

Anthropogenic Threats to Survival of the Critically Endangered Chinese Pangolins (*Manis pentadactyla*) and their Habitat in Kavrepalanchowk Nepal

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Abstract

Human activities are the prime reasons that cause the decline of Chinese Pangolins (*Manis pentadactyla*) throughout the world. Globally, the limited area is managed under protected area while most of the area lies outside protected areas where anthropogenic threats are experienced high. Incessant increase in the threats has lead Pangolins to a high risk of extinction in Nepal. This study was carried between October 2016 to January 2017 in Balthali VDC of Kavrepalanchowk district using semi-structured questionnaire interview (n=117) to assess prevailing anthropogenic threats to Chinese Pangolins habitat. Almost all respondents agreed that human activities are major threats to Pangolins habitat. More than half of the respondents stated that poaching and illegal trade, habitat destruction and haphazard construction and development activities like hotel and road constructions have resulted in reduced Pangolins population. Moreover, intentional human induced forest fire, heavy grazing and a significant increase in the use of chemical insecticides are diminishing the habitat of Chinese pangolins. To secure long-term conservation of Chinese Pangolins their habitat we suggest promotion of public awareness activities.

Key Words:

Threatened species; Human activities; Threats, *Manis pentadactyla*

Introduction

Human activities like hunting and illegal trading [1], deforestation [2], forest fire [3], agriculture accretion [4], traditional beliefs [5], forest fire and grazing are vital reasons for dramatic decline of biodiversity throughout the world [6-8]. Chinese pangolins, like other biodiversity components, are under severe threats due to similar anthropogenic activities [9-12]. Local people usually consider Pangolins as, a bush meat [13,14] and Asians consume Pangolins meat as a delicacy and medicinal importance [15]. Killing of Pangolins due to wrong myths and selling them for their scales is the biggest threat in Kashmir, Pakistan [16]. The Chinese Pangolins are critically endangered species, which are estimated to have declined by over 90 percent in the past 21 years [9]. Moreover, Pangolins in the present world are considered as most trafficked mammal in the world [17,18].

Pangolins are nocturnal mammals covered in tough, overlapping scales. They feed on ants and termites and can roll themselves up into a tight ball quickly for their protection [19]. Among eight species of Pangolins across the globe, two species; Chinese pangolin (*Manis pentadactyla*) and Indian pangolin (*Manis crassicaudata*) are found in Nepal below 2,000 m elevation [20,21]. Chinese Pangolins are distributed in Eastern, Central and Western Nepal [12,22]. They are

also found in China, Bhutan, India, Taiwan, Hong Kong SAR, Japan, Bangladesh, Lao, Myanmar, Thailand, Vietnam, besides Nepal [9,23-25]. All species of Pangolins includes Chinese Pangolins, sleep in hollows and logs during day time and emerge out in the evening to forage on ants and termites [19]. They have thick and long tail covered with large (2-5 cm diameter), round overlapping scales formed from fused hair, dorsally rounded and ventrally flattened, prehensile and very muscular [26]. Male Chinese Pangolins are larger than female ones. The mass of Chinese Pangolins ranges from 2.35 kg (young, sexually matured female) to 7.0 kg (fat male); similarly body length ranges from 545 mm (young female) and 795 mm (male) [27]. Pangolin scales, both whole and in powdered form, are used in traditional Chinese medicines to treat a variety of diseases, including psoriasis, infertility, to improve blood circulation, treat asthma, and even cancer [28]. Large ear pinna, a post-anal depression in the skin and a narrowing near the distal end of the tail helps to distinguish Chinese Pangolins from other Asian Pangolins [29].

The status of Chinese Pangolins is greatly affected by habitat destruction in the country like Nepal [21], Taiwan [30] and Malaysia [25]. There is a significant increase in poaching of Pangolins throughout their range countries [15,31,32]. While international trafficking is rising as a major threat to Chinese Pangolins [33], nationally Eastern Nepal [5] and some places of Central Nepal like Bhaktapur and Kavrepalanchowk districts [10] are considered more vulnerable areas to Pangolins trafficking. Similarly, they are reported to be under pressure from habitat destruction, especially by insecticide

spraying in Taiwan [33]. The IUCN Red List of Threatened Species categorizes the Chinese Pangolins as critically endangered and are therefore considered to be facing the very high risk of extinction in the wild [32-34] and protected in Nepal under the National Park and Wildlife Conservation (NPWC) Act 1973 [35]. However, the knowledge on distribution, habitat preference and anthropogenic impact on the distribution of Chinese Pangolins are rudimentary in Nepal [10,12,21,36].

Although anthropogenic factors are almost restrained inside protected areas [37-39], about 86% of the earth's total land lies outside of protected areas [40] and more than 78% of land in Nepal is outside protected area [41]. Balthali VDC, a suitable habitat of Chinese pangolins, lies outside the protected area is scientifically unexplored to great extent. This study tries to show the anthropogenic threats to Chinese Pangolins and their habitat in the Balthali Village Development Committee (VDC) of Kavrepalanchowk Nepal. This study has been designed to support the national status survey and conservation action plan by providing essential information on anthropogenic factors affecting Chinese Pangolins their habitat in Central Nepal.

Materials and Methods

The study area, Balthali VDC (27°32' 57" N, 85°32' 56" E) covers 9.5 square km and is located in Kavrepalanchowk district of Central Nepal. The elevation is about 1450 m above the sea level. This place also contains some other burrowing small mammals like Porcupine (*Hystrixspps.*) and Mongoose (*Herpestes auropunctatus*). The major vegetation in Balthali VDC are *Pinus roxburghii*, *Alnus nepalensis*, *Prunus cerasoides*, *Schima wallichii*, *Rhododendron arboretum*, *Choerospondias axillaris* and the major faunal species are *Panthera pardus*, *Funcambulus* species, *Canis aureus*, *Martes flavigula* etc. [12]. Balthali is one of the major places of Pangolins in Nepal with a suitable environment for its survival along with suitable reddish soil but lacks the scientific research on the threats to Chinese Pangolins and their habitat [12]. The project focuses on Balthali VDC of Kavrepalanchowk district. Anthropogenic threats are highly increasing in Kavrepalanchowk district, where traffickers and poachers with both live and dead Pangolins are arrested in large numbers in and around Kavrepalanchowk every year [10,12] yet there are very few projects focusing on Pangolins in this area.

The data were collected between October 2016 to January 2017. To find out the anthropogenic threats to Chinese Pangolins and their habitat, semi-structured interview [5,13] was conducted. Local people (n=117) from all wards residing in the study area from different disciplines: farmers, leaders, teachers, elite persons, students, agriculture groups and community forest users' groups were purposefully sampled and interviewed by using a set of structurally scheduled questionnaires regarding the human activities causing in decline of Chinese Pangolins and their habitat. People from different ethnic groups like Bahun, Chhetri, Newar, Tamangs and Dalits were included in the interview.

Sociodemographic Characteristics of Respondents

In Balthali, 62% of respondents were male, and 38% were female. The age of respondent ranged from 20 to 75 years. Ages were classified into three categories; younger (20-35), middle aged (36-55), and older (56+). In Balthali, 58% were middle aged, 29% younger and 13% older. The majority of the respondents were Brahmin with 43% while Chhetri

(21%), Janajati (27%) and Dalit (9%). Majority of the respondents were either illiterate or have education under School Leaving Certificate (SLC) (Table 1).

Characteristics	Frequency	Percentage (%)
Sex		
1. Male	72	62
2. Female	45	38
Education Status		
1. Below SLC	73	62
2. +2	32	28
3. Above +2	12	10
Cast		
1. Brahmin	50	43
2. Chhetri	25	21
3. Janajati	31	27
4. Dalit	11	9
Age		
1. 20-35	34	29
2. 36-55	68	58
3. 56 above	15	13

Table 1: Sociodemographic characteristics of respondents.

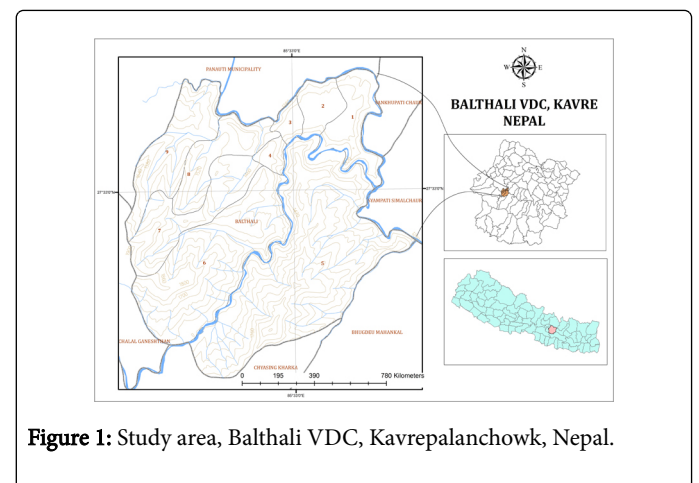


Figure 1: Study area, Balthali VDC, Kavrepalanchowk, Nepal.

Results and Discussion

Majority of respondents (99%) observed burrows of Chinese Pangolins in the study area. The highest percentage of respondents (68%) claimed sighting of burrows in their agriculture field and terraces while a few (32%) claimed to see the burrows in the forest. A similar result was suggested recorded occurrence of Chinese's Pangolins primarily in forest followed by agriculture land [11,42]. However, 23% of respondents had seen the live Chinese pangolins.

Living Pangolins are very rare to be seen because of their nocturnal nature and burrowing behavior [21] (Figure 1).

Overall, 96% respondents reported that the population of Chinese Pangolins is declining dramatically in the study area because of human activities. More than half of the respondents (54%) reported that poaching and illegal trade are the major anthropogenic threat to Pangolins followed by habitat destruction (29%) (Figure 2).

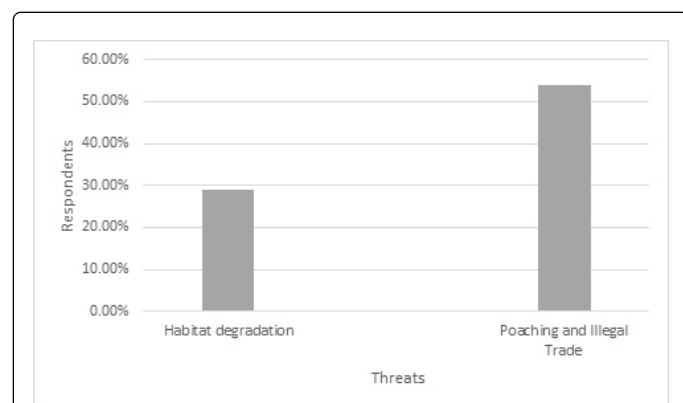


Figure 2: Anthropogenic threats to Chinese Pangolins and their habitat.

Previous studies also support these studies [13,15,31,32,42]. Study done by [17,18] shows that Pangolins are the most trafficked mammal in the world, which is the greatest threat to its small population.

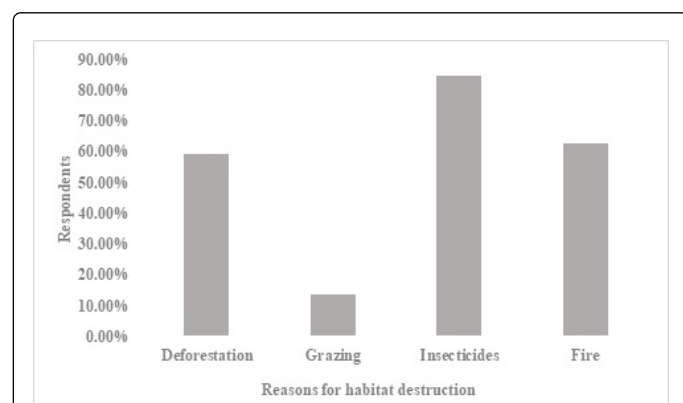


Figure 3: Reasons behind the habitat destruction of Chinese pangolins.

A few other studies have reported that drastic rise in international trafficking being a connected and well network partner throughout the world [5,33,43] is also potential threats to Chinese pangolins. Similarly, [13-15] shows the similar result that meat of Pangolins is highly consumed for which people poach Pangolins too much. Although Pangolins are ranked as critically endangered under IUCN status, survival of this species appears threatened because of ongoing illegal trade, poaching and use of meat and scales [1,16,44]. Hunters often capture the Pangolins near their burrows [14] which, shows that areas near to human settlements are detrimental to Chinese pangolins. In this study, approximately 60% of the respondents believed that deforestation was the primary cause of habitat destruction (Figure 3)

[2,42] have previously pointed out that deforestation is a vital driving factor for habitat loss. Moreover, deforestation for forest land and conversion to agricultural land is increasing [45] which, is the major cause of habitat destruction.

Grazing of domestic livestock within the habitat, encroachment of forest land by unscientific cultivation, intentional forest fires and mining of stone negatively affect the habitat of Pangolins and their number [25,30,36,42,46]. This study has shown the similar results. From our study we found that regular grazing has negative impact on habitat of Chinese Pangolins and reduced the potential habitat in Balthali VDC. Those areas with heavy grazing of livestock, especially trampling by large hoofed livestock, has recorded the detrimental effects on the habitat of Chinese Pangolins and cause in decrease of numbers [11]. More than half of respondents (63%) claimed that occasional forest fire is also the major human activities behind losing the potential habitat of Chinese Pangolins in the area. Katuwal HB, Richer R, et al. [11,47] state that shrubs, fallen logs and leaf litter and suitable for Pangolins habitat as these contain abundant ants and termites, however, frequent fire reduces the diet and habitat. Moreover, rock mining in the forest areas and construction of hotels and concrete roadways are also major cause of habitat destruction of Chinese Pangolins in Balthali VDC. There was clear visibility of rock mining activity and numbers of hotels and road construction works ongoing in the study area during our field work, which shows the destruction of suitable habitat of Chinese pangolins, which ultimately affect the population. The increase in developmental works may cause direct threats to the habitat of Pangolins [12,42]. Similar result was shown by [11] which show that construction of footpaths for daily agriculture activities in the Pangolins habitat directly exposes Pangolins to human that accelerates hunting and poaching. In our study, 85% out of total respondents reported the use of chemical fertilizers in significantly increasing in the recent years and this has resulted in a decrement of Chinese pangolin's population as it decreases the prey number in the agriculture land. In addition, use of potential habitat for modern agriculture practice with the use of high quantity of insecticides has destructed the habitat of Chinese Pangolins in the area. Pangolins are reported to be under pressure from habitat destruction, especially by insecticide spraying [30,42]. Similar study done suggests that use of insecticides has become a great threat to Chinese Pangolins because there may be decrease in prey availability due to excessive use of insecticides in agricultural lands [48].

Conclusion and Recommendation

From this study, we conclude Chinese Pangolins and their habitat are declining rapidly day by day due to the influence of human activities. Anthropogenic activities such as illegal trading, poaching, deforestation, heavy grazing, forest fire, development activities and significant increase in the use of insecticide sprays are the major threats to Chinese Pangolins and their habitat in Balthali VDC. Based on our findings, we recommend that public awareness activities should be highly promoted to secure long-term conservation of Chinese pangolins. We also recommend that the restriction of hunting, poaching and illegal trade, human-induced forest fire, grazing, deforestation. Similarly, rock mining and developmental activities should proceed only under environmental protection standards.

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