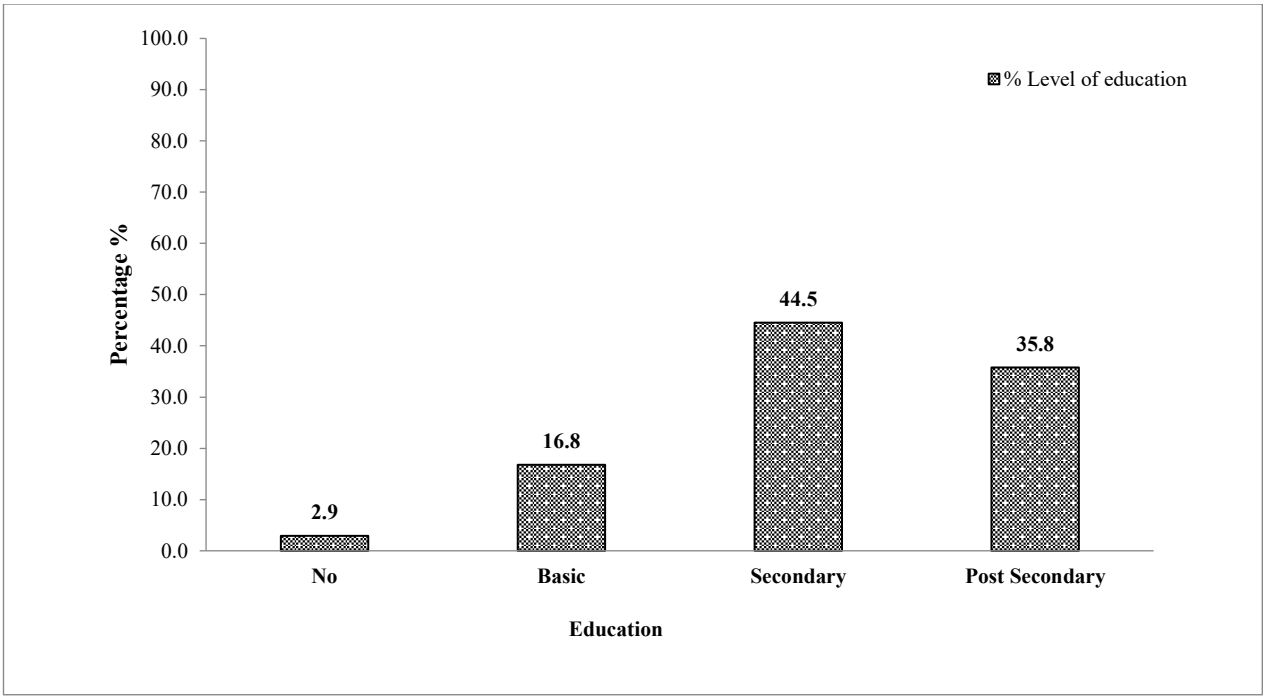



**Figure 3: Education level of respondent**

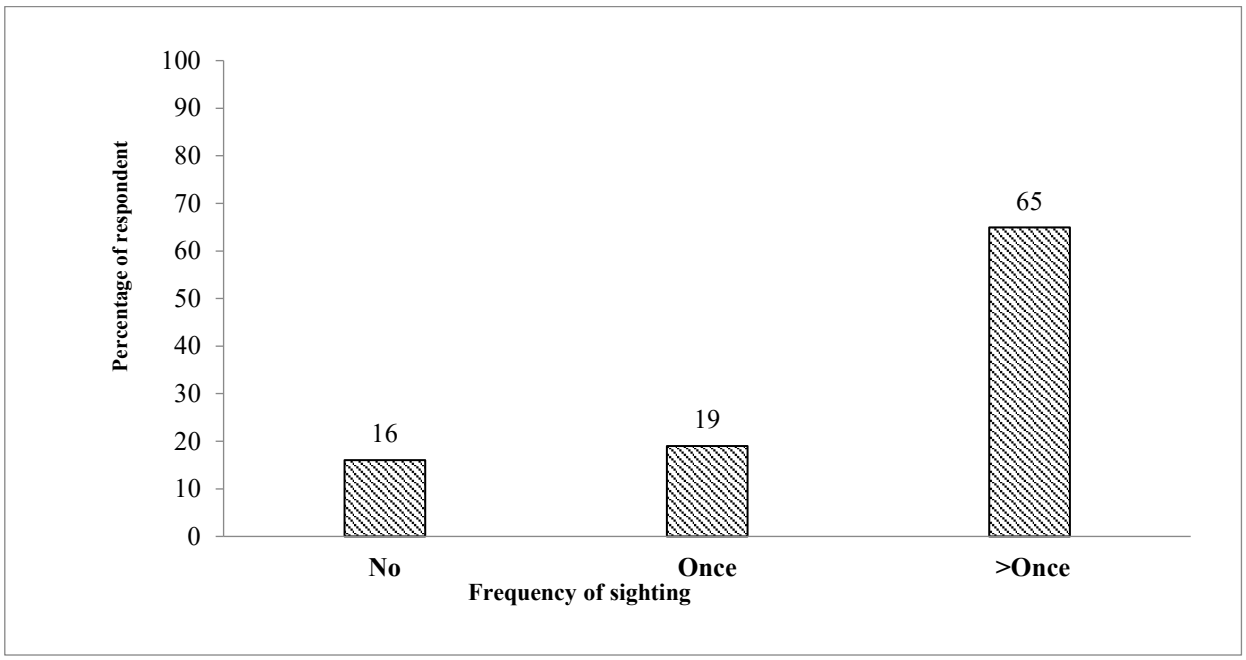



**Figure 4: Frequency of Sighting of Chinese pangolin**

Sighting frequency of Chinese pangolin were found to be more among farmers/ cultivators as they are mostly exposed to forest and out-door activities. During the interview session it was observed that frequency of sighting of pangolin by women was comparatively less and the sighted pangolin were mostly the hunted or trapped once that were brought by hunters to the villages. The pangolins that were sighted during day period, mostly consists of the trapped once. The best season for sighting a pangolin as observed from the interviews was during the summer (52.6%) between March to June, when there is forest fire. 40.1% have considered winters as suitable time to come across a Chinese pangolin while 3.6% have credited rainy seasons as the best time (**Fig. 5**).

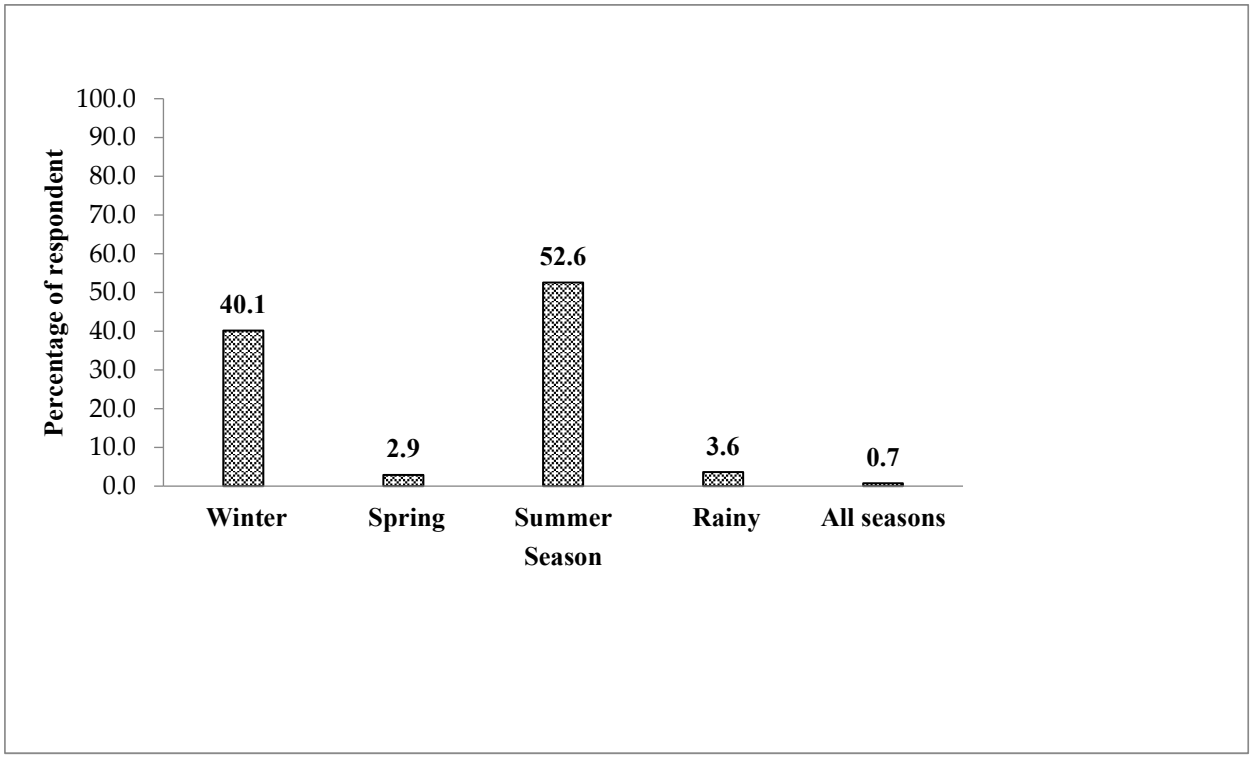



**Figure 5: Season of sighting of Chinese pangolin**

Different types of techniques and tools were found to be used by hunters and locals for hunting pangolins in the region. 45.5% of locals prefers digging of burrows, whereas 30.7% likes to use traps (wooden logs, iron traps etc.) and 0.5% of hunters used hunting dogs while hunting for a pangolin (**Fig. 6**). Digging of burrows usually rewards them a pangolin with their young once while in traps and dogs, only one pangolin is caught at a time.

Population trends of Chinese pangolin in the study area was found to have a decreasing gradient as 85.4% have viewed that pangolin are widely hunted across the district (Ukhrul) leading to a shard decline in its population. According to 13.1%, they don't have any idea or information about the population of pangolin while 1.5% preferred not to comments on the subject (**Fig. 7**). Chinese pangolin is mainly hunted as a source of meat and trade, due to high value; scales are sold to potential buyers. Decline in numbers of pangolin in the region were attributed to the high demand for pangolin scale in local and international market as most of the part of Ukhrul district are along the boundary areas to Mynamar. The scales of Chinese pangolin fetches as many as Rs. 15,000 to 25,000 per kg, serving as an excellent source of income for the local villagers. Scales were not used traditionally to cure any disease or in any cultural activity.

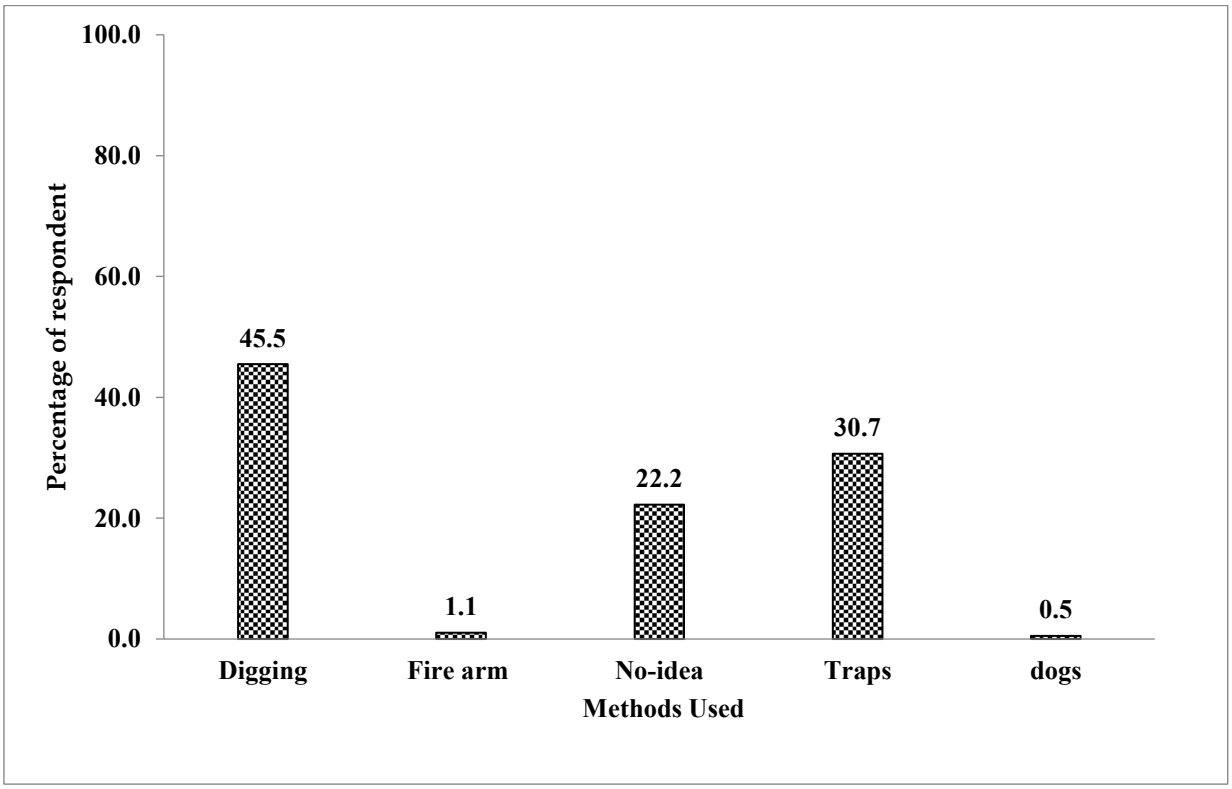



**Figure 6: Hunting tools and techniques for pangolin**

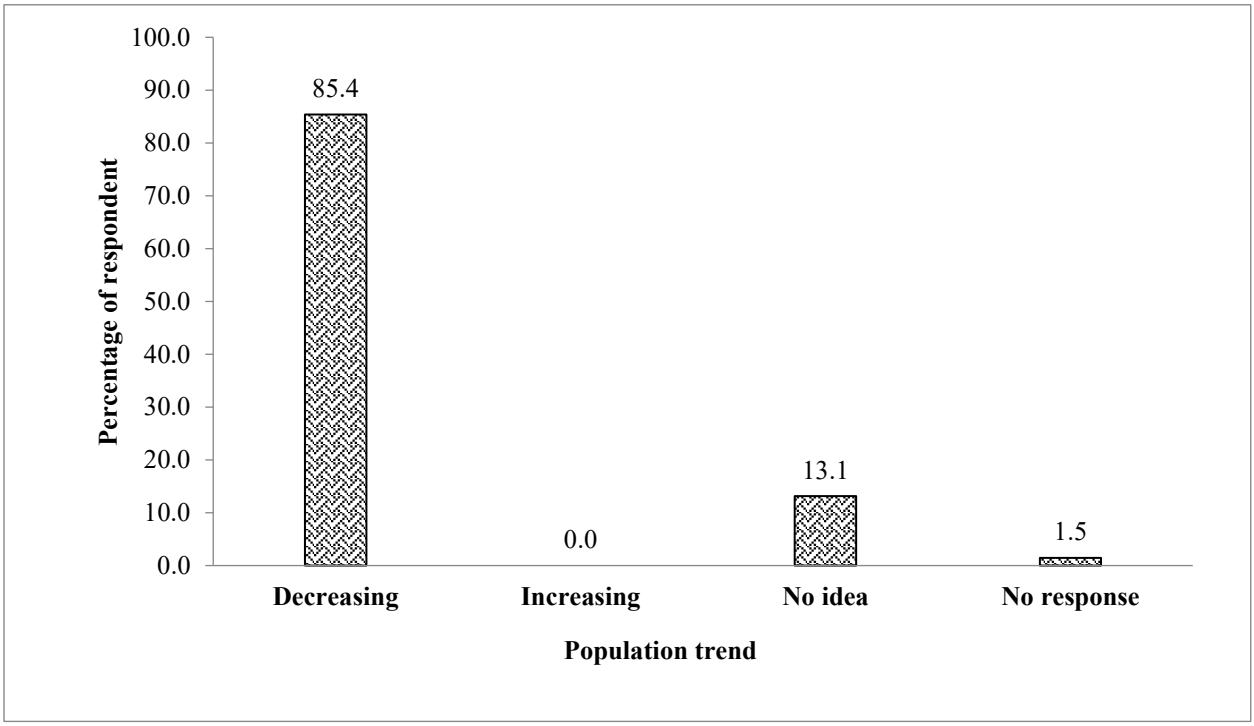



**Figure 7: Population trends of pangolin**

Conservation attitude and perception of local communities towards Chinese pangolin shows that 77.4% of locals support for conservation of the species and suggests that eradicating the sale of pangolin scale will help in conservation of the species. Most of the locals felt pity for the animals and termed it as 'foolish animal' as it does nothing but coils and rolls for its protection. They also informed that the meat of pangolin although is a delicacy as meat sources but it takes a lot of effort to catch them through digging its burrow and they would prefers other wild animals (deer, wild boar) as it is easy to hunt and the amount of meat is higher compared to a pangolin. About 18.2% remains to be neutral and 4.4 % says 'No' for conservation of pangolin as it is a good source of income and development of livelihood in the region (**Fig. 8**).

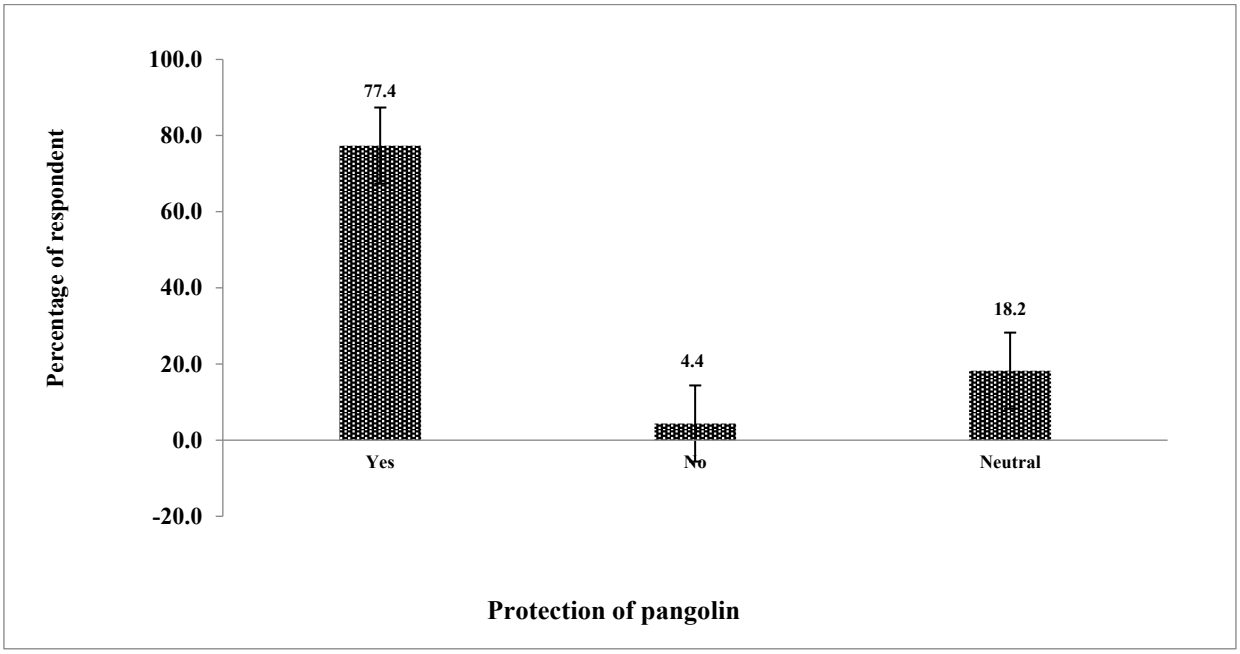



**Figure 8: Conservation attitude and perception of locals towards pangolin**

### 5.2 Identify the degree of trading and trade routes in the state

#### 5.2.1 Assessment of general hunting pattern and trends:

For determining the general hunting patterns and trends in the local communities semi-structured questionnaire with open and closed ended questions was carried out in interview format, survey was conducted following a set of predetermined questions. Survey was carried out in 6 village's i.e. in Ukhrul district: Khamasom (Khullen), Shiroi, and Zingsui, in Tameonglong district Bhalok, Old Tamenglong and Kahulong. During the survey 51 male individuals who had practiced hunting in the past or those who practice presently were interviewed. The respondent consists of various occupational backgrounds such as farmer, religious job and Govt. jobs. Highest numbers of respondents were farmers (90.2%), followed by unemployed (5.9 %), religious job (2%) and government job (2%) **(Fig. 9)**. 35.3% of the respondents had practiced hunting in the past where as 64.7% of the respondents currently practiced hunting (**Fig. 10**).

During the data collection on trade of Chinese pangolin scale it was found that the price of 1kg scale of Chinese pangolin cost around 12000/- to 17000/- rupees in the local market of Tamenglong. However, it was observed that the price was fluctuating from person to person during the semi structure interview **(Fig 11)**. It was reported that the scale has been traded from Tamenglong to Imphal which is the capital of the state. And from Imphal it will be exported to various parts of the country as well as abroad like Myanmar the only bordering country to India from Manipur **(Map 2)**. It is also reported that the scales collected from the various part of the states are graded here in Moreh where, the price of the Chinese Pangolin scales escalated up to

1,20,000/- rupees depending on the quality of the scale. Some of the famous district of Manipur in trading Chinese Pangolin scales which are documented during the informal interviews where, Tamenglong, Ukhrul, Chandel, and Imphal districts **(Map 2)**.

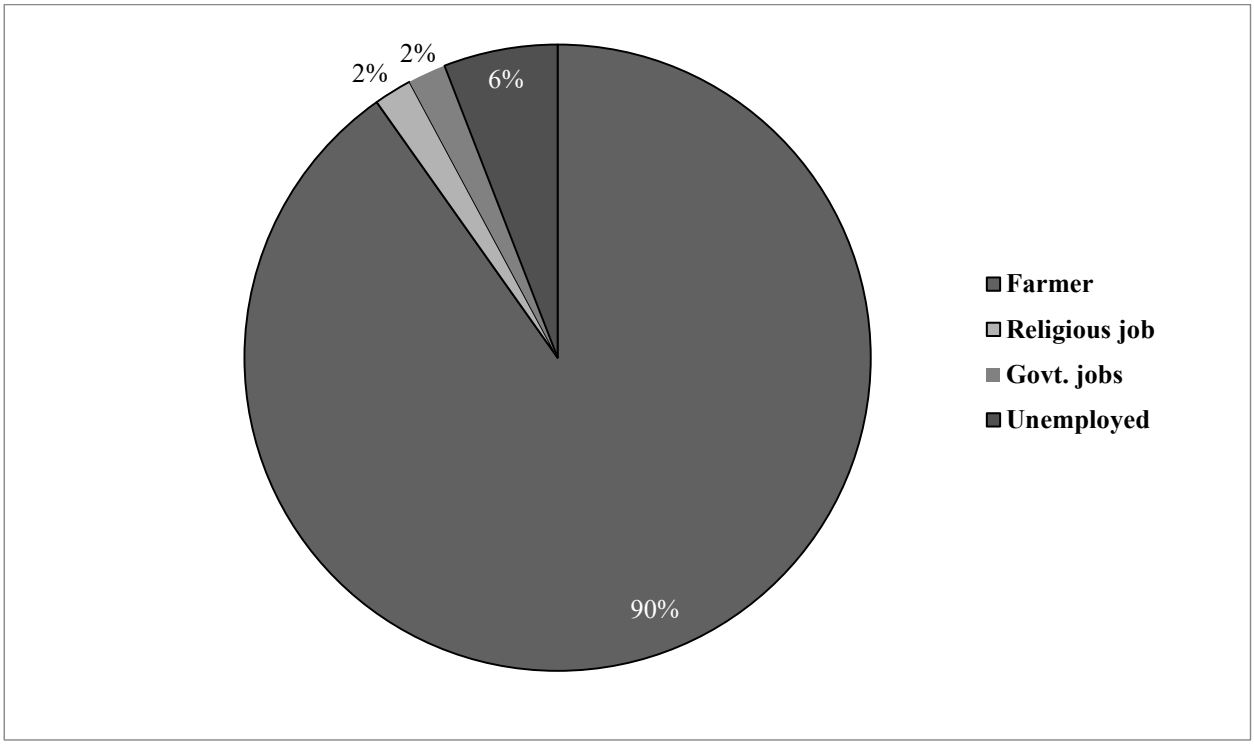



**Figure 9: Occupation of Respondent**

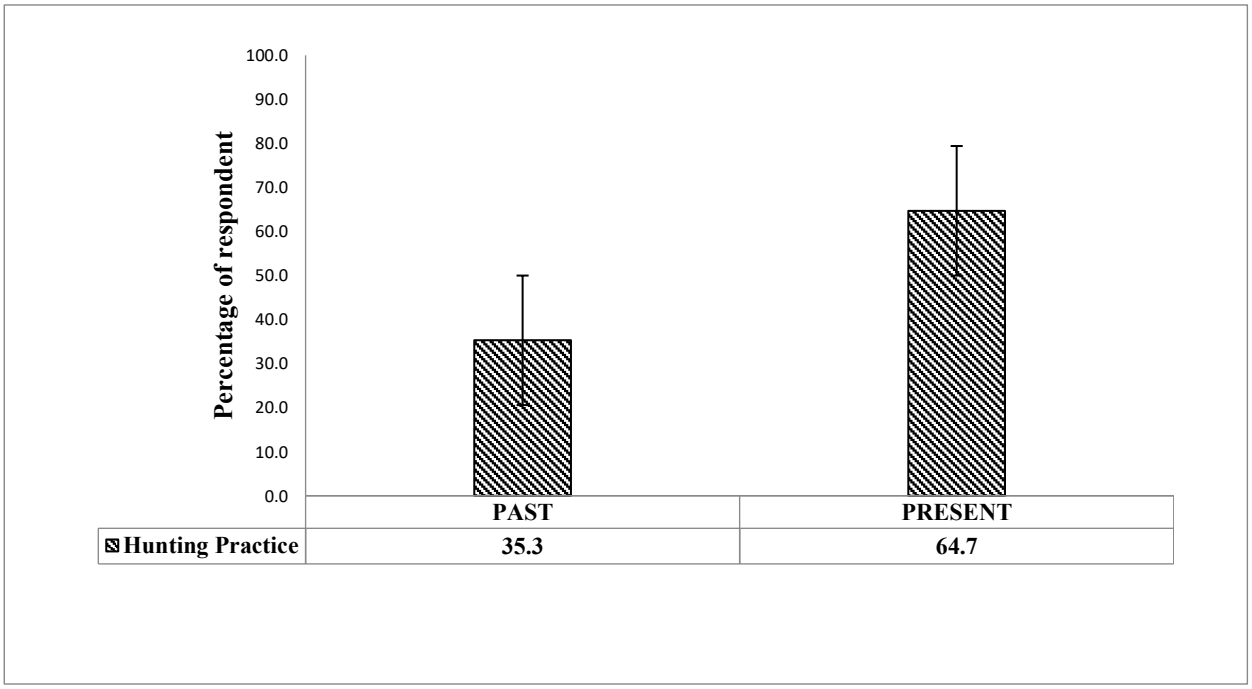
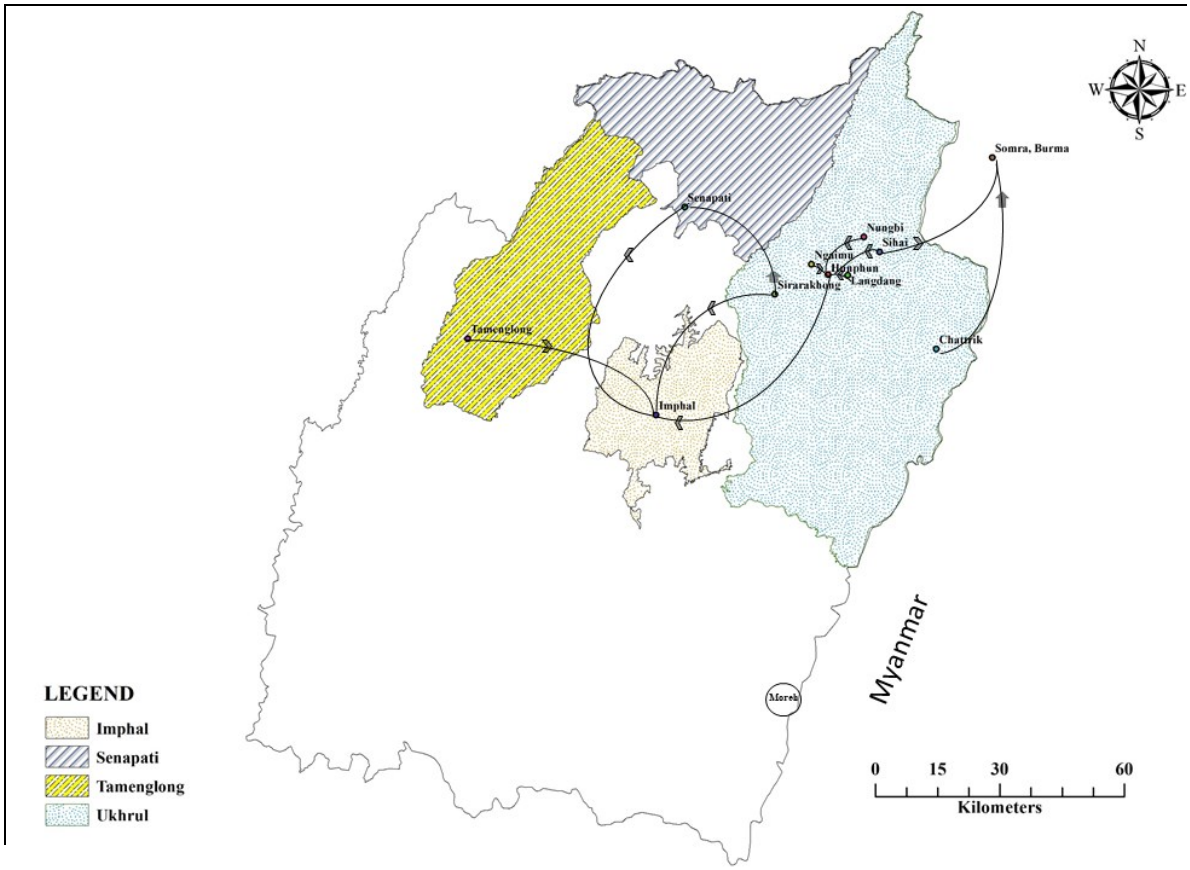



**Figure 10: Respondents practicing hunting in present or past**




**Map 2. Trading route of Chinese Pangolin from Manipur to Burma**

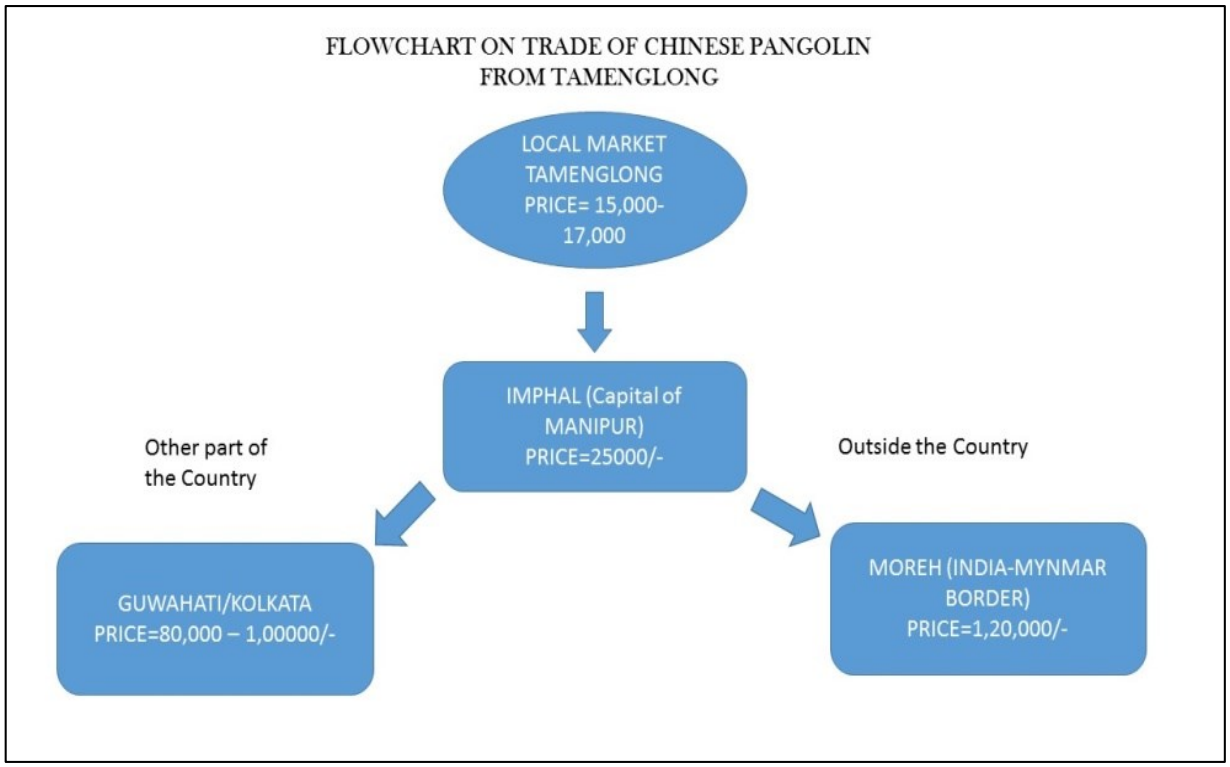



**Figure 11: Flowchart of market channel on trade of Chinese Pangolin Scale from Tamenglong**

The main reason for hunting was for food (82.4%) followed by hobby (31.4%), source of income (25.5%), medicine (9.8%), for status (3.9%), traditional use (3.9%) and defence of field (2%) **(Fig. 12).** Hunting as a source of income was an important reason because hunting was a form alternative livelihood resource for many young hunters. Old hunters reported that in the past bush meat was not sold in the market but was used for local consumption only. Market for wild meat has recently opened up in the region and bush meats are usually sold in nearby towns (Ukhrul, Tameonglong, etc). 11.5% (n=26) of old hunters (50-80 years of age) and 44% (n=25) of young hunters (20-49 years of age) hunted as a source of income **(Fig. 13)**. Hunting as a source of income is a relatively new driver for hunting in the region (Mann Whitney U test for hunting as a source of income between old (mean rank= 21.94) and young hunters (mean rank= 30.22): U= 219.50, Z= -2.571, P= 0.010).

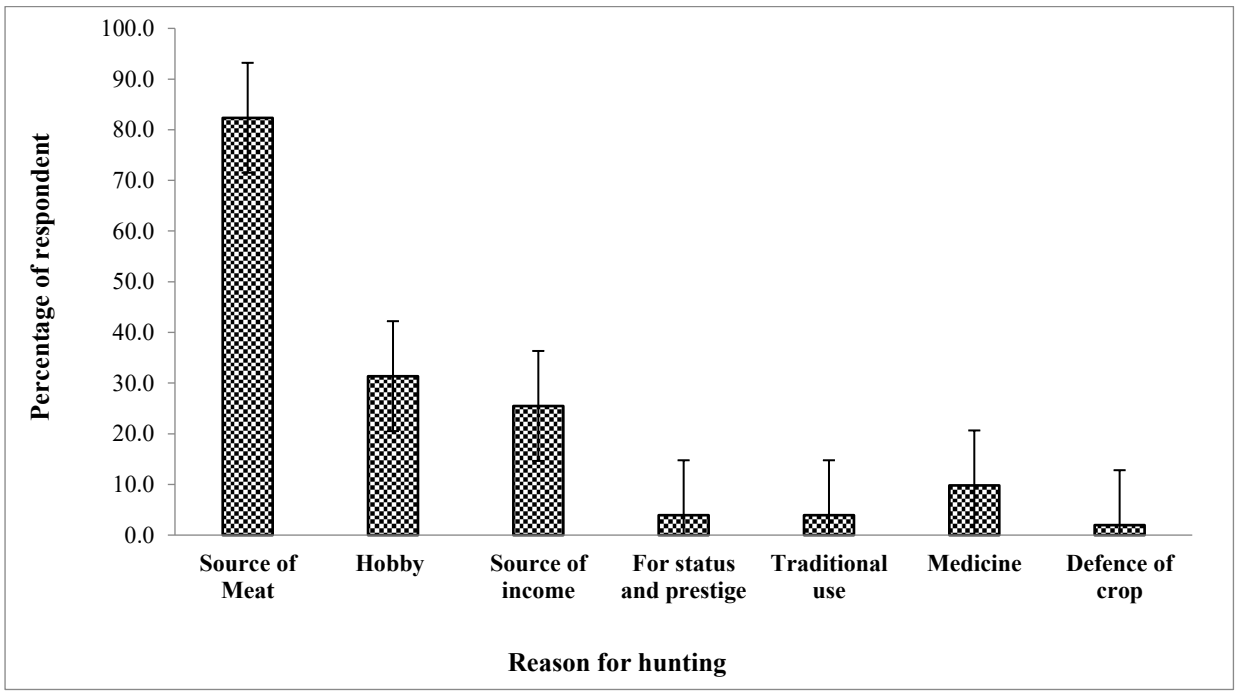



**Figure 12: Drivers for hunting in the region**

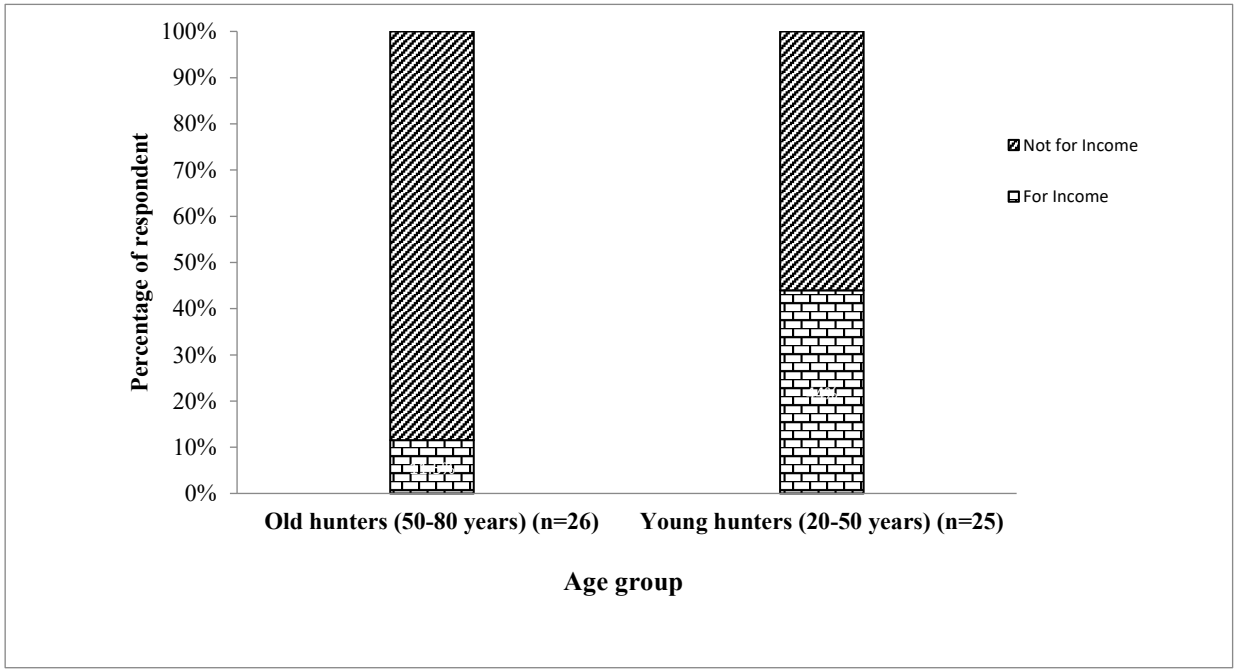



**Figure 13: Income as a driver for hunting in different age group**

### 5.2.2 Hunting patterns

Hunting is mostly done in winter season (40%) followed by spring (18.7%), autumn (17.3%), summer (8%) and rainy season (6.7%), while some of the respondents reported no preferred season (9.3%) **(Fig. 14).**

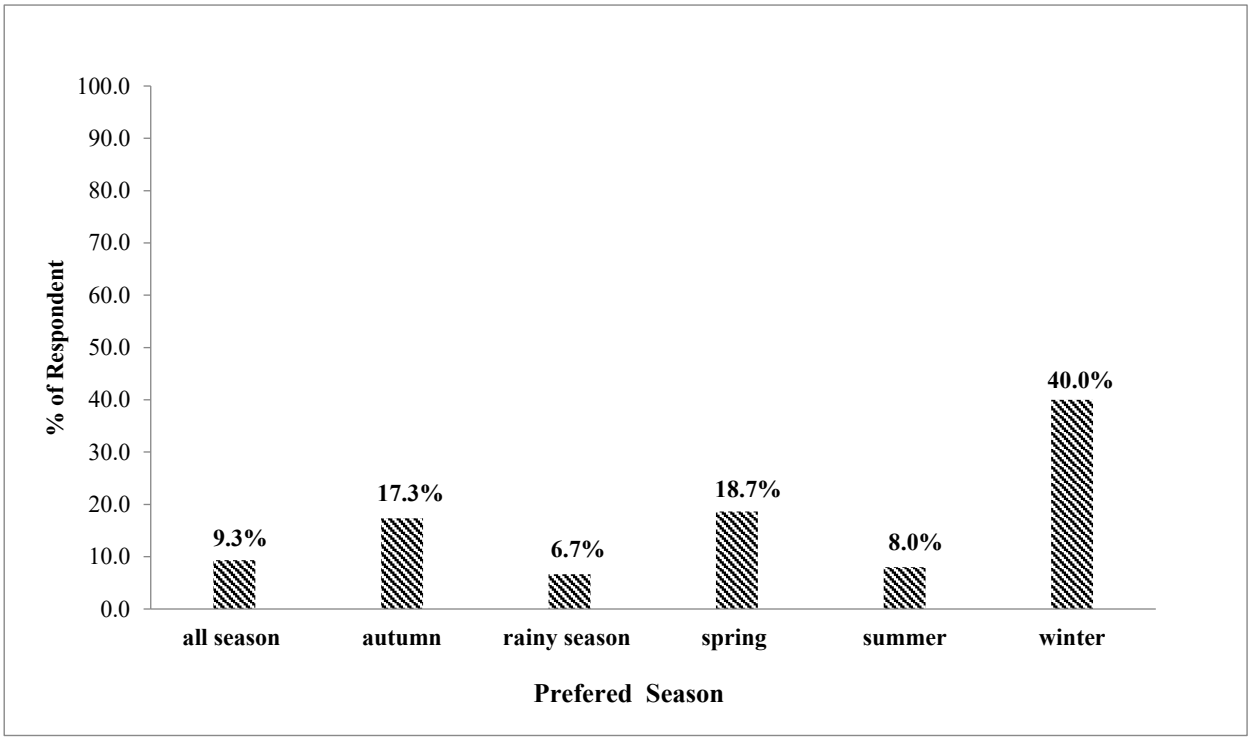



**Figure 14: Preferred season for hunting**

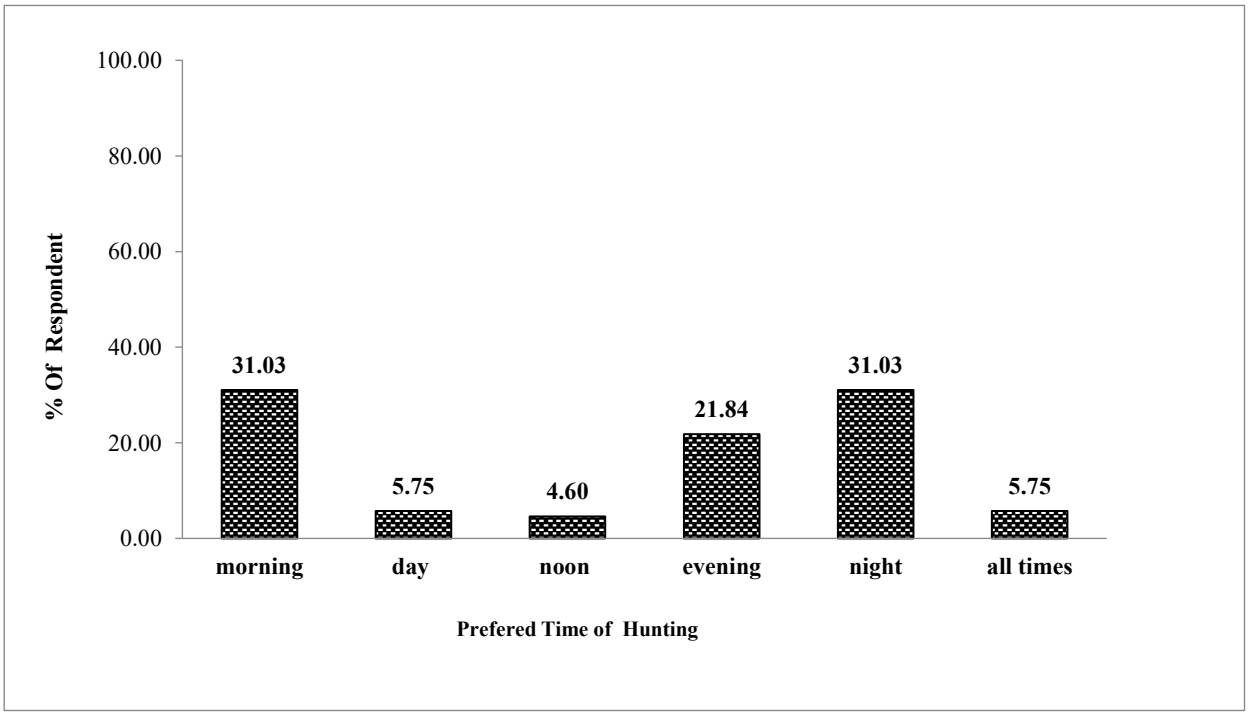



**Figure 15: Preferred time for hunting**

Since 90% of the respondents were farmers, most of them preferred hunting in winter season mainly because farming related activity was very low in winter while the least preferred season for hunting was spring because of the heavy rainfall in the reason making hunting activity difficult and also because farming related activity is the highest in rainy season (since most of the farmers cultivate paddy). Preferred time for hunting was night (31.03%) and morning (31.03%) followed by evening (21.84%), hunting was low during the day (5.75%) and noon (4.60%), few of the hunters reported to hunt at all times. (5.75%) **(Fig. 15)**. Older hunters reported that in the past hunting was not done at night since they used traditional technique and traps for hunting such as spears and dogs, with the use of firearms hunters started hunting at night as well **(Plates 1 to 8)**.

The average distance travelled by hunters is 15.2 Km (±1.83=SE). Distance travelled in each location varied mainly due to the proximity of nearby hunting ground in the area. Hunters travelled the longest distance in Khamasom (33.8 Km., ±4.6= SE) followed by Zingsui (16.9 Km., +-4.99=SE), Balokh (16.5 Km., +- 2.95=SE), Seroi (11.5 Km., +-2.41=SE), Old Tamenglong (6.4 Km., ±1.28=SE) and Kahulong (6.1 Km., ±1.1=SE) **(Fig. 16a, 16b)**.

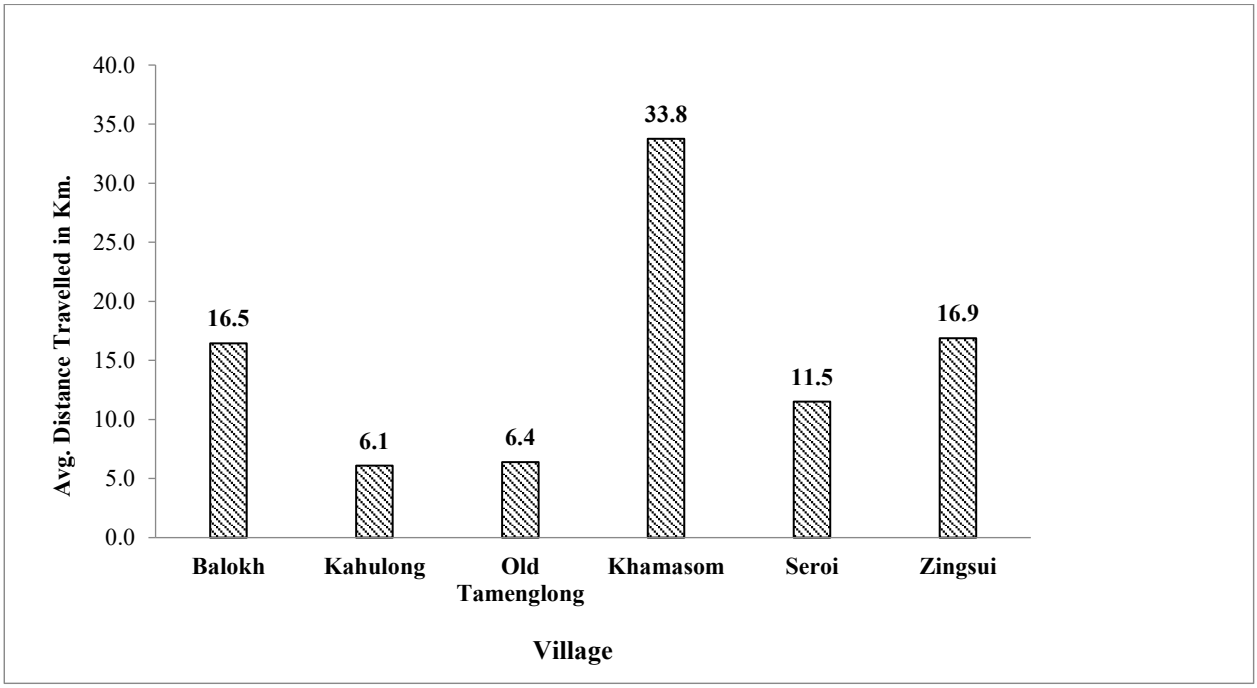



**Figure 16 a: Average distance travelled for hunting in each village Error bar**

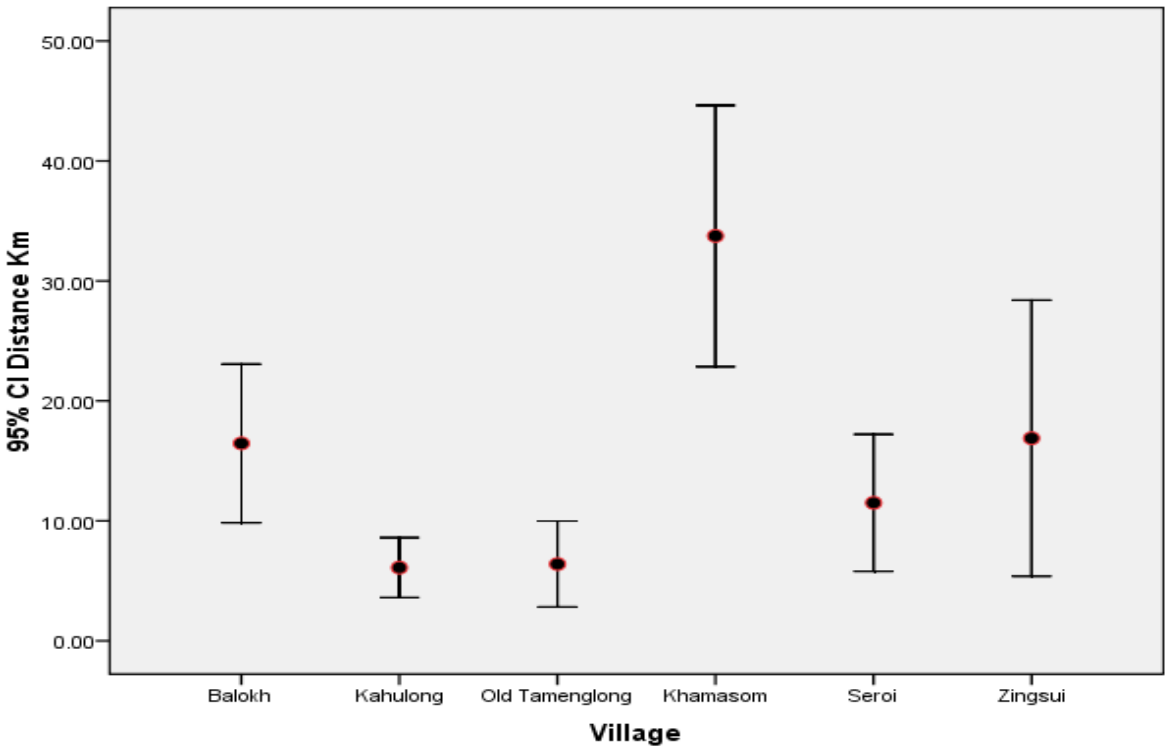



**Figure 16 b: Average distance travelled for hunting in each village Error bar**

Of the hunters interviewed 29% were 60-80 years, 37% were 40-59 years and 33% were 39-20 years. Average distance travelled by different age groups varied, very old hunters (40-59 years) traveled the least 11.80 Km. (±2.34= SE) followed by old hunters (60-80 years) 15.11 Km (±2.76=SE) and young hunters (20-39 years) travelling the longest distance of 19.06 Km (±4=SE) **(Fig. 17a, 17b)** , however there was no statistical significance for the data (Kruskal–Wallis test : Chi-Square = 1.122, df = 2, P = 0.571).

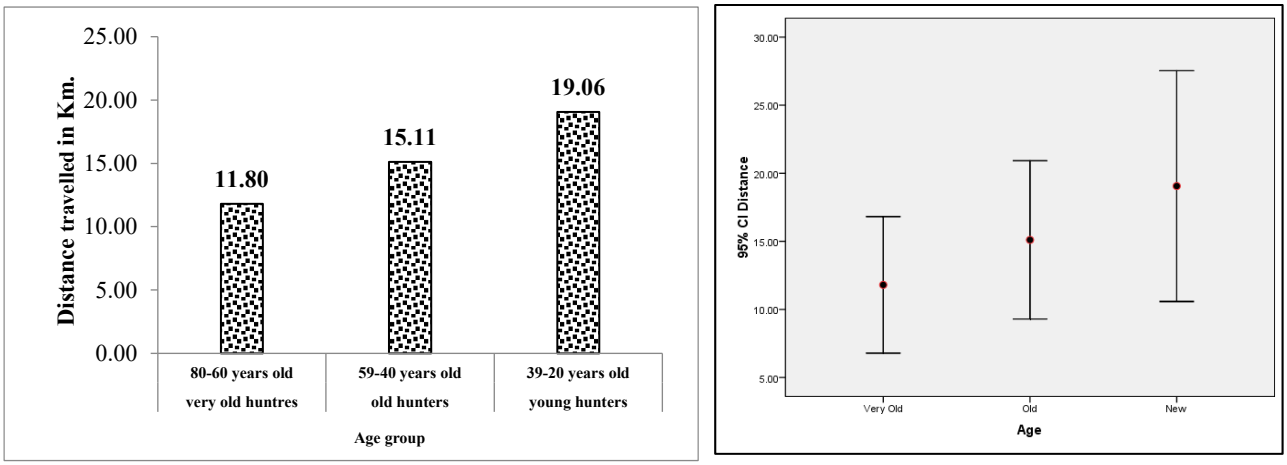



**Figure 17 a: Average distance travelled for hunting by different age groups; b: Error bars**

Average Frequency of hunting was found to be 9 times per month (±0.80=SE, 5.64=SD) but it differed between village. Hunters in Old Tamenglong had the highest average frequency (15/month, ±2.04=SE, 4.56=SD) and hunters from Khamasom had the lowest average frequency (5/month, +-0.89) **(Fig 18a, 18b)**. The difference between the hunting frequency of Tangkul and Rengma tribe was found to be insignificant (Mann Whitney U test: U= 251.50, Z= -0.761, P= 0.447).

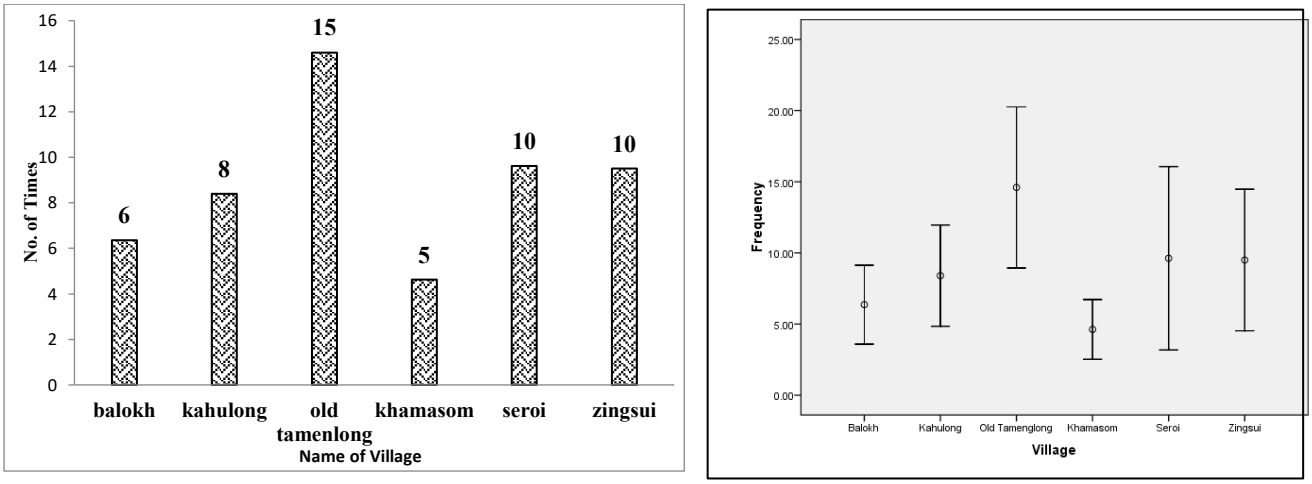



**Figure 18 a: Frequency of hunting in different villages; b: Error bars**

An average of 4.2 days (±0.43=SE, 3.08=SD) is spent for a single hunt. Average days spent in a single hunt was highest in Khamasom; 7 days (±1.34=SE, 3.78=SD), followed by Old tamenglong; 4 days (±1.44=SE, 3.21=SD), Kahulong; 4 days (±0.85=SE, 2.69=SD), Balokh; 4 days (±0.98=SE, 3.26=SD), Zingsui; 3 days (±0.91=SE, 2.74=SD), Seroi; 3 days (±0.83=SE, 2.36=SD) **(Fig. 19a, 19b)**.

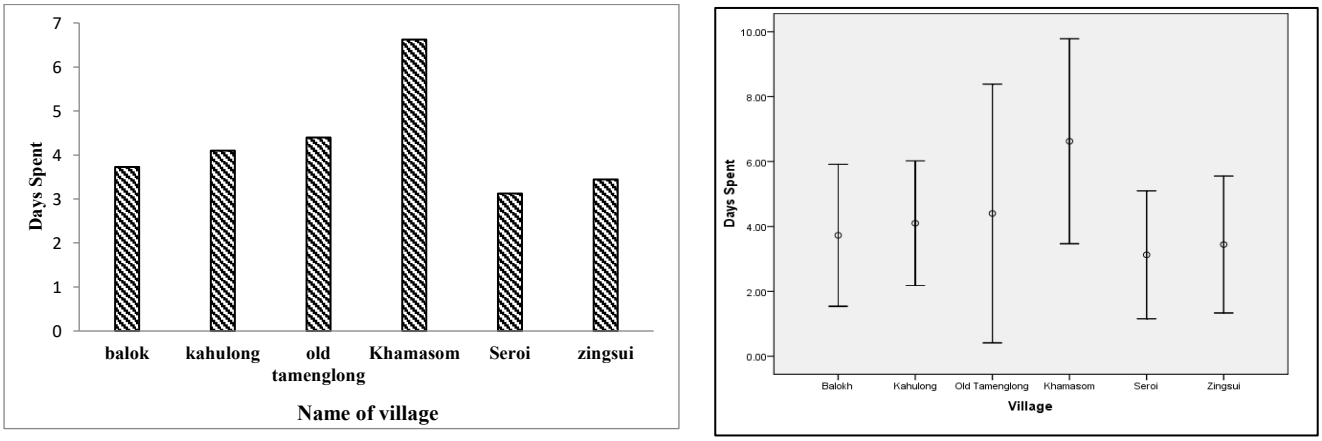



**Figure 19 a: Avg. days spent for a single hunt in different villages; b: Error bars**

Fire arms is the preferred hunting weapons 94.1% reported to have used Kartoos (single barrel 12 bore), 17.6 % have used Muzzle loaded gun, 35.3% use airgun, 2% 3 No 3 Rifle, 52.9 % use traps, 15% have used dogs, 9.8 % have used spears **(Fig. 20)**. Hunting with dogs and spears was a common practice for hunting in the past which has changed to fire arms in the present. Many traditional traps such as the log fall trap, bamboo traps, neck snares, leg snares, trigger-and-release, spring-pole, gum, etc. are also used **(Plates 1 to 8)**. Pitfall traps which were used in the past are no longer used instead commercial metal traps are used more frequently.

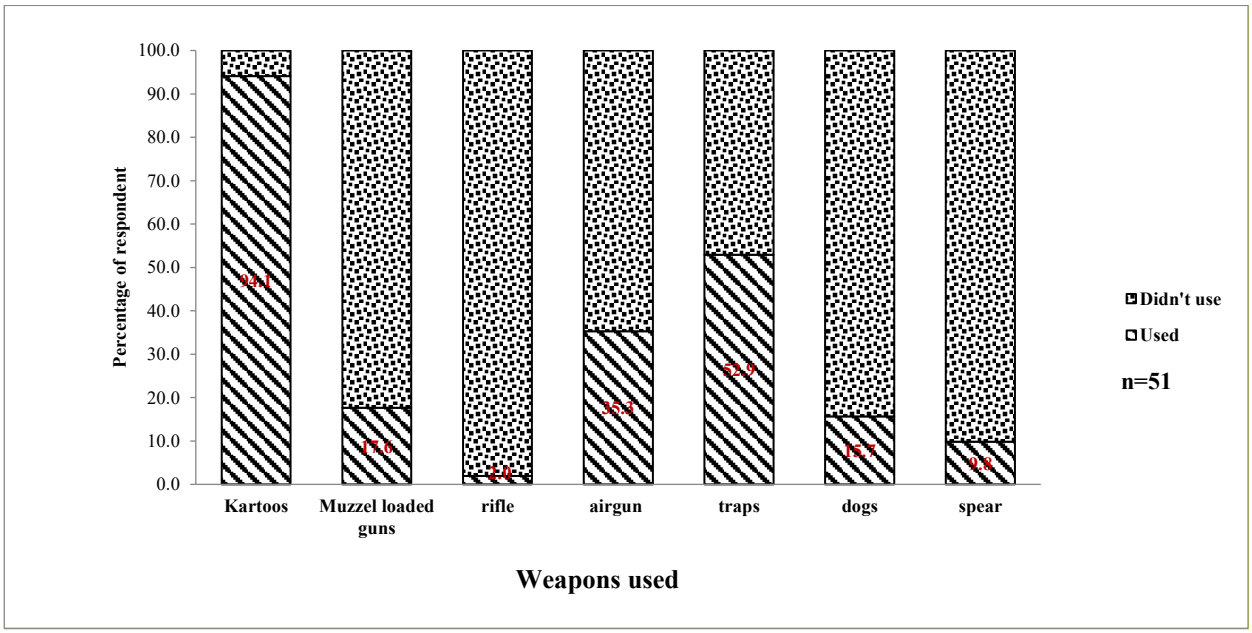



**Figure 20: Weapons used for hunting by different respondents**

94.1 % of the respondents preferred wild meat over domestic meat **(Fig. 20)**. Most of them preferred wild meat because of the taste (85.4%), other reasons for their preference were health benefits (25%), provides more energy (6.3%), cleaner than domestic meat (4.2%), medicinal properties (4.2%), rarity (2.1%) (**Fig. 21**) **(Plates 9 to 23).**

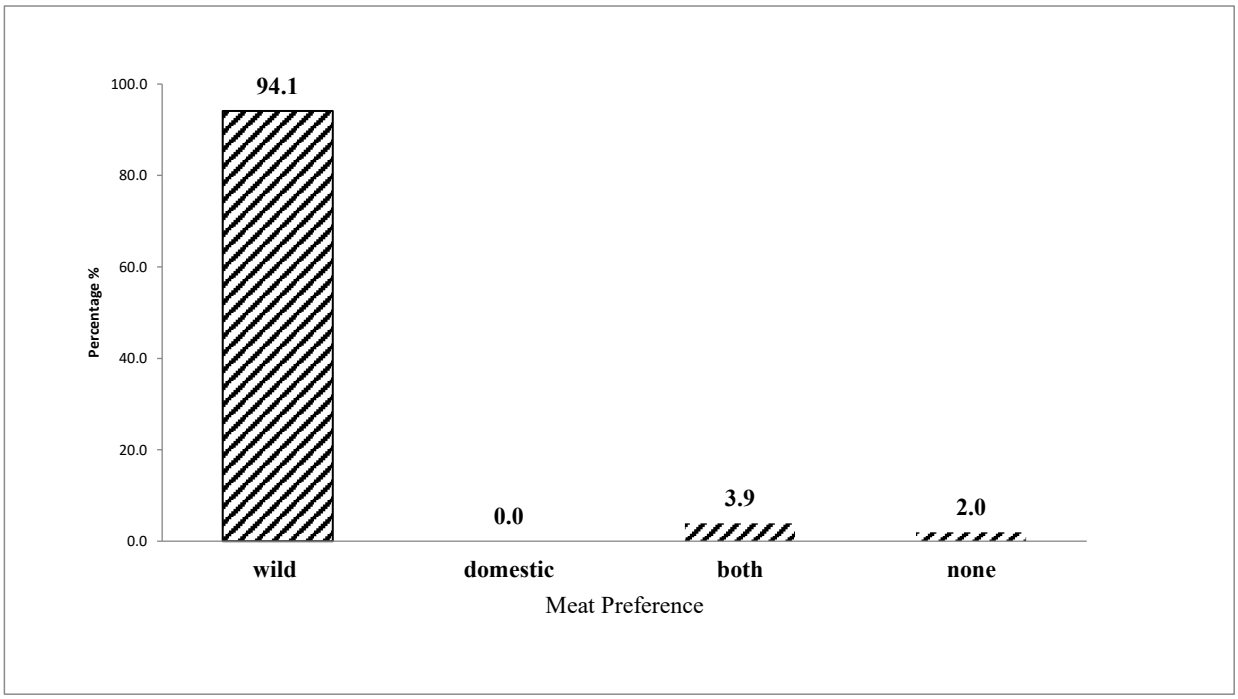



**Figure 21: Meat preference by respondents**

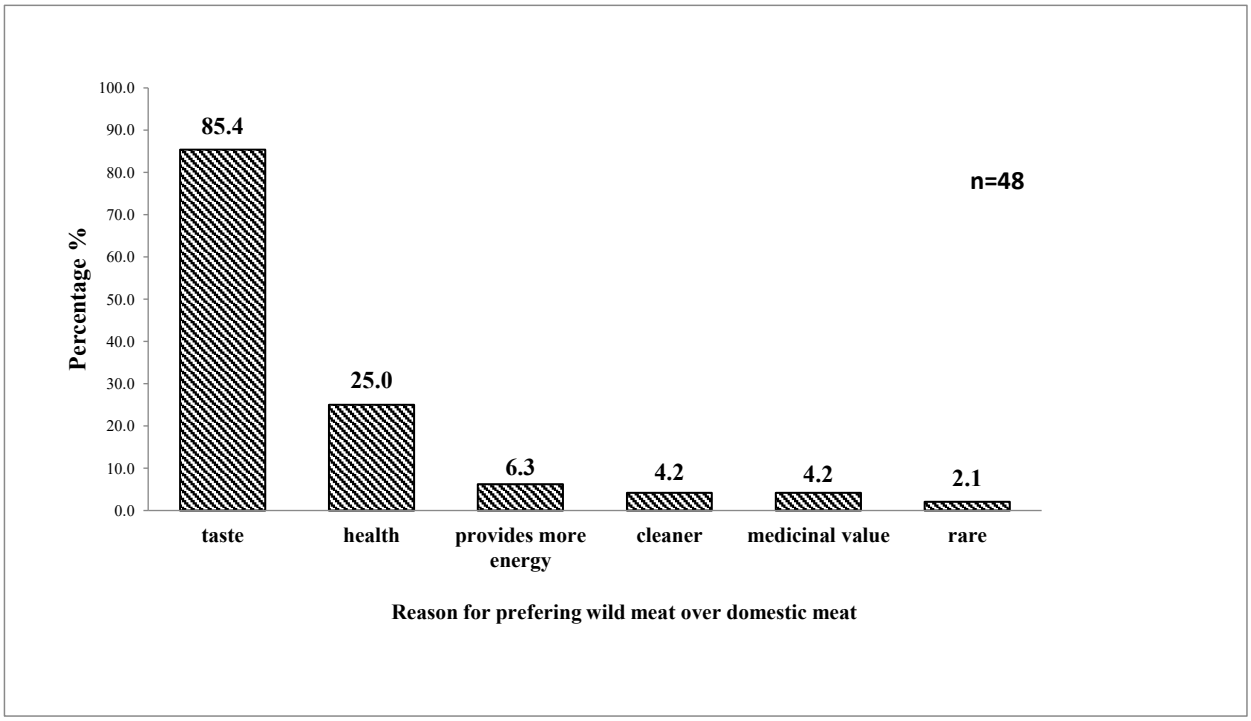



**Figure 22: Reasons for preference of wild meat**

More than 25 species of mammals were reported to be hunted by the villagers of which 1 was critically endangered (**Chinese pangolin**) Plates **(Plates 9 to 23)**, 3 endangered, 4 near threatened and 7 vulnerable according to IUCN red list.

## 5.3 Conduct awareness campaigns for community participation to restrain illegal trade of pangolin in the state

### 5.3.1 Introduction

The assessment of peoples' attitudes and perceptions towards conservation has become an important aspect in many studies of wildlife conservation (Newmark et al., 1993). Wildlife conservation, success depends on the attitudes of people towards conservation (Osmond, 1994; Katrina, 2000). Equally, understanding factors which influence attitudes is important to enable wildlife managers to implement approaches that attract support of stakeholders and the general public. It is necessary to seek and obtain the active participation of potential stakeholders not only in the technical efficiency of a conservation technology, but also the extent of satisfying cultural, social and political considerations in the environment which can help change the attitudes of indigenous people towards wildlife existence and conservation (Newman et al, 1994; Nji, 2004). People also need to be informed through specific awareness campaigns or environmental education which can help change their attitudes towards conservation.

### 5.3.2 Awareness programme in Tamenlong and Ukhrul District

Countless wildlife species are being driven towards extinction by habitat loss and the insatiable consumer demand for their body parts. Lack of proper education and poor communication among the forest authorities and tribal communities also serves as one of the major reason responsible for habit loss and extinction of animal species. Awareness programmes have been an integral part of educating local peoples for conservation and protection of floral and faunal diversity within any region. As per one of the objectives of the study, awareness programmes were conducted in different villages residing around the Chinnese pangolin distribution range area of Manipur in Ukhrul and Tamenlong district in between January 2018 to May, 2018. Through the programmes various issues were discussed and arrangements were made for interaction with all the section of the society such as members of village council, farmers, former hunters, church members and students. The participants include elderly persons, women, children and youths. 366 numbers of students were also present during the awareness programme held at their respective schools. The students were both of primary and upper section. Issues like hunting poaching and trading ware discussed in awareness programmes. Dependency of locals on the reserve, reasons for hunting and needs for conservation of animal's species with special preference to Chinese Pangolin were addressed in the programmes. Most of the villagers were found to be fully dependent on the forest

resources for their daily livelihood materials such as water, timber, food, fibres, medicinal plants and housing materials. Hunting has been practiced in the region as a tradition since civilization; however, they explain that one of the primary reasons of hunting now days is the lack of knowledge on conservation techniques and non-payment of crop damage compensation to the villagers from the forest department.

While conducting education awareness programme, emphasis was given on the conservation of forest and wildlife including Chinese pangolin and their importance in the ecosystem. During the programme the villagers and students were elucidate with the need for conservation of Chinese pangolin as it is one of the critically Endangered animal species in the IUCN data sheet and Scheduled-I species according to the Indian Wildlife Protection Act, 1972. They were shown photographs and posters of Chinese pangolin and other templates for identification and detail information on its feeding habits, activity, breeding, illegal trading and uses of body parts were provided to them. Chinese pangolin is also known as the "Farmers of the forest" due to their daily activities. They were also explained that in India Chinese pangolin have been restricted to few north eastern states only and Manipur being a place where it is found, it a matter of immense pride for the people of Manipur and therefore all necessary measures should be taken by the forest department and their full cooperation is required for its conservation.

**5.3.3 Result**

In Ukhrul there were two School programmes ware conducted in different school, one is Seriohi Govt High School and another one is Ukhurul Public School. In total (n=140) students, (n=13) teachers and 7 volunteers were participated in awareness programmes **(Plates 24 to 47).** The aim of the awareness programme was to reach out the people who live in the fringe area of the Protected Areas and to promote Chinese pangolin conservation. The other objective is to create an opportunity for the trained educators to conduct programmes utilizing

During the workshop and awareness programme the contents of the teaching toolkit is covered and the participants got sufficient time to practice the activities. In the process active teaching tools being introduced. The activities covered during the workshop are known each other, assessment tools, know your species, past and present distribution, illustrated history of Chinese pangolin status, threats and conservation, pangolin conference and tips for planning education programmes **(Plates 24 to 47).** The assessment tool is repeated before and after the workshop to

assess the knowledge they gained during the workshop period. At the end of the training the participants committed to act within the next three months from the date of the training.

During this period, an awareness program was conducted in Tamenglong HQs at Trinity Public School. At the program, students from 8th standard to 12thstandard were invited for participation in painting, speech and documentary shows with the theme "Save Chinese pangolin and its habitat". In the event, a total of (n=70) students took participation along with (n=4) teachers and (n=10) volunteers ware participated in Trinity Public School. In Builder School their ware (n=60) students, (n=50 teachers and (n=7) ware participated. One awareness program was also conducted in Tamenglong Village, their ware 50 participants involved in this program **(Plates 48 to 55)**.

On 27/03/2018 we have visited the Eklavya Model Residential School, Tamenglong district Manipur. Awareness cum interaction session was conducted with the class X students. The program was started by a welcoming speech from the vice-principle Mr. Pamei and followed by Introduction on Save Chinese Pangolin Campaign by Mr. Khumukcham Ronald. Various Topics and issued on conservation and protection of species where discuss in the session like; Present status of Chinese Pangolin, Reason for declining of Chinese Pangolin, Reason of hunting Chinese Pangolin, Different types of hunting methods, Ecological importance of Chinese Pangolin in the forest etc. During the session students where asked various questions like; Have ever seen or eaten Chinese Pangolin, what are the main reason for habitat loss, how they can save this endangered species. After interaction with the student Mr. Khumukcham Ronald explained on difference between the modernized method of hunting and its ill effect to the wildlife, forest and environment compared to year old traditional methods of hunting which is less effected to wildlife, forest and environment. He further highlighted the tools used in these two methods and the change in the people's attitude towards hunting. The session was concluded with light refreshment for the participants and later T-shirt, caps and Books where distributed to the participants.

### 5.3.4 Awareness Cum Meeting Program with The Tamenglong Village Authority

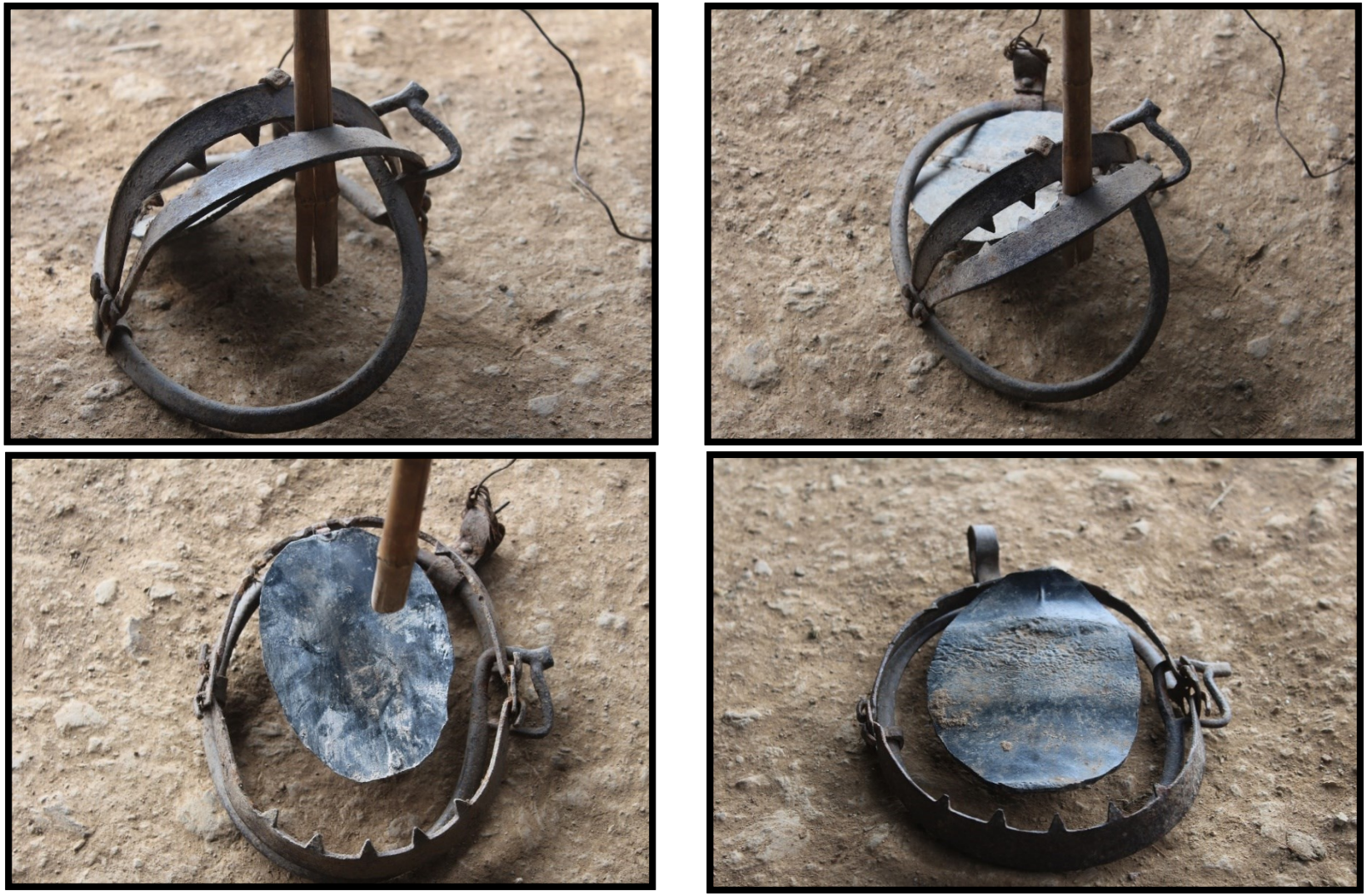
The awareness cum meeting program with the theme of "SAVE CHINESE PANGOLIN CAMPAIGN" was conducted successfully in Tamenglong, on 28 March, 2018 with the Tamenglong Village Authority. The program was coordinated by Mr. Khumukcham Ronald, during the program he highlighted the present status and its threats affecting the survival of

Chinese Pangolin in Tamenglong. He also explained on contribution by the Pangolin to the forest ecosystem. The village Authority explained that why the killing of Pangolin in Tamenglong has been increasing rapidly in the area for the last 5 years, giving the reason of trading of scales and meat. The selling of pangolin scale has become a side income for the villagers. The Village Authority also explained that the source of earning livelihood is very limited in Tamenglong because of the hilly terrain. So, finding an alternative was very natural. Later Khumukcham Ronald encourage them to cultivate high value medicinal and Aromatic plants and also suggested to change the traditional jhum cultivation to sustainable jhum practice and various Agroforestry practice suitable for the area. With the intention of improve livelihood will certainly decrease the percentage of killing pangolin. During the program t-shirts and caps where also distributed to all the members and the participants in the program. The program was concluded with a speech from the chairman N.T. Pamei encouraging it and also expressed his interest in this kind of program in future and lastly thanking Khumukcham Ronald and D-bon Nang a local wildlife enthusiast who helped in organizing the program **(Plates 48 to 55)**.

**Table 1**. **Awareness programme in different School and Village**

| Sl. No. | Name of Place/ School | No of Participant (n) | No of Volunteers (n) | Date of Awareness |
|---|---|---|---|---|
| **Tamenlong** | | | | |
| 1 | Trinity Public School | 74 (4 Teachers) | 10 | 03/05/2018 |
| 2 | Builder School | 65 (5Teachers) | 7 | 10/05/2018 |
| 3 | Tamenglong Village | 45 | 5 | 28/03/2018 |
| 4 | Eklavya Model Residential School | 56 (5Teachers) | 3 | 27/03/2018 |
| **Ukhrul** | | | | |
| 1 | Seriohi Govt. High School | 80 (11 Teachers) | 5 | 26/03/2018 |
| 2 | Ukhrul Public School | 70 (8Teachers) | 5 | 24/05/2018 |

**Plates 1 and 2: Hunting Techniques for Chinese pangolin**



**Plates 3,4,5 and 6: Different types of hunting trap using by hunters**


**Plates 7 and 8: Different types of hunting trap using by hunters**

**Plates 9, 10, and 11: Different types of poaching evidences of Chinese Pangolin**

**Plates 12, 13, 14 and 15: Poaching of Chinese pangolin and scales of Chines pangolin**

**Plates 16 and 17: Killing of Chinese pangolin and scales of Chines pangolin**

**Plates. 18, 19 and 20: Killing of Chinese pangolin and scales of Chines pangolin**


**Plates. 21, 22 and 23: Killing of Chinese pangolin and scales of Chines pangolin**





**Plates 24, 25, 26 and 27: Awareness Cum Meeting Program in different School in Ukhrul District**

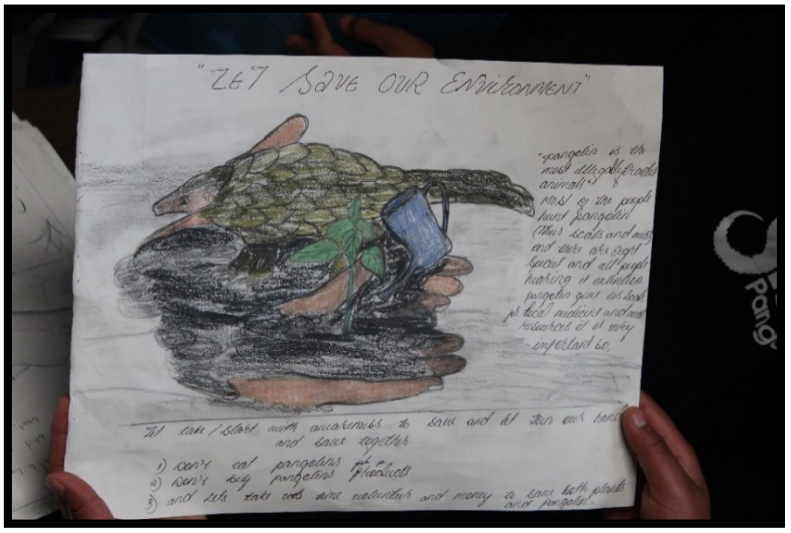




**Plates 28, 29, 30 and 31: Awareness Cum Meeting Program in different School in Ukhrul District**



**Plates 32 and 33: Awareness Cum Meeting Program in different School with painting activity**





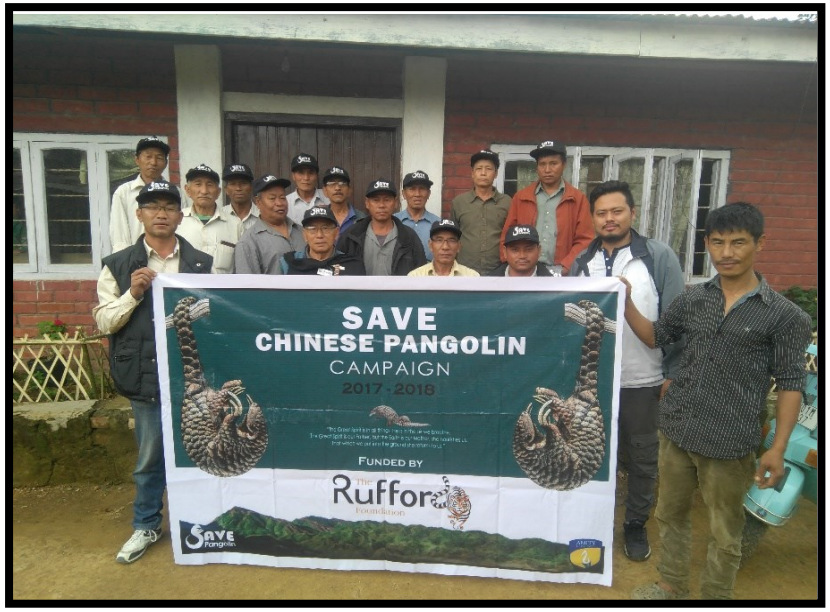
**Plates 34, 35, 36 and 37 Awareness Cum Meeting Program in different School in Ukhrul, Manipur**

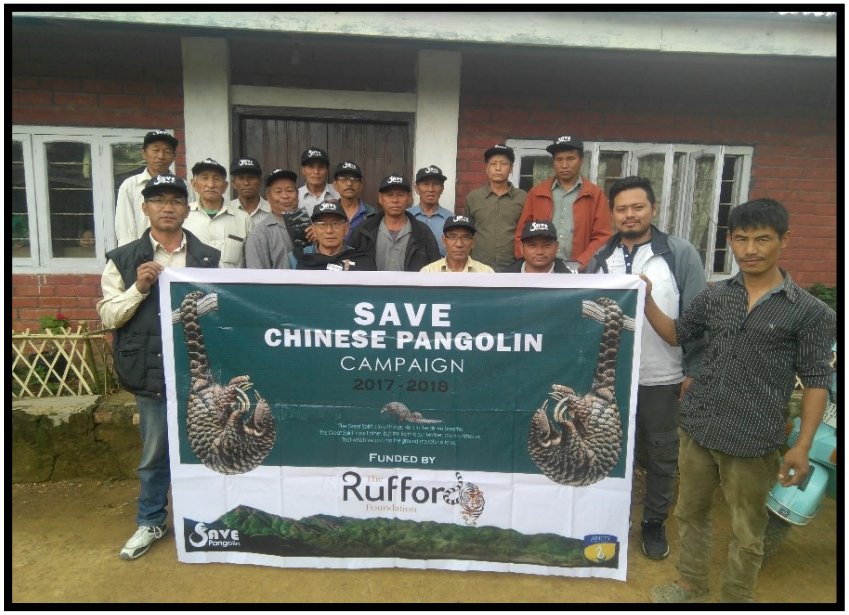
**Plates 38, 39, 40 and 41 Awareness Cum Meeting Program in different School in Ukhrul, Manipur**


**Plates 42, 43, 44 and 45: Awareness Cum Meeting Program in different School in Ukhrul, Manipur**



**Plates 46 and 47: Awareness Cum Meeting Program in different School in Ukhrul, Manipur**


**Plates 48, 49, 50 and 51: Awareness Cum Meeting Program in different School in Tamenlong, Manipur**





**Plates 52, 53, 54 and 55: Awareness Cum Meeting Program in different School in Tamenlong, Manipur**

## 6. Discussion

The current study also revealed that Chinese pangolin is illegally hunted and killed frequently in the study area as a source of meat but also for trade of its scales. Pangolin meat is considered to be a delicacy by both hunters and non-hunters. Trade of pangolin scale is one of the major drivers of population loss due to hunting. Hunters reported to have sold pangolin scales at different amounts (15000 to 25000 INR per Kg), the price of scale also varied from place to place. Hunters reported to have sold the scales in nearby towns and also told that the scales are sometimes collected by middlemen. Hunters from Ukhrul District reported that the scales are further sold to Somra, a market in Mayanmar. Immediate conservation efforts are necessary for the protection of this species. Most of the respondents were positive towards the conservation and protection of species because of recent decline in the population but also mentioned hunting of species as an alternative source of income in the area. Since the region has very few resources for livelihood and income generation, protection of this species would require generating alternative source of livelihood for the local community.

The data and analysis of the studies shows that majority of the hunter's still hunt for supplement as a source of protein. It is also influenced by recent growth in the local market for bush meat and commercial trade. Most of the locals preferred wild meat over domestic meat because of the taste. Unlike tribes in Arunachal Pradesh (Aiyadurai et al., 2011) there are no religious belief that helps in reducing the hunting pressure. Changes in the hunting pattern were noticed, traditional methods of hunting using spears, dogs and traditional traps have been replaced by hunting using firearms and commercial traps. Hunting pressure has increased in the region due to use of modern technologies and firearms.

This study reveals new information on hunting patterns, species hunted, sociological and economic factors that affects hunting in the two districts of Manipur. This is the first study done in the area done to understand hunting practices and trends in this region. Along with the interviews we used photographs taken by the hunters and trophies kept in houses to assess and triangulate the animals that were hunted in the region. Multidimensional nature of hunting makes it difficult to understand the drivers that affect hunting (Caldecott, 1988; Robinson & Bennett, 2000; Silvius et al., 2004;

Rao et al., 2005). We don't draw any conclusion of sustainability and exploitation of hunting in the region, more intensive study is required for that matter. Hunting and trade of many vulnerable, threatened and endangered species such as Hoolock gibbon *Hoolock hoolock*, Phayre's leaf monkey *Trachypithecus phayrei*, Hog deer *Axis porcinus*, Asiatic Golden Cat *Catopuma temminckii,* Indian Smooth-coated Otter *Lutrogale perspicillata*, Serow *Capricornis thar*, Chinese Pangolin *Manis pentadactyla,* Asiatic black bear *Ursus thibetanus*, Black Giant Squirrel *Ratufa bicolor*, Marbled Cat *Pardofelis marmorata,* Royal Bengal Tiger *Panthera tigris*, Common Leopard *Panthera pardus*, Clouded Leopard *Neofelis nebulosa*, Bengal Slow loris *Nycticebus bengalensis* and Gaur *Bos gaurus* is a matter of concern. Specific studies are required to find the population trend of these species in the region. Participatory and community based conservation policies are required for effective control of hunting in the region. Since hunting is part of the daily life of the local communities and is imbedded in the culture and tradition of the region. Conservation of different species by banning hunting is almost not possible in most of the remote places in the region. Many villagers have a perception of wildlife as a free and inexhaustible resource; there is an urgent need for awareness and sensitization of the community. Since most of the people are engaged in cultivation as their livelihood, human- wildlife conflict in the form of crop damage and retaliatory hunting has not been studied, further studies should delve into this matter. Many threatened species is also hunted by the community and many species have seen a rapid decline in population due to over exploitation. Since most of the forests are owned by the community, there is an urgent need for more local participatory policy based conservation efforts which integrate both traditional and conservation needs and practices. There is a virtual absence of N.G.O.'s working for wildlife conservation in the region mainly due to political turmoil in the region. As suggested by Velho & Lawrence (2013), multi-level government framework can be established to fill the gap between national and international policy and grass-root level governance.

## 7. Conclusion

The village survey and interview undertaken in the district of Tamenglong and Ukhrul, sub-division Tamenglong has provided many information which not only help to understand factor responsible for decline on the population of Chinese pangolin in the study site. But also provide the various reason for hunting of the target species. From the result it was found that hunting poaching and expansion of Agricultural lands where, the main factors for the declined on pangolin population and loss of habitat. The traditional belief of the Rongmei community in relation to use of scale of Chinese pangolin, has also play a role on its effect on population of the species. Trading of the target species was found to be a source of earning extra income for the local community in the study area. The different perspective of the villagers observed during the interview, can be said that the conservation of this endangered species can be successfully implemented if the concerned authority and government departments has taken some initiative which has the concept of people participation and voluntary contribution from the local people. For these there should be many awareness and training programs conducted in different levels.

## 8. References

Actman, J., 2016. The world's most trafficked mammal just got desperately needed help. URL http://news.nationalgeographic.com/2016/09/wildlife-watch-most-trafficked-mammal-just-got-help/

Aiyadurai, A., Singh, N. J., & Milner-Gulland, E. J. (2010). Wildlife hunting by indigenous tribes: a case study from Arunachal Pradesh, north-east India. Oryx, 44(4), 564-572.

Aiyadurai, A., singh, N.J., & Milner-Gulland, E.J. (2010) Wildlife hunting by indigenous tribes: a case study from Arunachal Pradesh, Northeast India. Oryx, 44 (4), 564-572.

Allen, G. M., & Coolidge, H. J. (1940). Asiatic primate expedition collections: mammals. Bulletin of the Museum of Comparative Zoology., 87, 131-166.

Banks, D., Desai, N., Gosling, J., Joseph, T., Majumdar, O., Mole, N. et al. (2006) Skinning the Cat: Crime and Politics in the Big Cat Skin Trade. Environmental Investigation Agency and Wildlife Protection Society of India, London, UK.

Baseline Survey of Minority Concentrated Districts (BSMC), District Report, Tamenglong. Ministry of Minority Affairs Government of India. 2016, 1-37.

Baseline Survey of Minority Concentrated Districts (BSMCD), Ukhrul District. Ministry of Minority Affairs Government of India.2016.

Begon, M. (1979). Investigating Animal Abundance. Edward Arnold, London, 96pp.

Bennett, E. L., & Robinson, J. G. (2000). Hunting of wildlife in tropical forests: implications for biodiversity and forest peoples.

Bennett, E. L., Milner-Gulland, E. J., Bakarr, M., Eves, H. E., Robinson, J. G., & Wilkie, D. S. (2002). Hunting the world's wildlife to extinction. Oryx, 36(4), 328-329.

Broad, S., Lusmoore, R. and Jenkins, M. (1988). Significant trade in wildlife: a review of selected species in CITES appendix II. Mammals. IUCN, Switzerland 1: 51-183.

Challender, D. W. (2011). Asian pangolins: increasing affluence driving hunting pressure. Traffic Bulletin, 23(3), 92-93.

Challender, D. W. S., & Hywood, L. (2012). African pangolins under increased pressure from poaching and intercontinental trade. Traffic Bulletin, 24(2), 53-55.

Challender, D. W., Waterman, C., & Baillie, J. E. (2014). Scaling up pangolin conservation. IUCN SSC Pangolin Specialist Group Conservation Action Plan. Zoological Society of London, London, UK.

Challender, D., Baillie, J., Ades, G., Kaspal, P., Chan, B., Khatiwada, A., ... & Hsieh, H. (2014). Manis pentadactyla. The IUCN Red List of Threatened Species.

Chao, J. T., Tsao, E. H., Traylor-Holzer, K., Reed, D., & Leus, K. (2005). Formosan Pangolin Population and Habitat Viability Assessment: Final Report. IUCN/SSC Conservation Breeding Specialist Group, Apple Valley, MN, USA.

Chhangani, A. K., & Mohnot, S. M. (2004). Crop raid by hanuman langur Semnopithecus entellus in and around aravallis (India) and its management. Primate report, 35-48.

Chin, S. Y., & Pantel, S. (2009, June). Pangolin capture and trade in Malaysia. In Proceedings of the workshop on trade and conservation of pangolins native to South and Southeast Asia (Vol. 30, pp. 144-162).

Corbet, G. B., & Hill, J. E. (1992). The mammals of the Indomalayan region: a systematic review (Vol. 488). Oxford: oxford university press.

Corlett, R. T. (2007). The impact of hunting on the mammalian fauna of tropical Asian forests. Biotropica, 39(3), 292-303.

Datta, A. (2007) Protecting with people in Namdapha: threatened forests, forgotten people. In Making Conservation Work: Securing Biodiversity in This New Century (eds Shahabuddin, G. & Rangarajan, M.), pp. 165–209. Permanent Black, New Delhi, India.

Devi, S. N., & Radhakrishna, S. (2013). Attitudes towards primates and primate conservation in Manipur, northeast India. Asian Primates Journal, 29.

District census handbook, Ukhrul, village and town directory, Series-15, 2011.

Don Carlos, A. W., Bright, A. D., Teel, T. L., & Vaske, J. J. (2009). Human–black bear conflict in urban areas: an integrated approach to management response. Human Dimensions of Wildlife, 14(3), 174-184.

Duckworth JW, Salter RE, Khounboline K (1999) Wildlife in Laos PDR: 1999 status report. IUCN, Vientiane

Economic survey of Manipur. Government of Manipur. 2010-2011.Imphal; Directorate of Economic and Statistics.

Ellis, R. (2005). Tiger bone and rhino horn-the destruction of wildlife for traditional Chinese medicine. Island Press, London.

Fa, J. E., Peres, C. A., & Meeuwig, J. (2002). Bushmeat exploitation in tropical forests: an intercontinental comparison. Conservation Biology, 16(1), 232-237.

Fairhead, J., & Leach, M. (2003). Termites, society and ecology: perspectives from West Africa. Insects in oral literature and traditions. Peeters, Paris, 197-219.

Gubbi, S., & Linkie, M. (2012). Wildlife hunting patterns, techniques, and profile of hunters in and around Periyar tiger reserve. Journal of the Bombay Natural History Society, 109(3), 165-172.

Gurung, K.K., & Singh, R. (1996). Field Guide to the Mammals of the Indian Subcontinent., San Diego, California, USA: Academic Press.

Heath, M. E. (1992). Manis pentadactyla. Mammalian species, (414), 1-6.

Kaltenborn, B. P., & Bjerke, T. (2002). The relationship of general life values to attitudes toward large carnivores. Human Ecology Review, 55-61.

Katuwal, H. B., Neupane, K. R., Adhikari, D., Sharma, M., & Thapa, S. (2015). Pangolins in eastern Nepal: Trade and ethno-medicinal importance. Journal of Threatened Taxa, 7(9), 7563-7567.

Kellert, S. R., Black, M., Rush, C. R., & Bath, A. J. (1996). Human culture and large carnivore conservation in North America. Conservation Biology, 10(4), 977-990.

Kellert, S. R., Black, M., Rush, C. R., & Bath, A. J. (1996). Human culture and large carnivore conservation in North America. Conservation Biology, 10(4), 977-990.

Kumara, H. N. (2007). Impact of local hunting on abundance of large mammals in three protected areas of the Western Ghats. Karnataka.

Li, Y., & D. M. LI. (1998). The dynamics of trade in live wildlife across the Guangxi border between China and Vietnam during 1993–1996 and its control strategies. Biodiv. Conserv. 7: 895–914.

Lim, N. T., & Ng, P. K. (2008). Home range, activity cycle and natal den usage of a female Sunda pangolin Manis javanica (Mammalia: Pholidota) in Singapore. Endangered Species Research, 4(1-2), 233-240.

Mahmood, T., & Hussain, R. (2014). Habitat preference and population estimates of Indian pangolin ( Manis crassicaudata ) in district Chakwal of Potohar Plateau , Pakistan Habitat Preference and Population Estimates of Indian Pangolin ( Manis crassicaudata ) in District Chakwal of Potohar. Russian Journal of Ecology, 45(January), 70–75.

Mishra, C. (1997). Livestock depredation by large carnivores in the Indian trans-Himalaya: conflict perceptions and conservation prospects. Environmental conservation, 24(4), 338-343.

Misra, M., & Hanfee, N. (2000). Pangolin distribution and trade in East and Northeast India. Traffic Dispatches, 14, 4-5.

Mitra, S. (1998). On the scales of the Scaly anteater Manis crassicaudata. Journal-Bombay Natural History Society, 95, 495-497.Mohapatra, R. K., Panda, S., Acharjyo, L., Nair, M., & Challender, D. W. (2015). A note on the illegal trade and use of pangolin body parts in India. Traffic Bull, 27, 33-40.

Naro, E., Mero, E. L., Naro, E., Kapfo, K. U., Wezah, K., Thopi, K., ... & Chirhah, T. (2015). Project hunt: an assessment of wildlife hunting practices by local community in Chizami, Nagaland, India. Journal of Threatened Taxa, 7(11), 7729-7743.

Nash, H. C., Wong, M. H., & Turvey, S. T. (2016). Using local ecological knowledge to determine status and threats of the Critically Endangered Chinese pangolin (Manis pentadactyla) in Hainan, China. Biological Conservation, 196, 189-195.

Newton, P., Van Thai, N., Roberton, S., & Bell, D. (2008). Pangolins in peril: using local hunters' knowledge to conserve elusive species in Vietnam. Endangered Species Research, 6(1), 41-53.

Nijman, V., Zhang, M. X., & Shepherd, C. R. (2016). Pangolin trade in the Mong La wildlife market and the role of Myanmar in the smuggling of pangolins into China. Global Ecology and Conservation, 5, 118-126.

Panda, S. K., Rout, S. D., Mishra, N., & Panda, T. (2011). Folk uses of some medicinal plants by Kol tribes of Similipal Biosphere Reserve, Orissa, India. International Journal of Biological Technology, 2(1), 16-20.

Parry, D., & Campbell, B. (1992). Attitudes of rural communities to animal wildlife and its utilization in Chobe Enclave and Mababe Depression, Botswana. Environmental Conservation, 19(3), 245-252.

Rangarajan, M. (2001) India's Wildlife History: An Introduction. Permanent Black, New Delhi, India.

Reels, G. (1996). Distribution of large mammals in Hong Kong. Porcupine, 15(36), 6.

RICHER, R., Coulson, I. A. N., & HEATH, M. (1997). Foraging behaviour and ecology of the Cape pangolin (Manis temminckii) in north-western Zimbabwe. African Journal of Ecology, 35(4), 361-369.

Roberts, T.J., Mammals of Pakistan, Karachi, Pakistan: Oxford Univ. Press, 1997.

Robinson, J. G., & Bennett, E. L. (2004, November). Having your wildlife and eating it too: an analysis of hunting sustainability across tropical ecosystems. In Animal Conservation forum (Vol. 7, No. 4, pp. 397-408). Cambridge University Press.

Sharma, B.K., 2014. Pangolins in trouble. Sanctuary Asia.

Shimray, U.A. 2001. Ethnicity and socio-political assertion: the Manipur experience. Economic and Political Weekly 36: 3674-3677.

Southwood, T.R.E. (1966). Ecological Methods, with Particular Reference to the Study of Insect Populations. Methuen, London, 391pp.

Srinivasulu, C., & Srinivasulu, B. (2012). South Asian Mammals. In South Asian Mammals (pp. 9-98). Springer, New York, NY.

State Forest report, Manipur, Imphal. 2005, 102-104.

Sterling, E.J., M.M. Hurley & D.M. Le (2006). Vietnam: a Natural History. New Haven/London: Yale University Press.