

## Review

# Wildlife hunting and conservation in Northeast India: a need for an interdisciplinary understanding

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**Abstract** Northeast India is rich in biodiversity and is also home to around 145 tribal communities, most practise shifting cultivation and are dependent on forests. Hunting is common and widespread in this region. Of the 50 Galliformes species native to India, 32 occur mainly or exclusively in the north-east of the country. The practice of wildlife hunting is seen as one of the significant contributors towards population decline and the possible extinction of some species. Research on wildlife hunting is at a preliminary stage in providing base line data on species presence and abundance. Hunting among tribal populations in this region is not just an entrepreneurial activity or a practice that is primarily aimed at consumption but has a larger socio-cultural link which is missing in the academic work produced from Northeast India. In this paper, I explore three aspects of wildlife hunting in Northeast India that have typically been studied separately: ecological, socio-political and cultural. I reviewed peer-reviewed and grey literature and found that there are few detailed studies of any aspect of hunting in Northeast India. There are surveys and reports that concentrate on the ecological aspects of hunting although all but a few lack detail. There are similarly few studies that have assessed the socio-economic background against which hunting takes place or have attempted a cultural understanding of hunting. I highlight the concern that conservation in this region may not be effective without a socio-cultural understanding of hunting. The paper makes an appeal to conservationists and ecologists to integrate anthropological, socio-economic and ecological strands to provide a genuinely multidisciplinary approach to understanding and addressing this serious issue.

**Keywords** Culture, hunting, indigenous, Northeast India, socio-economic, wildmeat,

## Introduction

Wildlife hunting is an age-old practice and humans have been hunting wild animals for many generations. Wildlife is an important resource for those communities that live in and around forests and is exploited for various reasons, including food, additional income, cultural practices and as a sport. Over the last few decades the extraction of wildmeat has become a serious concern globally because of suggestions that hunting is leading to the extinction of wildlife populations (Bennett et al., 2002; Robinson & Bennett, 2000). Indeed, overexploitation is thought to be the reason why 26% of Galliformes are listed on the IUCN Red List as threatened with extinction compared with 12% of all birds (Keane et al., 2005; McGowan, 2010). In this paper, I aim to provide a comprehensive understanding of hunting of a wildlife population in general and do not aim to focus solely on Galliformes because hunting is an issue that influences conservation more broadly; however understanding hunting in general will benefit Galliformes conservation.

The link between hunting and the socio-economic needs of local people is a major reason why wildlife hunting is seen as a difficult issue to address. This is because of the need to balance the impact of hunting on wildlife populations with the dependency of some rural communities on wildlife for food as it is the only protein available in some regions (Fa et al., 2003). Finding a way forward that will avoid species extinctions and not compromise rural communities requires a much greater understanding of ecology, anthropology and

socio-economics than we currently have and nowhere is this a bigger challenge than in Northeast India, home to 32 species of Galliformes (Sathyakumar & Sivakumar, 2007).

There are numerous studies on wildlife hunting across the globe highlighting the seriousness of this issue (Bennett & Robinson, 2001; Milner-Gulland et al., 2003, Robinson & Bennett, 2004). The majority of wildmeat studies in the conservation literature have been focused largely on the quantification of offtake and hunting effort (Jerozolimski & Peres, 2003; Rist et al., 2008). These ecological data are further developed as sustainability models to predict the impact that recorded levels of hunting may have on population levels (Wilkie et al., 1998; Swart et al., 2004).

Wildmeat researchers have used different approaches to understand the problem such as market surveys to quantify the trade, market accessibility and consumer profile (Juste et al., 1995). Recent studies compared different methods that researchers adopted to examine hunting and these studies evaluated their advantages and disadvantages (Gavin et al., 2010).

There are relatively few studies from Asia when compared with Africa (Corlett, 2007; Alvard, 2000) and micro-level information on hunting by indigenous people is even more scarce (Griffin & Griffin, 2000; Rao et al., 2005). In India, the emphasis of hunting studies has been on international trade of wildlife (tiger skins, ivory and leopard parts) which has been the focus until recently, and data on local and indigenous hunting in India is very sparse (Madhusudan & Karanth, 2002, Kumara & Singh, 2004; Kaul et al., 2004). Northeast India has witnessed only a few studies (Datta, 2002; Hilaludin et al., 2005; Aiyadurai et al., 2010) and so there is a lack, not only of detailed knowledge of species hunted and offtake, but also of socio-economic importance of hunting to local livelihoods. In Northeast India, hunting by tribal populations is not just of economic concern but has wider cultural importance as well (Elwin, 1959; Aiyadurai, 2007b) and this is important for understanding the reasons why hunting is so widely practised.

This paper is a first assessment of what we currently know about the ecological, cultural and socio-political aspects of hunting in Northeast India where hunting is widespread amongst the largely tribal population.

The aim of this paper is (1) to review the current understanding of wildlife hunting in Northeast India from three perspectives: ecological, socio-political and cultural; and (2) to make a case that conservation in this region needs a new approach.

### **India's Northeast**

India's Northeast is a region of rich biodiversity and of considerable ethnic diversity. It is located between 22° N and 29.3° N latitude and 89.7° E and 97.8° E longitude. The region occupies an area of 2,55,500 km<sup>2</sup> and comprises eight states, viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura (Fig. 1). It occupies 7.7 % of India's total geographical area and supports 50 % of the flora (ca. 8000 species) of which 32 % (ca. 2526 species) are endemic (Anonymous, 2006; Yumnum, 2008).

The region is an ethno-botanical transition zone between India, China, Tibet, Burma and Bangladesh (Ali & Das, 2003) and is home to 45 species of Galliformes (Sathyakumar & Sivakumar, 2007) (Table 1). The fauna and flora are used by the local people for a wide variety of socio-economic and medicinal purposes (Solanki & Chutia, 2004; Kato & Gopi, 2009; Dollo et al., 2010). The human population is mainly rural and practise swidden farming (clearing a field by slashing and burning, planting it for a number of seasons and then abandoning it for a lengthy fallow period) which is markedly different from the more intensive farming that is characteristic of most of rural India. Dependence on forests for firewood, bamboo and other forest produce is high.

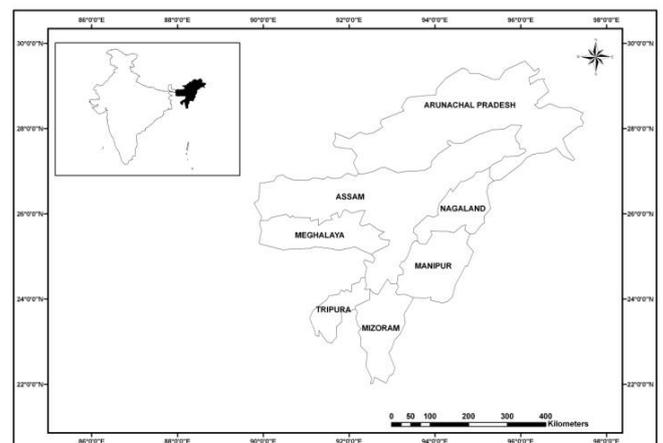


FIG. 1 The Northeast region is highlighted black in the insert and the eight states that make up Northeast India are shown.

TABLE 1 List of Galliformes in Northeast India, their population and status on the Indian Wildlife Protection Act (IWPA), 1972 (as amended up to 1993).

Common name	Scientific name	Population	Hunting	IUCN	IWPA
Snow partridge	<i>Lerwa lerwa</i>	Fairly common		Least Concern	IV
Tibetan snowcock	<i>Tetraogallus tibetanus</i>	Uncommon		Least Concern	I
Himalayan snowcock	<i>Tetraogallus himalayensis</i>	Fairly common		Least Concern	IV
Buff- throated partridge	<i>Tetraophasis szechenyii</i>	Rare		Least Concern	IV
Black francolin	<i>Francolinus francolinus</i>	Common		Least Concern	IV
Chinese francolin	<i>Francolinus pintadeanus</i>	Rare		Least Concern	IV
Swamp francolin	<i>Francolinus gularis</i>	Fairly common	✓	Vulnerable	IV
Tibetan partridge	<i>Perdix hodgsoniae</i>	Fairly common		Least Concern	IV
Common quail	<i>Coturnix coturnix</i>	Fairly common		Least Concern	IV
Japanese cuail	<i>Coturnix japonica</i>	Fair	✓	Near Threatened	IV
Blue quail	<i>Coturnix chinensis</i>	Uncommon		Least Concern	IV
Rain quail	<i>Coturnix coromandelica</i>	Common		Least Concern	IV
Jungle bush-quail	<i>Perdicula asiatica</i>	Fairly common		Least Concern	IV
Manipur bush-quail	<i>Perdicula manipurensis</i>	Rare	✓	Vulnerable	IV
Hill partridge	<i>Arborophila torqueola</i>	Fairly common		Least Concern	IV
Rufous- throated partridge	<i>Arborophila rufogularis</i>	Fairly common		Least Concern	IV
White-cheeked partridge	<i>Arborophila atrogularis</i>	Fairly common	✓	Near Threatened	IV
Chestnut-breasted partridge	<i>Arborophila mandellii</i>	Uncommon	✓	Vulnerable	IV
Mountain bamboo-partridge	<i>Bambusicola fytchii</i>	Uncommon		Least Concern	I
Blood pheasant	<i>Ithaginis cruentus</i>	Fairly common		Least Concern	I
Satyr tragopan	<i>Tragopan satyra</i>	Rare	✓	Near Threatened	I
Blyth's tragopan	<i>Tragopan blythii</i>	Rare	✓	Vulnerable	I
Temminck's tragopan	<i>Tragopan temminckii</i>	Rare		Least Concern	I
Himalayan monal	<i>Lophophorus impejanus</i>	Fairly common		Least Concern	I
Sclater's monal	<i>Lophophorus sclateri</i>	Rare		Vulnerable	I
Red junglefowl	<i>Gallus gallus</i>	Common		Least Concern	IV
Kalij pheasant	<i>Lophura leucomelanos</i>	Common		Least Concern	I
Tibetan eared-pheasant	<i>Crossoptilon harmani</i>	Rare		Near Threatened	I
Mrs Hume's pheasant	<i>Syrmaticus humiae</i>	Rare		Vulnerable	I
Grey peacock pheasant	<i>Polyplectron bicalcaratum</i>	Fairly common		Least Concern	I
Indian peafowl	<i>Pavo cristatus</i>	Common		Least Concern	I
Green peafowl	<i>Pavo muticus</i>	Rare	✓	Vulnerable	IV

### **Ecological understanding of hunting**

Northeast India's biodiversity has been subject to a growing academic interest among ecologists, both within India and from other countries. This is partly because the region has been included within the Eastern Himalaya 'biodiversity hotspot' (Myers et al., 2000).

Ecologists identify hunting as one of the primary threats to wildlife populations in Northeast India (Pawar & Birand, 2001; Datta, 2002; Mishra et al., 2006). Furthermore, there is an increasing number of status surveys and anecdotal records from Northeast India which further suggest that hunting is a significant threat to many species (Kumar & Solanki, 2008; Mishra et al., 1998; Choudhury, 2006; Ghose, 2003). They have so far focussed on gathering basic information on species data, such as identifying which species are present and what their distribution is, which species are hunted and how many individuals there are, and what the overall biomass extracted is (see for example Hilaludin et al., 2005; Solanki & Chutia, 2004). Studies on the impact of hunting on the wild population are only just starting.

Camera trapping in Namdapha National Park in Arunachal Pradesh indicates the absence of large carnivores and an 'empty forest' (Datta et al., 2008). However, quantitative information of the effect of observed levels of offtake on wild populations of hunted species in Northeast India is in desperately short supply. Preliminary data of animals hunted is available from different parts of Northeast. For example, Mishra et al.'s (2006) study in Western Arunachal Pradesh (Tawang and West Kameng) reported a list of at least 26 mammals hunted locally. Aiyadurai et al. (2010) reported 33 species of mammals hunted by tribes of Arunachal Pradesh from East Kameng, Lohit and Anjaw districts. Hilaluddin et al., (2005) reported hunting of 134 wild animals (mammals, birds and reptiles) from Nagaland, Mizoram and Arunachal Pradesh. Chutia (2010) reported 43 species of mammals hunted in Nagaland and Arunachal Pradesh. These studies provide basic data on species hunting, the reasons behind hunting and also the changes in the hunting patterns. No conclusions about the sustainability of hunting can be drawn from these studies.

In this paper, I highlight the fact that studying hunting from an ecological point of view is one aspect, but other linkages like markets and changes in socio-economic aspects give a

bigger picture, which needs serious examination. I argue that conservation interventions largely focus on communities but the broad level changes are not considered when planning conservation interventions. This needs to be addressed.

Interestingly, new species of mammals and birds have been discovered recently from this region leading to further scientific explorations and ecological surveys. In 2004, a new subspecies of Sclater's monal pheasant *Lophophorus sclateri* was discovered (Kumar & Singh, 2003). A new species of primate, the Arunachal macaque *Macaca munzala* from Tawang District was discovered in 2005 (Sinha et al., 2005), and a year later, a new bird species *Liocichla bugnorum* was reported near Eagle Nest Wildlife Sanctuary in Arunachal Pradesh (Athreya, 2006). Northeast India is still largely understudied ecologically and these discoveries give an idea of the richness of the region's biodiversity. Moreover, saving these 'extremely rare' species means stricter regulations are likely to be further imposed, with its implications on wildlife hunting by local people.

### **Socio-political understanding of hunting**

Research on wildlife hunting shows a recent shift towards examining the use of wildlife by local people and its socio-economic-cultural role (Aiyadurai, 2009; Dollo et al., 2010). Hunting is illegal in India, but because the rural people of the Northeast have always hunted it is considered a traditional right. The destruction of wildlife in any form was made unlawful in 1972 when the Wildlife Protection Act was enacted (Anonymous, 1994). The law was promulgated in response to the rapid decline of India's wildlife. The Indian Wildlife Protection Act is a comprehensive law for protecting India's biodiversity, and it prohibits hunting of any species and trade in trophies, animal articles and derivatives. A complete ban on hunting of wildlife species has affected the livelihood of many communities in India (Dutt, 2004; Gadgil & Malhotra, 1998). In remote areas, however, such as Northeast India, hunting still continues, largely due to its linkages with local customs. The awareness of conservation and sustainability issues is extremely low and in places people who are aware continue to hunt because of traditions and cultural norms.

The lack of economic alternatives or any other means of sustaining livelihoods in the region

ties villagers to the forest and they remain dependent on wildlife hunting. Species like musk deer and black bear are targeted because they command a good price. In the Mishmi Hills of Arunachal Pradesh, the market price of a musk deer pod (*Moschus* sp.) is ₹10,000<sup>1</sup> (£126) per *tola* (10 gms). The pods (scent glands) are not used locally but are sold to *marwaris*<sup>2</sup>. Pods are then exported illegally to international markets and used in making perfumes. The black bear is targeted for its gall bladder from which bile is extracted and used in making traditional Chinese medicine. It is sold locally for ₹5000 (£63) per *tola* (10 gms). The demand for soft and waterproof otter skins is high in the international trade and each skin is sold for ₹8000-10000 (£100-125) to buyers from outside the region, e.g. from Myanmar. Other than highly priced products, animal skulls and skins are shared and sold as a trophy material and occasionally bartered for bottles of alcohol with the defence personnel posted on the international borders. Government officers are often given animal skins and some even ask villagers for particular animal skins or teeth (Aiyadurai et al., 2010) also pers obs).

Though the major consumers of wildmeat in Northeast are the rural communities, in Nagaland, high income families also eat wildmeat which they see as a luxury. As elsewhere in the region, people living in comparatively remote areas have limited access to markets and are largely dependent on wildmeat. Those who have migrated to cities and towns, however, maintain their preference for the taste of wildmeat. The belief in Nagaland is that wildmeat is 'purer' than domesticated meat, and as a result the people pay up to five times the price (Hilaludin et al., 2005). In Mizoram, people with higher education hunt less due to limited availability of time to hunt, but in Nagaland, the Angami higher income resulted in greater extraction of wildmeat.

People use both guns and locally prepared traps to hunt wildlife. The state government of Arunachal Pradesh issued gun licences in the 1950s to villagers to protect their crops and wild animals, but the arrival of guns in the Northeast goes back to the British

administration in Arunachal Pradesh, erstwhile NEFA (North East Frontier Agency), Naga Hills and other parts of Northeast India. Guns were used as 'political presents' which were paid as gifts to tribal chiefs for friendship and alliance by colonial frontier officials (Bailey, 1912; Mainprice, 1945). The local villagers then replicated these guns resulting in the proliferation of small arms, which probably had serious consequences on off-take (Aiyadurai et al., 2010). The presence of guns over time has become a symbol of prestige and gun licences are given by local politicians to gain the favour of the influential men in the village in exchange for their votes during local elections. Furthermore, the arrival of markets has increased accessibility to sophisticated weapons and ammunition and the growth of markets has led to a shift from cultural value to economic value of wildlife products. Animal parts that earlier had a mainly cultural value and were used as part of traditions are now sold for cash income. In Nagaland, a Kalij pheasant *Lophura leucomelanos* is sold for ₹110 (£1.6) whereas in Walong (Arunachal Pradesh), pheasants are priced at ₹200 (£2.7) (Hilaludin et al., 2005; Aiyadurai, 2007a). A villager would share wildmeat with family members and villagers to maintain kinship ties, but with an economic value attached to it, wildmeat is often traded in the market.

Hunting in Northeast India is also a traditional leisure activity for various tribal communities, and politicians and bureaucrats also take part in modern day hunting. People who have moved to towns in search of jobs continue to maintain this tradition by hunting during weekends (see Das, 2010). In Khonoma village, urban elites come to stay in their village during the long winter vacation, and hunt during the month of January just after Christmas celebration. This is also true around Nagaland's 'Green Village' and their conservation activities in the Tragopan Sanctuary. This is a community-led initiative for conservation (D. Das, pers comm). Although hunting is banned, and conservation efforts are continuously being promoted by conservation NGOs, they may not deliver the expected results. According to Das (2010) 'most of the conservation conscious people who also acted as members of the conservation project in various capacities did not find it wrong to hunt wildlife outside the village where they worked as teachers, government servants and as contractors' (Das, 2010:175). People who are involved in conservation programmes may not hunt themselves due to lack of hunting skills,

<sup>1</sup> Price shown is from 2006 in Anjaw district of Arunachal Pradesh. See Aiyadurai (2007a).

<sup>2</sup> Traders from Rajasthan who run small businesses and travel in and out of Arunachal Pradesh frequently.

but they are happy to accept hunted animals offered by other villagers, instead of saying 'No' to such practices. When the elite members visit their village for a holiday, they pressurize the local members of the conservation projects to allow hunting, and sometimes hunting is permitted for a month. Here the power and influence of elite and educated people is used to justify that it is their culture to hunt and rules are at times relaxed. Cultural practices are prioritized over conservation in places like Northeast India. Elsewhere, school teachers and government clerks use their motorbikes to travel further into the forests with their guns to shoot birds during their free time; often politicians and officers encourage hunting (Aiyadurai, pers obs). Due to lack of employment options, a traditional activity like hunting becomes beneficial for local people especially given the proximity to Myanmar and to wildlife trade routes in China (Datta, 2007).

The rise in human population is often a concern. During 1991–2001 the human population in Arunachal Pradesh increased by 27%, whereas the average increase for India was 21% (Anonymous, 2006). Migration from other states has led to a four-fold growth in the human population since 1947 (Anonymous, 2006). More than local population pressure, it is the demand from urban populations for wildmeat and the diffusion of new technologies of hunting that are causing the change.

The impact of socio-political changes in the region can be seen in the cultural practices. The linkages between these changes are built through several external actors like the defence personnel, traders or buyers who contact local go-betweens for purchasing, selling or exchanging of wildlife products. Through these channels, an informal commodity chain of trade is established. As cash becomes important in the local economy, wildmeat sale or trade through local gatekeepers becomes a profitable means to sell animal products rather than using them within the village. The demand for cash is becoming more than in the past, as cash is used to send children to school, used for medical care and to purchase commodities that are usually not available in the village. These basic needs draw people to enter into such exchanges. A very well known hunter in Anjaw in Arunachal Pradesh told me that he bartered a leopard skin for a crate of beer from a defence official and these beer bottles were later sold on a lottery to make more money. The lottery was run on a weekly basis which fetched him a

larger amount of cash. Another example is from a popular Hindu religious site '*Parshuram kund*' in Lohit district (Arunachal Pradesh) which is visited by large numbers of pilgrims during January for a religious fair. This fair has been long used as a site for trading of local wildlife products, but with the increase in transportation and communication facilities, the temple site has become the centre of exchange between outside traders (*marwaris*) and local villagers, in this case Mishmis. Local hunters look forward to this fair in January which also coincides with the hunting season and provides a chance for hunters to sell their products at a profitable price. It is a cultural, religious and trade gathering which is beneficial as it is easier to meet potential buyers and bargain for a good price. Knowledge of what is going on now is important in understanding the multiple linkages that point to changing wildlife hunting practices. This network of actors, sites and reasons clearly indicate that simplistic conservation prescriptions, such as controlling or restricting hunting, will not help conservation to succeed.

### ***Cultural & anthropological understanding of hunting***

In a predominantly Hindu state, India's forests and animals are afforded religious and cultural protection (Rangarajan, 2001). Several species, such as elephants, tigers, and monkeys are worshipped and have an important role in Hindu mythology. The animist tribes of the Northeast however, do not share this religious tradition and several wildlife species are hunted for cultural and religion reasons.

The Northeast region of India largely has tribal populations living in close proximity to forests and their relationship to forests show stronger linkages with forest spirits. The pioneering work of Alex Aisher with the Nyishi community of Arunachal Pradesh throws light on the forest spirits and how they influence the way that people feel about their interactions with the ecosystem, thus emphasizing the intricate relationship local people share with their environment (Aisher, 2007). Similar observations were made among the Mishmi of Arunachal Pradesh who believe that *shuttho* (mountain spirit) takes care of the mountains and the animals that reside there (Kri, 2008; Aiyadurai, 2009). Such beliefs are also followed by indigenous groups in other parts of Asia; for example, according to the Kerinci people of Sumatra, wild animals in the forest are thought

to have a spiritual 'herdsman' who own these animals (Bakels, 2004).

Displays of wild animal skulls and skins are a common sight amongst the Miju Mishmi tribe. Wild boar *Sus scrofa*, takin *Budorcas taxicolor*, serow *Nemorhadus sumatrensis*, goral *Nemorhaedus goral* and Asiatic black bear *Ursus thibetanus* are some of the animals whose skulls are mounted on a neatly made bamboo frame which is found in every rural Miju Mishmi house in Arunachal Pradesh.



FIG. 2 Wild animal skulls displayed by the Miju Mishmi tribe

These skulls are tar-black (Fig. 2), the result of an occasional varnish of animal blood from frequently sacrificed domestic livestock. Skins of goral and Malayan sun bear *Helarctos malayanus* are used as mats. According to the animistic belief in Northeast tribal communities, sacrifices of domestic livestock are necessary to appease the spirits so that the village is protected from disease and famine. Domestic animals are offered to the spirits and in turn,

villagers receive animals during their hunting expedition from the spirit world.

It is important to emphasize here that several indigenous groups across the globe have similar beliefs about wild animals and hunting. The exchange of vital force between the human world and the spirit world through domestic animal sacrifices from human to spirits and vice versa during hunting is seen as an important process (Close et al., 1930; Singh, 1987). Among Asian hunting societies in China and Indonesia, hunting is a significant social activity and wild animals are powerful as subjects of myths, symbols and omens (Donovan, 2004). Hunting continues to play an integral part in several indigenous societies in spite of major social and economic adaptations and remains at the 'heart of the culture' as described for Agta indigenous groups in the Philippines (Estioko-Griffin & Griffin, 1981).

Unlike in the western world, for indigenous people the boundary between the human world and the natural world is often blurred. Humans are considered part of the natural systems, and animals, trees and rivers are believed to be 'people' with emotions and feelings. Two major concepts which are central to almost all indigenous groups are the presence of 'souls' in all objects (animate and inanimate) and the existence of an 'owner of the forest'.

Souls are sometimes referred to as spirits and the deep forests as a 'spirit world'. Among the Chewong of peninsular Malaysia, soul is believed to be present in inanimate objects, and the presence of 'another world' is common to the Nishi group in Arunachal Pradesh (Aisher, 2007). According to Ingold (1980), hunting in indigenous societies is seen not just as a normal survival activity but as a 'world renewing process' that is required for circulation and regeneration of life.

Unfortunately, there is a serious lack of such in-depth academic studies in Northeast India to highlight the relationship between forests and people with emphasis on hunting. Anecdotal observations from the region emphasize that hunting and the presence of wildmeat is important in local peoples' customs. Hunting has been an important activity with a great pride attached to it. Gifting fresh or smoked wildmeat is a traditional norm and practised during festivals. Wildmeat is offered as a bride price during weddings and is regarded a status symbol.

Among the Apatani tribe in Nagaland, religious rituals include offerings of smoked Indian palm squirrel or five-striped palm squirrel *Funambulus pennanti*, particoloured flying squirrel *Hylopetes alboniger* and orange-bellied Himalayan squirrel *Dremomys lokriah*; they also sacrifice Assam macaques *Macaca assamensis* to propitiate their deity during their annual spring festival, 'Morum'. The festival's feasting includes a voluminous amount of barking deer *Muntiacus muntjak* and wild boar *Sus scrofa* meat (Hilaludin et al., 2005).

Among the Nishi tribe, barbets, specifically the great barbet *Megalaima virens*, are often served to entertain special family guests. Nishi priests decorate their headgear with Asiatic black bear *Ursus thibetanus* skins and a pair of hornbill tail feathers. Furthermore, Nyishi prize the skin of capped langur *Presbytis pileatus* and black bear skin for making sheaths for their traditional machetes and as shoulder belts (Aiyadurai & Varma, 2003).

Orange-bellied squirrels are gifted by Adi men to the bride's family during marriage ceremonies in Arunachal Pradesh (Das & Shukla, 2007). Tribes in Mizoram use meat of the Assam macaque during pregnancy and this is believed to aid the development of the infant; bats are supposed to cure asthma; the gall bladder of the Asiatic black bear heals jaundice; and the liver of the hoolock gibbon *Hylobates hoolock* kills malarial parasites. Angamis consume hoopoe *Upupa epops* to alleviate male impotency. Mishmi prepare hand fans from pheasant tails (Fig 3). Mishmi shaman priests keep these fans, which are used when the priests chant and these fans can be found in most Mishmi houses.

The hunting practices are undergoing several changes for socio-economic and political reasons. These changes can be seen in the erosion of cultural practices that were followed in the past. Hunters follow certain taboos which are related to conservation practice to prevent over-hunting of animals. For example, the yellow-throated marten *Martes flavigula* is not hunted and not eaten by Miju Mishmi; if it gets caught in the traps set for other animals, it is buried in the soil immediately. Similarly, hunting of hoolock gibbon is taboo in Miju Mishmi villages in Lohit district. Even sighting one is considered extremely inauspicious, especially for pregnant women who strongly avoid seeing one - it is believed that the sighting leads to the death of the baby. The

belief system plays a key role in maintaining such taboos. Currently, there is a large scale conversion of Miju Mishmi to Christianity. Interestingly, those villagers who have converted have abandoned the ritualistic way of worshipping spirits and have stopped displaying the animal skulls in their huts, but they continue to hunt.

Hunting practices appear not to have been affected even after the belief system is altered, but what is serious is the erosion of taboos among those who have been converted. Such developments also threaten local culture and may thus change villagers' relationships with wildlife and nature. For example, a shift towards Christianity in Arunachal Pradesh could lead to more hunting of species that were previously protected by hunting taboos. Therefore any steps taken to control hunting will need careful planning. In this region, hunting is not just an economic activity but is linked to the cultural practices of local communities.

### **Hunting and the challenges of wildlife conservation in Northeast India**

In places like Northeast India where forest use and wildlife hunting is part of the daily lives of human population, conservation in any form will not be easy, whether it is through protected areas or through community participation. West (2006) from her experiences in Papua New Guinea among the Gini indigenous people, wrote that 'remote rural communities often see conservation projects as a kind of developmental strategy that would provide education, health care and improve the quality of life, in exchange for their co-operation and participation in conservation projects'. Although nature conservation projects carry good intentions they often fail to engage with the socio-political and historical realities of how communities have evolved. Moreover, conservation workers have little appreciation of the indigenous concept of nature and local ways of conservation, and therefore conservation programmes have had little success trying to educate people about conservation (Sillitoe, 1988).

Most villagers perceive wildlife as an inexhaustible resource and do not expect wildlife to go extinct due to hunting (Aiyadurai, pers obs). Similarly in Vietnam, villagers do not seem to consider the loss of certain species as a problem and species extinction is not perceived as a problem (Donovan, 2004). This

perception that wildlife is in plenty is strongly rooted and thus communities may not participate actively in conservation projects.



FIG. 3 Pheasant tails are used to produce fans. 1. Himalayan monal *Lophophorus impejanus* (male), 2. Blyth's tragopan *Tragopan blythii* (male), 3. Grey peacock-pheasant *Polyplectron bicalcaratum* (male), 4. Himalayan monal *Lophophorus impejanus* (female), 5. Grey peacock-pheasant *Polyplectron bicalcaratum* (male), 6. Blyth's tragopan *Tragopan blythii* (male), 7. Temminck's tragopan *Tragopan temminckii* (male), 8. Sclater's monal *Lophophorus sclateri* (male).

There are innovative approaches to either stop or regulate hunting in Arunachal Pradesh. Erstwhile hunters are employed as field assistants in wildlife monitoring programmes and villagers have taken a stand against hunting by taking a pledge (Datta, 2007). Conservation NGOs provide medical support, training in health care, and education to the community, and they encourage people's participation in wildlife research as part of 'community conservation'. In 2001, a wildlife-based NGO distributed fibreglass hornbill beaks to Nyishi tribe people for whom the hornbill beak is a symbol of manhood and valour, but many areas especially in eastern and central Arunachal have seen such high hunting pressure that the great hornbill has become extremely rare (WTI, 2001). The Village Development Councils also announced a fine of ₹5,000 (£69) for any person caught hunting hornbills. The artificial beaks became popular and were widely accepted by the Nyishi men.

The impacts of these initiatives need assessment both ecologically and sociologically.

The vision of conservation NGOs in the region is to secure India's natural heritage, and many of them also use community participation as a tool to conserve natural resources. It is time to look at conservation in regions like Northeast India not from a purely ecological point of view but from an interdisciplinary perspective. A conservation strategy may be ecologically appropriate but socially unsuitable or unacceptable. It is high time that conservation projects are evaluated not only in terms of how much forest area is protected, whether the wildlife numbers increased or not during the census, or whether or not there is community participation, but on how the benefits of the conservation is shared among a community, who benefits and who is not benefitted and why.

Infrastructural and economic development in Northeast India is an important issue. There are about 100 hydroelectric dams planned in Arunachal Pradesh which could adversely affect the biodiversity. Without proper Environmental Impact Assessments (EIA) there is a danger that these will result in damage to wildlife populations. There is no doubt that the government of Arunachal is following the conventional 'development' path. Elwin (1959) was concerned about the developmental policies that Arunachal Pradesh might adopt, and strongly advocated that "development work in combination with the cultural and social sensitivities of the people of Arunachal Pradesh is the best way forward", but unfortunately the development trajectory of Northeast India does not seem have taken any leads from Elwin's policy.

### **The way ahead**

Wildlife conservation involving communities can be particularly challenging when it involves indigenous people with a tradition of wildlife hunting. In regions like the Northeast where wildlife hunting is a way of life, conservation through engagement of communities and their effectiveness needs to be debated. The challenge before the government as well as conservation NGOs is to find a middle ground where conservation can run hand in hand with communities' aspiration for which a holistic understanding is vital. Attention is needed not only from ecologists but also from social scientists, conservationists and those from the development sector who must work together to

seek solutions to help save species like Galliformes which are threatened with extinction and are important for subsistence economies, diet, culture and commerce of mankind the world over (McGowan & Garson, 2002).

As more and more ecologists and wildlife researchers are becoming conservationists, it is questionable whether they have the skills and knowledge to deal with social issues when it comes to community conservation. The gap between ecologists and social scientists is wide and there is a clear need for interdisciplinary approaches to environmental conservation (Guha, 1997; Adams, 2007). Similarly, Saberwal & Kothari (1996) indicated that social sciences and humanities are absent from most conservation biology or wildlife management courses in the developing world. As Adams (2007) put it, "if we are to make real progress in conservation we have to take the challenges of the communication between different academic ways of understanding the world seriously" (p. 276). Approaches from other disciplines need to be incorporated in understanding conservation issues and during implementation of projects. Sillitoe (2009), an anthropologist who studies hunting in Papua New Guinea, felt that agencies concerned with protecting biodiversity should consider tacit knowledge of indigenous groups about hunting. He also recommended that "...it seems sensible to use extant cultural channels to explore with people conservation priorities, for example to promote the notion of conservation within the context of hunting, not in opposition to it" (p. 389).

For a country like India, with huge population pressures and increasing economic development, it is a big challenge to ensure that wildlife resources remain for the benefit both of local people and of the country. Therefore, a systematic cultural understanding of hunting is needed, without which there is a significant risk of doing more harm than good to the local communities when trying to stop wildlife hunting from leading to species extinctions.

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### Biographical sketches

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