



Small Mammal Conservation Awareness Programme For Schools, Colleges, Foresters and Local Communities of Nearby Bumdeling Ramsar Site

Small mammal constitutes $\approx 75\%$ of the world's mammalian diversity (Molur and Singh, 2015), thus represents major taxa of global biodiversity. In South Asia, 62 species of small mammals are endemic of 185 recorded species (Molur *et al.*, 2005). Small mammals play a vital ecological roles such as tropic food cascade, as predator on and guilds (Barnett and Dutton, 1995), seed dispersal, engineer of soil, mediate energy flow and nutrient distribution (Anke *et al.*, 2010), act as parasite host and disease reservoirs, bio-pest control and principal regulator of terrestrial ecosystem process (Ofori *et al.*, 2015). Importantly they are an integral part of biodiversity and as interface between humans and nature besides acting as environmental indicators (Dhal *et al.*, 2011).

The importance of conserving small mammals is not an easy concept to promote in developing countries (Kumar, 2014). Of the total mammal species in Bhutan, 20% are small mammals, many of them are less studied and under meagre protection (UWICE, 2011). There seems to be numerous on-going threats to many small mammals in Bhutan, but the major threat may be due to anthropogenic intrusion, misconception and negative perception besides retaliatory killing (Gyeltshen, 2013; Poel, 2013; Dorji, 2016). Based on a basic literature survey and informant interview, small mammal particularly squirrel species are being used. Rodents and shrew species are being killed because of misconception and treated as vermin. There is an urgent demand to fill the gap in conservation awareness of small

mammals and to have a communication dialogue with the public and communities of all age group because they would bring greater impact to small mammal conservation and biodiversity in general.

To address this gap, field-based small mammal outreach programmes were conducted in institutions, colleges, schools and to the local communities resided nearby Bumdeling Ramsar Site in the month of June, 2016 and November, 2016 through diverse technique. This will aid to save the life of many innocent small mammal species directly or indirectly.

The key objectives of this programme is to 1). educate the people about small mammal and their immense role in ecosystem services, 2). work towards an attitude change in the communities of all age group people and assess public attitude, 3). participatory approach in biodiversity conservation and wetland protection and 4). built capacity of the youths and develop small mammal conservation interest in school level and make champions to conserve small mammal. Subsequently, the message will be dissipated and aid in the long-term conservation of small mammal in the locality and through the nation as well.

The programme has been initiated by imparting on ecological studies. Drawing and essay writing activity were also organized in school to impart effective message to the school kids. The different communication tools such as poster, pamphlets/leaflets, presentation, audio-visual aids and interactive session were used in all the session. Shared information



about small mammal vernacular names, populations, diversity, their distribution and conservation status, ecological significance and potential threats to the target audiences. Food pattern, role in pollination and seed dispersal in Bhutan was discussed. Likewise, information on two groups of small mammals namely flying (volant) and non-flying (Non-volant), and arboreal and ground dwelling was presented.

The conservation outreach programme was conducted in alliance with the Department of Forest and Park Services, Bumdeling Wildlife Sanctuary, Bumdeling and Trashi Yangtse Range Office, schools and colleges administration, and head of local government and villages.

Focused group discussion and informant interview was conducted in each programme to gather the information on people's perception regarding small mammal. Roughly >80% of the participants do not have an excess knowledge about what mammals are usually included under small mammals category. According to the participants wild dog, civet, wild cat, otter, deer, etc are considered as small mammals because of their small body size. Through this outreach programme many participants came to know what exactly the small mammals and the vital ecological role they play in the ecosystem.

School level small mammal conservation awareness programme

A half day small mammal conservation and awareness programme was conducted in Bumdeling Lower Secondary School on 2nd November 2016 for school students and teachers. There were >250 students,

15 teachers and 13 supporting staffs attended for the programme. Attitude assessment, audio-visual aids session and focused group discussion were organized. Photos of small mammals were shown to the participants and they responded enthusiastically by mentioning the small mammals vernacular name. Small mammal facts and their importance of conservation were explained. Most of the students said they had seen rats, shrews, squirrels and bats in their vicinity. The ecological role of small mammals in the food chain, agent of pollination and seed dispersal, importance to human being and agriculture, bio-pest control were presented. Further, the effects of habitat destruction, use of pesticide in agriculture field, impact of forest fire and effects of global warming on small mammals were explained explicitly.



Bumdeling L.S.S students & teachers are actively listening to the conservation advocacy.

An hour long lecture was delivered in the assembly. The school children were asked to convey the similar message to their parents, friends, relatives and society. Students also assured that they would protect the small mammals in their locality and help them to survive.

Data on small mammal species captured from the Bumdeling Ramsar Site was shared with the participants. The mass enjoyed using the outreach materials and



learned about small mammal ecology, behaviour and protection with lot of zest. Session was closed after question answer and feedback collection.

Beside indoor activities, on 2nd November 2016 afternoon 10 students were voluntarily participated in field-based outreach programme. Equipment handling was practically demonstrated to them. Students were interviewed in field and asked type of small mammals seen in their vicinity. Small mammal photos were publicized to the students. The programme lasted for an hour.



Demonstrate equipment handling to voluntarily participated students



Showing small mammal photos to the student from field guide book

Similarly, the same programme was conducted in Trashi Yangtse Lower Secondary School on 3rd November 2016. Around 45 students and 4 teachers were actively participated in the program. The presentation and interview were conducted. Many students were very glad and shown curiosity during the question answer session. The students also vowed to convey the messages to their parents, friends and neighbour communities for the interest of small mammals.



Students of Trashi Yangtse lower secondary school actively listening to awareness presentation

a). Small mammal drawing and essay competition: Small mammal drawing (class V and VI) and essay writing (class VII and VIII) was organized at Bumdeling Lower Secondary School. Only 25 students had participated in drawing and 15 in essay writing. Few of the participants have little knowledge about small mammals but still lack knowledge based about the ecological role contributes by small mammal. All the drawing and essay writing were evaluated by their teachers and awarded prizes to the participants. Precisely, most of them had showed full enthusiasm during the programme.

b). Display of small mammal material: Around 22 of Bumdeling Lower Secondary School and 27 of Rangjung Central School students had read the published brochures/pamphlets entitle “Small mammal of Bumdeling Ramsar Site”.

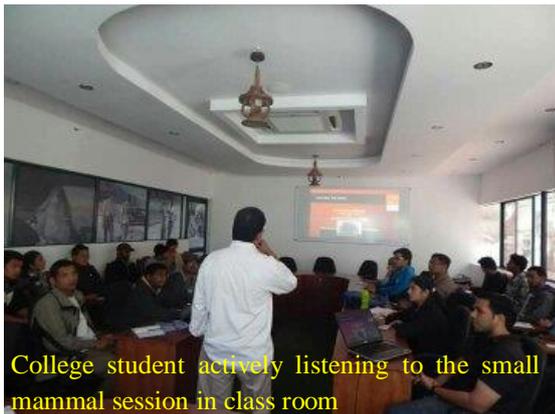


Students & teacher of Rangjung CS read material on “small mammals of Bumdeling Ramsar Site”



College level small mammal conservation outreach programme

The programme was conducted in two colleges of Royal University of Bhutan in the month of November, 2016 with full cooperation from the respective college administration, lecturers and students. This program was organized both in-door and out-door. A short theoretical presentation was delivered to the participants about the importance of small mammals conservation in Bhutan. Posters were displayed and asked them to carry out small mammal ecological research in other conservation and protected areas in Bhutan where no conservation research was conducted to date.



College student actively listening to the small mammal session in class room

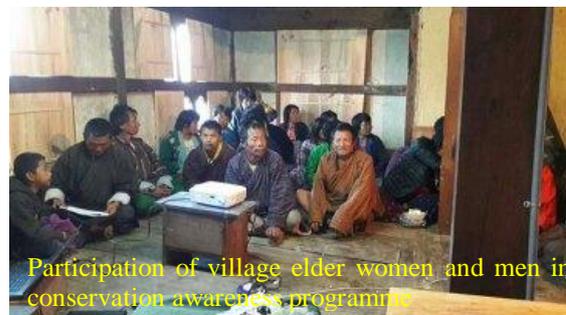
A total of 83 students were actively participated. The students were from B.Sc. Environmental science, Life sciences and Forestry. Programme conveyed clear information about status, distribution and conservation importance. The students participated with a lot of zeal. They were also taken to the field for practical demonstration and impart sampling design, general wildlife survey, equipment and small mammal handling techniques, identification and record keeping.



College students taking active participation in awareness programme question session

Village level small mammal conservation outreach programme

Small mammal conservation outreach programme was conducted in Bumdeling Block on 15th November 2016 by covering 6 villages that locates around the Ramsar Site in collaboration with the staffs of Bumdeling Wildlife Sanctuary and Range Office, and head of the Gewog and four villages. Totally 130 people's were participated in this conservation education irrespective to gender. The programme begun with introducing main objectives of the programme, followed by asking question.



Participation of village elder women and men in conservation awareness programme

Attitude assessment was carried out. Information on the small mammals of BRS was explained and the photos were shown. Education outreach materials (posters and brochures) in local dialect were distributed to explain the facts, distributions, ecological importance and impacts of threats to small mammals. Group discussion and informant interview was also conducted with participants and knowledgeable people.



In the gathering villagers were informed to protect the Ramsar Site or wetland and surrounding vegetations. Participants were also informed to alter negative perceptions and halt retaliatory killing of small mammals. They were also informed to avoid habitat perturbations and impacts of pesticide use and forest fire. The participants were asked to convey the same message to their family, friends, relatives and society. They also assured to give strong support in biodiversity conservation.



Participation of village elder women and men in conservation awareness programme

Similarly, rigours door to door and in public work place awareness campaign were also conducted. Communities were shown photos of small mammal and asked to identify the species seen in their locality and work place.

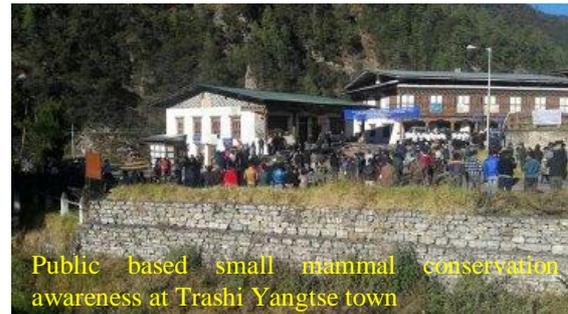


Researcher campaigning at public work place

Community level small mammal conservation and awareness programme

On 25th November 2016, small mammals conservation and awareness programme was conducted in Trashi Yangtse main

town with full supports from Trashi Yangtse District administration and town people. The session was lasted >2 hours. Trashi Yangtse town is located 8 kms south of Bumdeling Ramsar Site. During the programme 150 people were participated irrespective to their gender and age. Programme inceptioned with main objectives of conservation advocacy. General information about small mammals, important role in ecosystem services, conservation status and threats were explained through various technique such as presentation, poster distribution and hanging banners. Many of the people's were not aware about the essence role ploughed by small mammal to our ecosystem and environment.



Public based small mammal conservation awareness at Trashi Yangtse town

Attitude assessment and group discussions were also conducted. The programme was concluded with question answer session and by feedback collection.

Conservation awareness through different techniques/methods/materials:

a). **Presentation of project findings:** On 14th June 2016 project findings were presented to 85 participants of M.Sc. Forestry, Environmental Management and Ph.D scholars of Forest Research Institute University, Dehra Dun- India. They were from SAARC countries (Afghanistan, Bhutan, Nepal, India and Sri-Lanka). Besides, presentation also covers the topic such as sampling design for ecological



studies using GIS tools, general wildlife survey, equipment and small mammal handling techniques, identification and record keeping.



Posters/Brochures/Leaflets



Author presenting project finding to the audience



After presentation of project findings in Forest Research Institute University, Dehra Dun- India

Similarly, the project findings were also presented to 18 foresters of two Forest Range Office and Bundeling Wildlife Sanctuary of Bhutan.

a). Poster dissemination: About eight number of posters were disseminated to schools, colleges and institutions. Each to Bundeling Wildlife Sanctuary, Bundeling and Trashiyangtse Range Office. Two posters were attached and displayed at local people’s homes and public road ways. The main idea of displaying posters proved to be a very useful tool to teach and create the awareness concepts in a short time. Posters were illustrated in both national and international language.

b). Pamphlets/Brochures dissemination: About 50 pamphlets/brochures were disseminated to school childrens, communities, Range and Park staffs. The detailed information on small mammal in Bhutan, their ecosystem services and conservation strategies were mentioned. Photograph and their IUCN status were also reflected.

c). Providing “A Wetland of International Importance in Bhutan: Diversity and Abundance of Terrestrial Small Mammals in Bundeling Ramsar Site”: Four hard copies of M.Sc. thesis book was published and distributed to the libraries of Forest Research Institute (FRI) University, Dehra Dun- India, Wildlife Institute of India (WII) and Bundeling Wildlife Sanctuary, Bhutan.



Materials deposited to the library



Conservation outreach programme through:

a). Participation: Two local women were actively participated in field activities with other research team.

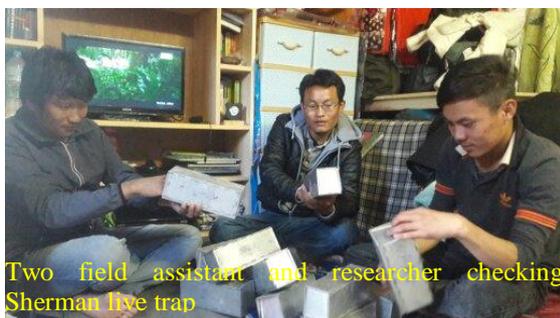


Participation of local woman and eagerly waiting to see the live captured small mammal

b). Wider information sharing: Shared detailed knowledge about Sherman live trap setting and other ecological studies equipment handling to three government officer. They have experienced and pledged to take small mammal research in near future.



Participants handling Sherman live trap



Two field assistant and researcher checking Sherman live trap

In entire field activities the knowledge and ideas were shared with the foresters of Bumdeling and Trashiyantse Range and Bumdeling Wildlife Sanctuary. Inturn

Foresters also provided necessary support to the researcher and team members.



Researcher with Bumdeling Forest Range staffs after presenting small mammal research techniques

c). Field training program: As part of involving the local communities, students and conservationists in the conservation campaign, field-based training programme of students, local people and foresters were conducted during this study period. A local volunteers, students, foresters and field assistants were trained during the project on field activities; handling of equipment and small mammals, identification and sexing, and necessary field data collection. The participants were also taught how to used a GPS, compass and other ecological studies equipment. The training program proof successful, they also aid us in conducting field survey, and also help us arranging meetings with village heads and people in their communities during the outreach program.



Forester deploying Sherman live trap in the field





Field assistant weigh live trap small mammal



Researcher demonstrates equipment handling technique to the students

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Question enquired during conservation and awareness programme:

1. What are small mammals?
2. Have you seen small mammals?
3. Where small mammals live and diet they take.
4. Importance of small mammal conservation and ecosystem services?
5. Impact of habitat perturbation, etc.?

