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Is Local Ecological Knowledge (LEK) Efficient in Studying Nocturnal Mammals in the Philippines?

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Editorial

The Philippines is one of the biodiversity hotspots and one of the 17 megadiverse countries in the world [1]. Its remarkable wildlife species diversity attracts many visitors to the country. Mammals are no exception, with 214 native terrestrial species, of which 125, or 58%, are endemic to the Philippines [2]. Some of them are very unique to the archipelago – for example nocturnal cloud rats – arboreal herbivorous rodents, or the Philippine colugo (*Cynocephalus volans*), one of the two extant Dermoptera species. Due to their nocturnality little is known about Philippine mammals.

Yet, more studies on behaviour, ecology and distribution of many species are needed more than ever. The mammalian populations in the Philippines are threatened by habitat loss – since 2000 the country has lost 7.9% of its tree cover [3]. Other threat to mammals is hunting, which might take different forms. For example, the main purpose the Philippine tarsier (*Carlito syrichta*) is hunted is sales to the tourist facilities[4]. On the other hand, the main reason for capturing the Philippine pangolin (*Manis culionensis*) is meat consumption [5]. Conservation status and habitat requirements are not understood for many mammalian species in the Philippines due to difficulties in studying them [4-6].

There were many definitions of local ecological knowledge (LEK), but it can be shortly defined as "knowledge held by a specific group of people about their local ecosystems" [7]. Over the last few decades the studies incorporating LEK have been on raise, covering many taxa and different research topics [8,9]. LEK has been vital in uncovering the attitudes and perceptions people hold towards certain wildlife species [4,5], but it has been also used for modelling species distribution [10], wildlife landscape use [9], discovery of deep-water hidden biodiversity [11] and even has helped in establishing preliminary behavioral repertoire of the species in question [12]. Relatively rapid data gathering and lower costs in comparison to traditional methods used in ecology are undisputable benefits of approaches incorporating LEK, especially when larger geographical scale and historical trends are considered [5,8,13].

One of the biggest concern is whether LEK can be used to study more cryptic nocturnal mammals. The affirmative answer has been provided by several studies conducted in Asia in the past few years. Research utilizing LEK on the Critically Endangered Chinese pangolin (*Manis pentadactyla*) in Hainan, China provided invaluable information on its population status and trends, encounters as well as patterns of exploitation through time [13]. Another example was interviewing local people from two different indigenous groups on behavior and distribution of the Philippine slow loris (*Nycticebus menagensis*) in Sarawak, Malaysia [14]. The researchers found that a wide range of people with different degrees of interaction with their environment, not only local experts, can provide meaningful ecological knowledge that can contribute to delineation of conservation strategies.

These are not the only studies encouraging the use of LEK in the context of nocturnal mammals. In fact, there have been two studies on cryptic mammalian species in the Philippines conducted in the recent years. One of them employed LEK to study the distribution, status and threats

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of Critically Endangered Philippine pangolin in Palawan Island [5]. The authors reported that the majority of the local people possessed the high ecological knowledge on the species – 87% of the interviewees were able to recognize pangolins and 70% of them encountered the animals. The study also revealed the species occurrence in 17 out of 18 municipalities across the Island. Yet, the population trends were described as decreasing, since 72% of the respondents consider the pangolin as 'rare' or 'very rare'. At the same time, 49% of the local people elaborated on the local use of the species, which is still being used for consumption, trade or medicine. These information helped to prioritize the areas for the conservation efforts to protect this Critically Endangered species.

Equally secretive and even smaller than the Philippine pangolin is the Philippine tarsier which is another Philippine endemic species. Together with my research colleagues I conducted the study among the local communities in several villages of Bilar, Bohol [4]. The Philippine tarsier was correctly recognized by the majority of interviewees, however encountered much less frequently in the wild. We found much higher encounter rate and knowledge on the species among men, especially local resource suppliers. Even though we did not aim to quantify the population size and distribution of tarsiers in the municipality, we had revealed that hunting is widespread in the area, with 62% of respondents stating they had seen or heard about this activity in the area. This result coupled with the answers of local residents that tarsiers are caught mainly for sale to tourist facilities points out that tourism is a vital threat that might impact the population size of the Philippine tarsier in Bilar.

Considering the difficulties in encountering, and even more difficulties in observing, either the Philippine pangolin or the Philippine tarsier, the information presented in the aforementioned studies would be impossible to obtain with the sole use of traditional monitoring methods and tools. Undoubtedly, LEK studies have their problems, bias and dishonesty of respondents, especially on sensitive topics. Yet, there are many species of mammals in the Philippines which have been a focus of very limited research or none at all. These, among others, include all species of the cloud rats, the Philippine palm civet (*Paradoxurus philippensis*) or Philippine slow loris. The latter occurs in Sulu Archipelago, which is politically very difficult area to get to for outsiders, Filipinos from other islands or foreigners alike, making any ecological studies on the species almost impossible. Another example of understudied mammal is the Philippine colugo which has been a subject of only one ecological study in XX century [15]. All of the mentioned examples are nocturnal and rather elusive species, yet distinguishable and charismatic enough that local people rarely can confuse them with other animals. This make them good candidates for LEK studies and it should be considered as a tool to gather at least baseline information for further studies. And in the era of biodiversity loss crisis researchers must grab this opportunity - before it is too late.

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