Status, Values and Challenges in Chiropterans Conservation

Richa Niraula[1] and Sunny Jha[2]
Corresponding author: Richa Niraula
Email: richaniraula@gmail.com

Abstract

Chiropterans (Bats) comprise 1,001 species in total and are distributed worldwide. These have high ecological and economical value. Nepal comes under the highlighted sub-region in the South Asia owing to the abundance of bats over here. Yet, very few detailed analyses have been done, and the exact status including biological habits are still not properly documented. This has made already vulnerable population more vulnerable with a continuous threat that some valuable species might get lost even before realizing. This paper provides insight to the status of bats in Nepal, the challenges present in their conservation and the ways ahead.

Key Words: Chiropterans, Ecological Value, Economical Value, Issues and Challenges.

Introduction

The order Chiroptera contains 1,001 species of bats globally, and are sub-categorized as Megachiroptera (Fruit bats) and Microchiroptera (Insectivorous bats), on the basis of their specialization in feeding habitat and morphological adaptation (Hutson et al. 2001). Among the total of 1,001 species of the bats found, about half are currently at risk (SMM 2011). These are distributed worldwide with the exceptions of the areas of the Arctic and Antartic, and isolated oceanic islands (Mickelburgh et al.1992). In the Northern Hemisphere, Palaearctic bats have been recorded as far as north as 70ºN (Rydell et al. 1994), while in Southern hemisphere, bats have been found south of Tierra del Euego in Chile, at a latitude of 65ºS (Koopman 1967). In South Asia alone, 17 species are endemic out of the total 123 species found.

These come under highly overshadowed and neglected species all over the world. Lack of public awareness, enough documentation and research and lower charismatic value in comparison to other flag species have always kept bats in the lower order in the conservatory aspects. With the celebration of United Nations decade of biodiversity (2010-2020), this

[1] Student, Kathmandu Forestry College

year 2011 coincides with both year of Forest and year of Bats. Even with this, bats are still mysterious and very little is known about them. This paper talks about the ecological and economic values of the bats, conservatory issues and the ways forth.

Ecological and Economical value of Bats

Fruit eating bats play an important role in the pollination and seed dispersal of many tropical plants. In the Neotropics, phyllostomoid bats act as seed dispersal agents for up to 24% of forest tree species at some sites (Humphrey and Bonaccorso, 1979). There are over 100 phyllostomoid species that are responsible for dispersing seeds of pollinating plants, many of which are commercially valuable (Dobat and Piekert-Holle, 1985). For instance, an individual *Carollia,* one of the most important disperser for the *Piper* species in Neotropics, and crucial to many pioneer plants, eats about 35 *Piper* or 8-10 *Cecropia* fruits in a typical night. It moves relatively short distances before consuming these fruits, with the result that most seeds are dispersed close to the parent plant. Each bat may eat up to 60,000 seeds a night; a colony of 400 could disperse 146 million seeds annually. Even if only 0.1% of these germinate, that represents 146,000 seedlings (Fleming, 1988). In the neo-tropics, the bat dispersed plants, such as*, Cecropia, Piper* are among the first and most abundant species to invade natural and human-made clearings (Hutson et al.2001). Apart from their contribution in seed dispersal, bats also have profound role in pollination of many plant species.

Insectivorous bats are also crucial from both ecological and economical aspect. However, economical aspect has not been analysed in detail for them unlike for fruit consuming bats (Fujita and Tuttle, 1991). Some of the insectivorous bats consume very large quantities of insects. For example, in the USA, *Tadarida brasiliensis*, which can roost in colonies numbering 20 million, may ingest 50-70% of its body mass per night(Kunz et al.1995) and *Myotis lucifugus* as much as 100%(Kurta et al. 1989).In a study in Southeastern Ontario, Canada, little brown bats (*M.lucifugus*) fed predominantly on mosquitoes, which was revealed by the mosquito remains in 85% of the total faecal samples, suggesting that this species could play an important role in the biological control of insect pests (Fascione et al.1991). Bats also consume a variety of other insects including Lepidoptera, Coleoptera, Homoptera, Hemiptera and Trichoptera (Ross, 1967; Black, 1974; Kunz, 1974a; Whitaker and black, 1976; Anthony and Kunz, 1977; Whitaker et al.1977; Warner, 1984; Swift et al.1985; Dalton et al. 1986; Rydell, 1986; Kunz et al. 1995).

Guano, Bats' faeces also have high economic value as fertilizer. It comes in the top ten biological fertilizer in the world (Adhikari, 2008). Though it has been replaced by the chemical fertilizers in developed countries, it is still an important source of revenue in developing world (IUCN 2001).

Snakes, hawks, owls are the natural predators of bats. This mutual relation between the prey and predator makes the ecosystem run smoothly.

Abundance and Condition in Nepal

Nepal comes under the highlighted sub-region within Asia owing to the 40.6% coverage in bats availability in South Asian region. At least, 37 species are known to live and breed in Nepal (BPP, 1995), whereas Hutson et.al (2001) reported 51, and 53 species were reported by Baral and Shah (2008) of which 39 species are in threat as per the IUCN report (IUCN, 2006). In recent years, bats, though with low charismatic factor, are slowly attracting more and more conservationists and researchers, adding new information to what we already have.

Among the 51 species found in Nepal, 4 are megachiropterans and remaining 47 belong to microchiropteran category. Among these all, only one, *Myotis csorbai* is endemic to Nepal. History about the bat research in Nepal has its origin from the 19th century, yet, very least has been explored. People still consider bats as bad omen, vampire and sinister. This negative attitude has led to the merciless killings in many parts of the country, evidences of bat trade in Shaktikhor Bazaar, Chitwan(SMM 2011) also prevail. Nepal is blessed with wildlife; however, we are generally obsessed with some few flag species having high charismatic value. Because of this, small mammals like bats are generally neglected, which actually contribute more than 60% of the total wildlife in the country (SMCRF Report 2010).Bats are widespread in Nepal, their distribution being observed and studied from different districts, at different altitudes by various researchers. These small species have been found in caves, abandoned houses, mines, church and trees too. Being nocturnal in habit, their study is most often rendered difficult. Different authors have provided checklist for their abundance in Nepal, one provided by Adhikari et al. (2008) has been given below-

S.N	Scientific Name	Common Name	Red List/NP List
	Pteropodidae		
1.	Rousettus leschenaulti	Leschenault's rousette	NT
2.	Pteropus giganteus	Indian flying fox	LC/CITES II
3.	Cynopterus sphinx	Greater short-nosed fruit bat	LC
4.	Sphaerias blanfordi	Blanford's fruit bat	NT
	Megadermatidae		
5.	Megaderma lyra	Greater false vampire bat	LC
	Rhinolophidae		
6.	Rhinolophus affinis	Intermediate horse shoe bat	LC
7.	R. ferrumequinum	Greater horse shoe bat	NT/ CITES III
8.	R. Lepidus	Blyth's horse shoe bat	NT
9.	R. luctus	Wooly horseshoe bat	NT
10.	R. macrotis	Big eared horse shoe bat	NT
11.	R. pearsonii	Pearson 's horse shoe bat	LC
12.	R. pusillus	Least horseshoe bat	LC

13.	R. rouxii	Rufous horse shoe bat	NT
14.	R. subbadius	Little Nepalese horseshoe bat	EN
	Hipposideridae		
15.	Hipposideros armiger	Great Himalayan leaf nosed bat	LC
16.	H. ciniraceous	Ashy roundleaf bat	NT
17.	H. fulvus	Fulvus roundleaf bat	LC
18.	H. pomona	Anderson's leaf nosed bat	NT
	Miniopteridae		
19.	Miniopterus pusillus	Small bent-winged bat	CR
20.	M. schreibersii	Schreiber's long -fingered bat	LC/ CITES III
	Vespertilionidae		
21.	Myotis blythii	Lesser mouse- eared bat	VU
22.	M. formosus	Hudgon's bat	NT
23.	M. mystacinus	Whiskered bat	VU
24.	M. muricola	Whiskered myotis	LC
25.	M. longipes	Kashmir cave bat	NT
26.	M. siligorensis	Himalayan whiskered bat	NT
27.	M. csorbai		DD
28.	M. cecarius	Mandelii's mouse eared bat	VU
29.	Plecotus auritus	Brown long- eared bat	NT
30.	P. austriacus	Grey long-eared bat	NT
31.	Barbastella leucomelas	Asian (or Eastern) Barbastelle	NT
32.	Scotomanes ornatus	Harlequin bat	NT
33.	Scotophilus kuhlii		NT
34.	S. heathii	Asiatic greater yellow hose bat	LC
35.	Eptesicus serotinus	Serotine	NT
36.	E. gobiensis	Gobi big brown bat	DD
37.	E. dimissus	Surat serotine	VU
38.	Ia io	Great evening bat	CR
39.	Pipistrellus javanicus	Javan pipestrelle	LC
40.	P. coromandra	Indian pipistrelle	LC
41.	P. trenuis	Least pipistrelle	LC
42.	P. affinis	Chocolate pipistrelle	SU
43.	P. circumdatus	Black-gilded pipistrelle	NT
44.	Nyctalus montanus	Mountain noctule	NT
45.	N. noctula	Noctule	LC

46.	Hesperoptenus tickelii	Tickell's bat	DD
47.	Murina cyclotis	Round-eared-tube-nosed bat	LC
48.	M. aurata	Little tube- nosed bat	NT
49.	M. leucogaster	Greater tube- nosed bat	VU
50.	M. huttoni	Hutton's tube-nosed bat	DD
51.	Kerivoula picta	Painted bat	LC
52.	Philetor brachypterus	Rohu's bat	VU
	Emballonuridae		
53.	Taphozous longimanus	Long-winged tomb bat	DD

DD- Data Deficient, VU- Vulnerable, NT- Not Threatened, LC- Least Concerned, CR- Critically Endangered, EN- Endangered, SU- Status Unknown

Source: Adhikari et al. 2008

Issues and Challenges

There are various issues and challenges in bat conservation which need to be addressed. But, the way forth is not an easy one. The issues and challenges present in the current scenario are-

1. Increasing Human population

   Increasing human population implies extra demands for land, food and almost all the resources. This often, results in the degradation and destruction of certain habitat types with a concomitant effect on bat populations.

2. Habitat Destruction and Modification

   Increasing population creates high pressure in land resources, especially in the forested areas. These forests support large number of bat colonies. Rapid deforestation, habitat fragmentation, change in the land use pattern, over grazing have caused destruction and modification in the bat habitats, causing decline in their population.

3. Roost Site Disturbance

   Loss of trees, alterations in the roosted buildings and miming activities are worldwide threat for bat population. This threat, especially to the karst ecosystems, has increased so much that it has led to the drafting of Guidelines for cave and Karst Protection under the IUCN World Commission on Protected Areas (Watson et al.1997). Unmanaged tourism in such sites and caving have also contributed in bat declination.

4. Persecution

   Bats are still considered as bad omen, evil and objects of fear in most of the societies. Combination of this thought with lack of awareness has led to the persecution of bats in many places in the world.

5. Lack of Information

This is probably the greatest threat to bats. Out of the 1,001 species found in the worldwide, very few have been studied properly. The condition is even worse in the developing countries owing to the lack of resources and awareness.

These threats need to be carefully studied and then addressed so as to get the maximum protection. All of the above mentioned threats are the outcome of human activities in one or another way. Impact of the human interference in bats' habitat in South Asia has been explained with the help of below given pie-chart.

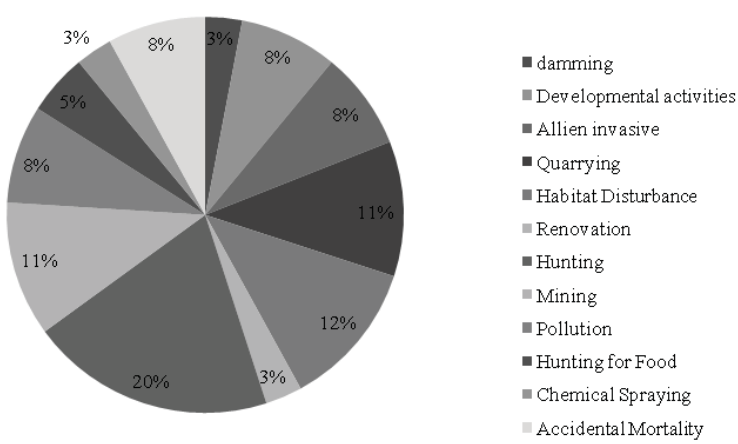
Ways to mitigate the prevailing threats

1. Constant monitoring and research
2. Controlling deforestation and habitat fragmentation
3. Raising public awareness
4. Establishing bat houses and clubs
5. Strong implication of laws
6. Sustainable management of caves and other bat habitats
7. Encouraging individuals and organizations to work for bats conservation

Conclusion and Recommendations

Even though the tiny chiropterans have high ecological and economical values, these have not been properly studied. There are many threats in conservation, major one being

Loss in bats' habitat from human interference in South Asia



Source: C.A.M.P Summary, 2002

the chances of losing some species of bats before knowing about them properly. There is the immediate need of addressing the existing issues, for which awareness at local level, advanced research works and knowledge sharing could be some. More specifically, options like captive breeding, reintroduction of the species, genome preservation and constant monitoring could be applied. On this regard, this International Bat Year-2011 could be a major turning point, provided we do not consider the conservation of species based only on their charismatic factor.

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