Project Update November 2022

Achievement of the Project's original objectives

Bat Surveys

Bats are the most species rich mammals in Bangladesh, and the lack of bat research, coupled with rapid habitat conversion, has put bats at risk. Data on the population, conservation status and response of bats subject to land-use change in this country is urgent. In addition, bringing new techniques (harp traps and acoustic devices) and complementary mist nets to bat survey in this country will assist with providing complete inventories and development of a key to the bats of Bangladesh. To conduct the study, I selected three protected areas, with each protected area categorised into three different levels of land use – undisturbed, slightly modified and highly modified. There were three localities in each protected area where all the three land uses can be found in proximity to each other, making a total of 27 sites (three protected areas x three habitat types x three localities). Mist nests, harp traps and acoustics were implemented in each site to conduct bat survey.

Objective	Status	Comments
1. Bat surveys	Partially achieved	We were able to work on 29 trapping nights (from June 14 to August 5, 2022) in three study sites, of which we covered nine sites. We deployed a total of 52 harp traps and ~720m mist nets during the field season. We collected a total of 82 vegetation plots (10 x 10m grid) data. Overall, we captured ~550 individuals and ~17 species. We collected the echolocation calls for the bats captured before release. A total of 36 acoustic transects (two transects x three habitat types x three study sites x two replicates per transect) have been made. Nets and traps were not deployed in the highly modified land cover (tea), instead an acoustic survey was made.

Table 1. A list of species recorded during the fieldwork.

Family	Species	Trapping methods	Habitat type
Pteropodidae	*Pteropus medius*	Visual observation – echolocation calls collected	Unmodified forest
Pteropodidae	*Cynopterus sphinx*	Mist nets	Unmodified forest, disturbed forest

Pteropodidae	*Rousettus leschchenaultii*	Mist nets	Unmodified forest, disturbed forest
Pteropodidae	*Macroglossus sobrinus*	Mist nets	Disturbed forest
Megadermatidae	*Lyroderma lyra*	Mist nets, harp traps	Unmodified forest, disturbed forest
Rhinolophidae	*Rhinolophus lepidus*	Mist nets, harp traps	Unmodified forest, disturbed forest
Rhinolophidae	*Rhinolophus shortridge*	Harp traps	Unmodified forest
Hipposideridae	*Hipposideros lankadiva*	Mist nets, harp traps	Unmodified forest, disturbed forest
Hipposideridae	*Hipposideros pomona*	Harp traps	Unmodified forest
Hipposideridae	*Hipposideros fulvus*	Harp traps	Unmodified forest
Vespertillionidae	*Myotis muricola*	Mist nets	Unmodified forest, disturbed forest
Vespertillionidae	*Myotis annectans*	Mist nets	Unmodified forest, disturbed forest
Vespertillionidae	*Pipistrellus tenuis*	Mist nets	Disturbed forest
Vespertillionidae	*Pipistrellus javanicus*	Mist nets	Disturbed forest
Vespertillionidae	*Pipistrellus sp.*	Mist nets	Disturbed forest
Vespertillionidae	*Pipistrellus sp.*	Mist nets, harp traps	Unmodified forest
Vespertillionidae	*Scotophillus heathii*	Mist nets	Disturbed forest

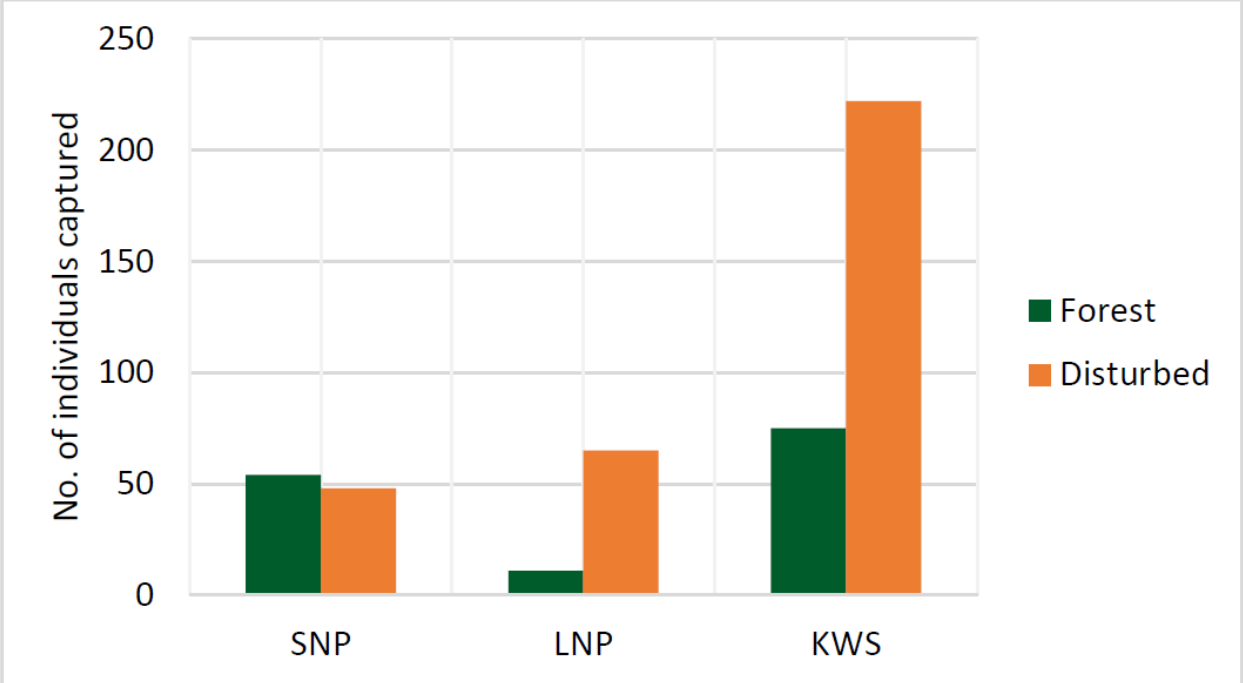


Figure 1. The number of individuals captured in disturbed and forested habitats in three study areas (SNP – Satchari National Park; LNP – Lawachara National Park; KWS – Kalenga Wildlife Sanctuary).

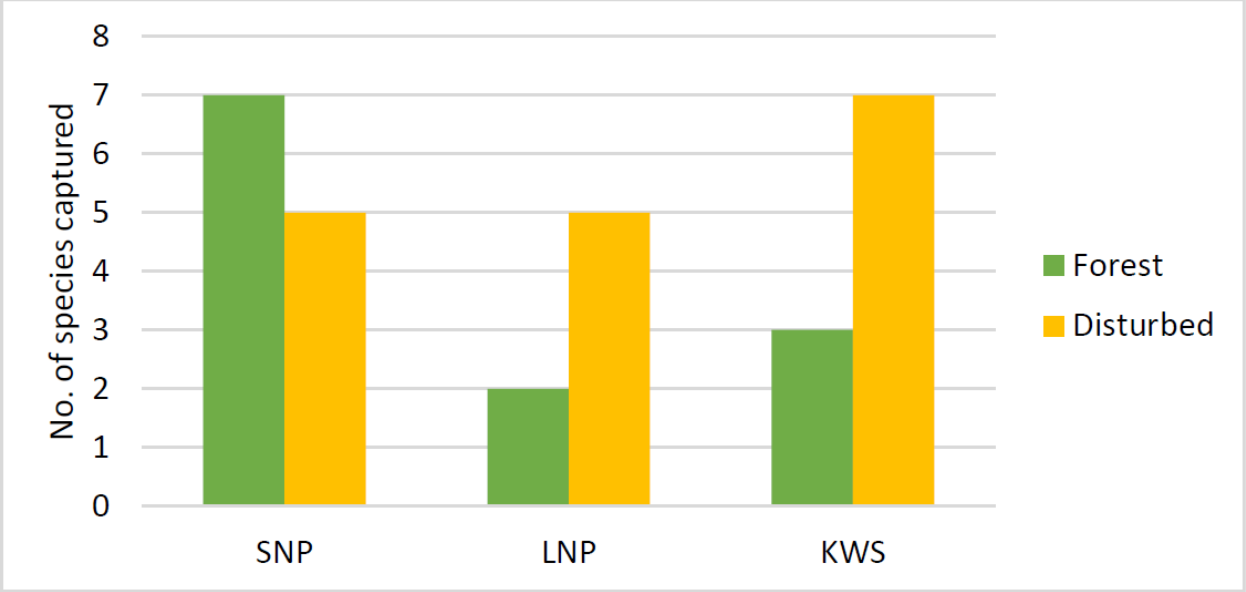


Figure 2. The number of species captured in three study areas and different land-use (SNP – Satchari National Park; LNP – Lawachara National Park; KWS – Kalenga Wildlife Sanctuary).

Capacity building

This project aimed to develop bat research capacity among the young researchers and arrange a "bat community night" to promote positive attitude towards bats. In addition, this project aimed to arrange awareness programmes among the school going students to dispel the misconception about bats.

Objective	Status	Comments
2. Capacity Building	Fully achieved	In sum, three Bangladeshi students worked as research assistants, and three students worked as volunteers (two graduate and four undergraduates). In addition, five local field assistants were appointed in different sites during the fieldwork to help trapping and guide into the study sites. Professor Tigga Kingston, Dept. of Biological Sciences, Texas Tech University, and Co-Chair, IUCN Bat Specialist Group (Old-World Bats) visited Bangladesh (Dr Kingston covered her expenses of her own) to observe the feasibility of the study methods and assist the PI in initial training of the research assistants and volunteers associated to the project. In addition, Professor Kingston was invited at the Vice-Chancellor's office to initiate a discussion about the Memorandum of Understanding (MoU) between Jagannath University (JnU), Bangladesh and Texas Tech University (TTU), USA. The Vice-Chancellor, Dr Md. Imdadul Hoque and Professor Kingston

		discussed about the potential benefits of the MoU and how it benefits both institutions and foster Bangladeshi research capacity. Dr Md. Maniruzzaman Khandaker, Dean, Faculty of Life and Earth Sciences, JnU, Dr Md. Saiful Islam, Chairman, Department of Zoology, Jagannath University, JnU also attended the meeting.
3. Awareness	Partially achieved	I gave a talk in a seminar organised by Jagannath University, Bangladesh. My presentation was focused on the human dimensions of bats in Bangladesh, and the ecological services provided by bats. I talked about the current project and the anticipated outcome of the project. In addition. Professor Kingston talked about the diversity and conservation of the Paleotropical bats. We were not able to arrange the bat community night, and outreach programme at schools but we disseminated the facts about the ecological services of bats to the local communities. We took opportunities to talk informally with members of the local communities and stakeholders of the forest department. In addition, our voice reached more people where the bats of Bangladesh and my speech wasfeatured in a daily news article https://www.tbsnews.net/environment/nature/unseen- benefits-bats-outweigh-their-stigmatised-portrayals- 492930). The Kingston Lab featured the project update on the website (https://kingstonlab.org/2022/09/21/ashrafs-first-field- season-yields-550-bats-and-17-species/).

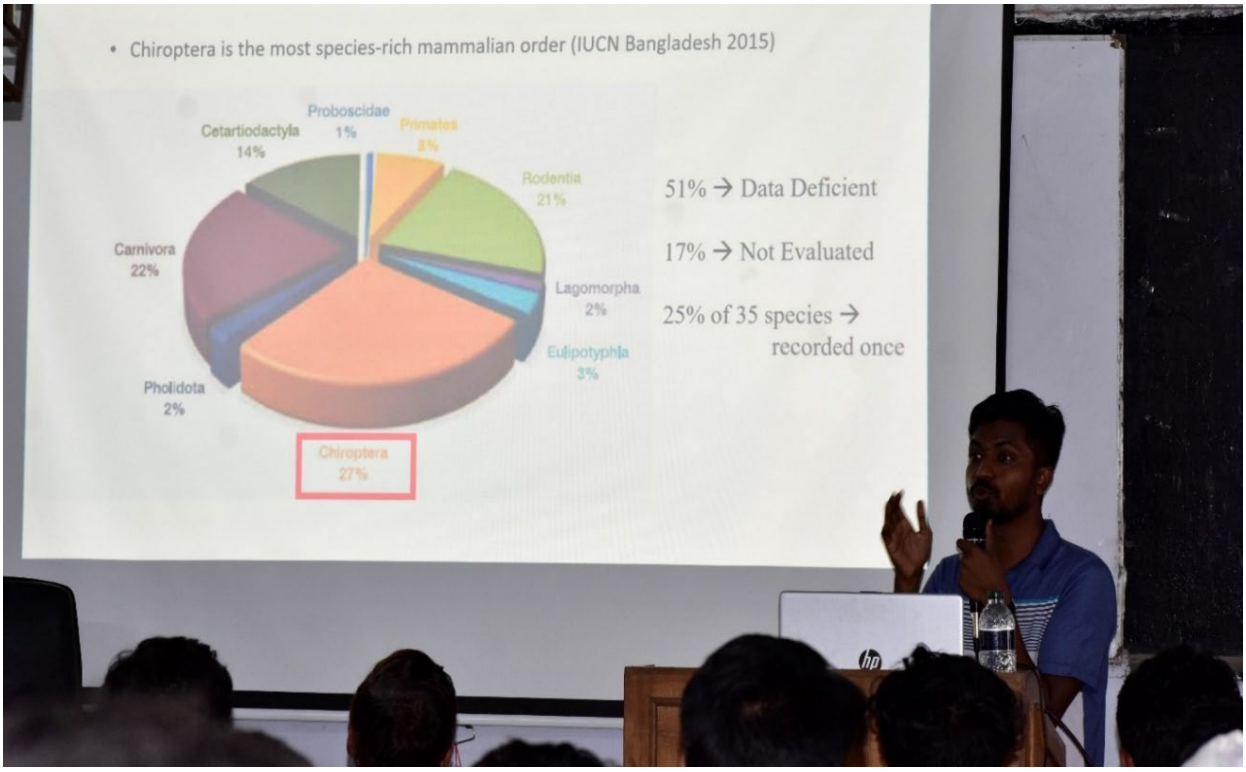
Unforeseen difficulties during the project

We were not able to start the project at the scheduled time due to the global pandemic, and travel restrictions. In addition, it took a few more weeks to get all the equipment and supplies ready to go to the field (i.e., harp traps, mist net poles, bat bags, sundry supplies) because of the fact that the PI brought two harp traps from Malaysia and ordered four harp traps in Bangladesh. It took more than the expected time to get the copies delivered as the raw materials of the harp traps were sparsely available in the country. The project was intermittently paused due to the massive flood and rain in the study areas. That flooding was featured on international news (read more: https://www.nytimes.com/2022/06/24/world/asia/sylhet-bangladesh-floods.html). We had to take a break on the second and third week of July 2022 because of the religious event, the *Eid- Ul-Adha*. We were not able to leave the harp traps open overnight for a few reasons: (1) it rained heavily at night – so it was plausible that bats avoid foraging during rain, thus we could not be able to catch bats during rain; and (2) we did not stay close to the traps till dawn for the security issue.

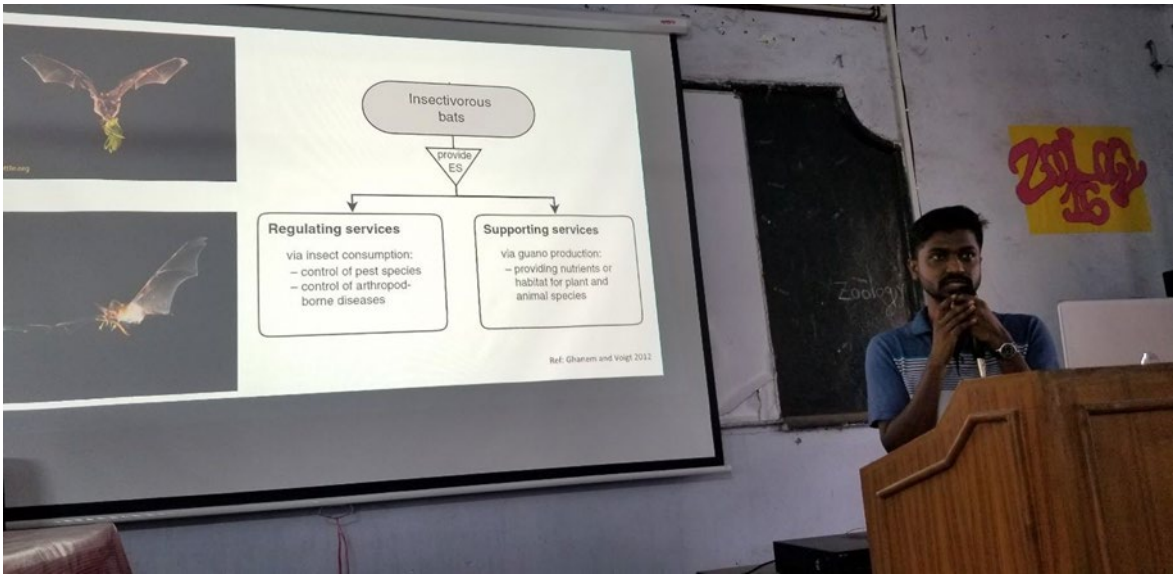
Involvement and benefits of the local communities through this project

The field assistants (five in total) involved in this field season are confident enough to guide bat researchers in future and any research related to night survey. We took the opportunity to talk with the members of local communities and forest department stakeholders about the importance of this research and how important this data is to add value in bat conservation. We also talked about the importance of bats in nature and the ecosystem services of bats. Moreover, we purchased food and sundry from local stores, which benefits the local communities financially.

Photo Gallery



Md Ashraf Ul Hasan, the project PI was giving a talk on the human dimension of bats in Bangladesh. Ashraf also went through the outline of the project funded by the Rufford Foundation and mentioned why his research is critical for the country – as there is no complete work on bats that has been done so far.



Ashraf talked about the ecological services of bats – specifically, how the fruit, insect, and nectar eating bats help forest regeneration, arthropod suppression, and pollination, respectively.

Project Research Assistants, Tania Akhter, Adnan Ahmed (left), and Rifat Hasan (right) were learning the use of slide calipers and spring scales to get morphometric data from bats. Dr. Kingston had there guided them.

Dr Kingston taught setting up mist nets and triple high nets.

The project team members were in action, they were collecting echolocation calls of bats.

Dr Kingston showed the team how the echolocation calls of bats are different in distinct families.

A harp trap was set up and ready to catch bats (left); the team was collecting morphometric data to identify bat captured in harp traps (right).

Ashraf and his team were setting-up the harp traps and mist nets under a culvert to see which bat species came to roost there.

Following the recommendations of the IUCN Bat Specialist Group to reduce the risk of transmission of SARS-CoV-2 from human to bats, field equipment and bat bags were cleaned with disinfectant and washed with water, and then dried open under the sun.

16 FRIDAY 09.09.2022 EARTH THE BUSINESS STANDARD

Large fruit bats are still a common sight in Dhaka city.

UNSEEN BENEFITS OF BATS OUTWEIGH THEIR STIGMATISED PORTRAYALS

Muntasir Akash
Nature Editor

In movies from Dracula to Morbius, bats were evocative of monstrosity. In reality, bats can be powerfully effective like the Bat of Gotham, keeping epidemics at bay and ecosystems functional. They deserve our careful understanding

My first visual memories of bats were nothing to be scared of. It was a tropical summer evening, humid and sweltering. Windows were open, fans spinning at max speed. A sudden thump caught my attention—something collided with the ceiling fan. Another thump followed immediately. Then, another this time, something hit the wall. Then, something dropped on the floor. After the initial shock subsided, I came upon a tiny, furry blackish dead body--about the size of a sparrow--wrapped in a cloth. I vividly recall what I saw under the light. The leafy projection of its pointy nose and unusually long, flattened ears were etched onto my memory.

A pipistrelle is a type of small bat that, in Bangla, is dubbed as "chamchika" and uses echolocation much like Marvel's blind hero Daredevil. By producing very low-pitched sounds and gauging the nature of the echoes that gets bounced back to its hypersensitive and large ears, bats can do pretty much everything from tracking down food to communicating with kin to avoid dangers. Unlike Daredevil or any other mammal, bats are the only mammal capable of independent flight.

But the dead pipistrelle did not match anything I watched in any movie or read in any fiction. It did not seek permission or make creepy whispers before barging into an apartment. It was a hapless small bat perhaps too young, too old or starved and having a bad night—made a wrong turn.

At that time, my then residence was a rapidly developing peri-urban area. With buildings sprouting and old groves vanishing, the changing landscape became unfamiliar to bats.

An evolutionary wonder

Bats might be struggling to tackle man-made obstacles, nonetheless, they form a fascinating taxonomic order; the Chiroptera. Bats are most known for mastering flight and use of sonar. However, it is believed that bats are blind or have poor eye sight. "Bats, both large and small, have very good vision," says Md Ashraf Ul Hasan, a graduate student at Texas Tech University, US. Larger bats use a rudimentary form of echolocation; a few not at all.

Bats do not lay eggs. They give birth and breastfeed their newborns. They have a mammalian build so much so that they have finger-bones similar to ours. Those bones have become elongated to support thin, extended skin membranes that play the role of birds' wings. The skin flap, patagium, can be present between the legs. Some bats have a long tail—in some, the paragium extends down to the tail; in a few species, the tail dangles free. Some bats sustain on fruits, some on nectars. Some hunt insects and some can even catch fish by diving like a hawk. A few bats drink blood but they do not follow Vlad Dracul, who used to drain his victims to death. Vampire bats are one of the smallest types of bats. They do not swoop on to victims as a savage swarm either. Movies are more often than not, misrepresentative when it comes to the portrayal of wildlife.

Do bats spread disease?

Bats do not transmit disease deliberately. David Quammen, the writer of the famous book *Spillover*, made a factual remark, "deadly pathogens, by nature, can live in animal hosts as reservoirs. Removal of animals or getting too close to them can infect humans."—akin to, Ebola, COVID-19 among many others. The pattern was the same in every case. It was traced down to us getting dangerously close to wild animals. Read: we do not stop eating wild animals.

Spillover stresses that "understanding the chain of transmission of emerging infectious disease from animals to humans needs careful understanding." In the case of bats, the picture is not clear yet. But, most often, it started with our palate for bushmeat. What was done in Wuhan did not stay in Wuhan.

Yes. Bat can spread deadly disease as we keep taking away bats' food, destroying bat caves and eating bats—as grotesque and risky as it might sound, we still do. Bat Conservation International, the NGO dedicated to bat research and conservation, highlights the fact that "destruction of habitats and exploitation of wildlife increase the risk that new pathogens will jump into the human population." A 2019 study in the journal *Mammal Review* assessed the link between human activities and fruit bats in the spreading of Ebola and found "a significant link between forest loss and fragmentation that potentially altered the natural ecology of virus resulting in virus outbreaks." Simply put, due to dwindling numbers of bats, viruses are being forced to adapt and infect new hosts; and are finding human physiologies to be a good replacement.

Greater short-nosed leaf bat.

Scenario: Bangladesh

Seasonal death by Nipah virus is common in northern and western Bangladesh, as is the practice of eating bats. The potential source of the spreading disease was deduced to be the drinking raw date juice and our habitual tendency of not worrying about bats. Bats are carriers of Nipah virus and have a taste for date palm juice. Heating raw date juice to a certain temperature can eliminate any virus that might be spilled from bat saliva, urine or faeces. In Bangladesh, we still have a long way to go as we still deem killing the bats, an easier remedy. I can recall news of tree felling in parks to get rid of bats and subsequent collection of bat corpses meant for illegal bushmeat markets.

Dr Tigga Kingston, Professor and supervisor of Hasan at Texas Tech University, says, "bats are frequently paired with scary, negative emotions, so we must work to link a positive perception of them."

Bat research in Bangladesh is still in its infancy. New bat species are recorded every year. Two new bat species were recorded recently by researchers of Jahangirnagar University after a hiatus of more than a century. Hasan is assembling a team of young bat scientists. "We need to build up a museum collection to understand bats, their positive roles and potential risk of meddling with them," Hasan echoed David Quammen. "We need to have a genetic database of all sorts of bat derivatives," the bat ecologist commented on tackling bat-borne diseases.

What if all the bats are gone?

Insect-eating bats are effective pest controllers. "Insectivorous bats can prey on 500 to 3000 insects per night, and fruit-eaters and pollen-drinkers are proven pollinators," said Hasan.

Dhaka University holds a good population of bats. Afternoons are rife with regal, leisurely flights of large fruit bats; but for how long I wonder, noticing all the infrastructure cutting deep through a once green campus. Bats are not built to squeeze through the concrete mazes. With less and less trees, bats will have cities someday, viruses will not.

Painted Bat.

PHOTOS: COLLECTED

East Asian tailless leaf-nosed bat and painted bat are recorded last year in Bangladesh after more than century.

Greater short-nosed fruit bat feeds on fruits.

A daily news featured bats of Bangladesh and mentioned Ashraf's comments on the misconception of bats, the ecosystem services of bats, and the urgency of bat research in Bangladesh (read here: https://www.tbsnews.net/environment/nature/unseen-benefits-bats-outweigh-their-stigmatised-portrayals-492930).