

Preparation and sharing of camera traps occurrence database in Asia, including >500,000 observations of >300 vertebrate species from >200 sites

Programme:BIFA

Project ID: BIFA6_005

Project lead organization:Small Mammals Conservation & Research Foundation

Project implementation period:1/9/2021 - 28/2/2023

Report approved: 25/5/2023

Narrative Final report

Executive Summary

The project's implementation action was focused on extraction data from published gray literature, particularly in the South and Southeast Asia. Additionally, workshops were conducted for the data synthesis, and biodiversity data mobilization workshop to advocate significance of open access data platform. A total of 435 literature relevant to camera trapping studies in between 1999-2022 were used to extract species occurrence. The geographical coverage was 14 countries including Indonesia, Singapore, Malaysia, Bhutan, Thailand, Myanmar, Cambodia, Laos, Vietnam, Nepal, Japan, South Korea and eastern part of the India. The temporal coverage in between 1999 to 2022. A total of 10322 occurrence of 548 species from 301 sites were extracted. The data consists 276805 individual camera trapping that belongs to 123 families of vertebrates.

Accessing such camera trap data to consist mainly two challenges: published literature do not contain supplementary files and studies frequently concentrated on a single charismatic species. Furthermore, despite email requested to respective authors/co-authors, the majority of researchers did not share the camera trapping studies. It indicated clearly, that there is need to promote the important of open access data hub through intensive biodiversity data mobilization workshop. Mostly of published information are in native languages. Due to the intricacy of the existing data of ECL's and the use of Darwin Core language, activities-R package and online data visualization have been modified based on the physical meeting among stakeholders. Deliverables of this activity were compensated through adding literature review and has conducted biodiversity data mobilization working on species occurrence data in Nepal.

Progress against milestones

Has your project completed all planned activities?: Yes

Has your project produced all deliverables?: No

Rationale: Due to complexed with existing ECL and Current data, both R package to onboarding camera trapping data and online data visualization were withdraw. After physical meeting with project team, and GBIF authority, the elaire propose added more literature review and biodiversity data mobilization workshop that were supplied by the workshop. Later, 3000 species were added to compensate existing information.

Report on Activities

Activity implementation summary

The project consists of five activities, including a review of the literature, data curation, the creation of R package, a tool for data visualization, a workshop, and data publication. The main task for which data extraction was fully utilized was the literature review. The following keywords were used to search

a total of 435 pieces of literature: nation, camera trap, vertebrates, IUCN threatened category (CR, EN, VU), biodiversity (distribution, abundance, richness), and other carnivores, herbivores, and omnivores. The research included in the literature came from 305 localities in 14 different countries, totaling 276,805 unique capture records. 10322 locations were ultimately created. This occurrence data mostly focused on mammals rather than other species.

Data were extracted using the ECL structured data template after the literature had been gathered. These data, which are primarily taken from other open access data, include species occurrence records and 24 environmental records. Following that, Darwin Core terminology was needed for the entire curated database of all entries and their GBIF-converted metadata. Ultimately, based on Darwin core nomenclature, the data were organized into 24 columns. Data curation and mining were carried out using the R programming language, MS Excel, and openRefine, as well as coordinated conservation, the GBIF data validation tool, and Global Name Resolver. After the literature collected, data were extracted based on the ECL structured data template. That data consists species occurrence records along with 24 environmental that mostly extracted from other open access data. After that all curated database of all records and their metadata that were transformed into GBIF required Darwin Core terminology. Finally, information were compiled into 24 columns based on Darwin core terminology. Both data mining and curation were conducted in R program, MS excel and openRefine, and coordinated conservation, GBIF data validation tool, Global Name Resolver.

Aiming to reach findings to wider community, the project has assigned to publish one peer peer-reviewed manuscript. The manuscript drafted entitled - CamTrapAsia: 74 full wildlife capture lists from camera trapping studies. The draft manuscript is under the review with project team member. Also, draft manuscript included main text with detail sulimentary information and meta data.

Most of these activity were compted within extened projected deadline.

Completed activities

Activity name: Literature Review

Description: 435 literature were search using Web of Science and Google sholar. Based on downloaded. A total of 10,322 occurrence of 548 species wereconeucted.

Start Date - End Date: 1/11/2021 - 31/1/2023

Verification Sources: doi.org/10.15468/r84kt7

Activity name: Curate Database

Description: The data were extracted from the literature. Firstly, all the information were generated based on ECL data template which is finnally traformed into Darwin Code.

Start Date - End Date: 31/3/2022 - 31/12/2023

Verification Sources: doi.org/10.15468/r84kt7

Data curation R syntax will include in published data paper.

Activity name: Short Intensive worksoop

Description: After data extracted, data mining and strandatztion were performed in the intensive workshop. Previously, workshop was proposed in Thailand However, due to p endemic issues, workshop vene has changed into Nepal. The work has conducted in Chitwan National Park in Nepal. PI ad Co-PIs (3) memeber attain project

Start Date - End Date: 27/9/2022 - 7/10/2022

Verification Sources: <https://www.ecologicalcascades.com/gbif>

Activity name: Peer-reviewed data paper

Description: Data paper entitled CamTrapAsia: 74 full wildlife capture lists from camera trapping studies is drafted which under the review with project team member. Results in the paper were analsis in the descriptve form which included tables and figures

Start Date - End Date: 30/11/2022 - 28/2/2023

Verification Sources: Draft attached

Activity name: R Package for onboarding camera trap data and Online vizualization and analysis tool (Supplemented by add occurrence and data mobilization workshop)

Description: Due to complex data nature, R package and online vizualization could not permformed. The activities were supplemented by adding more literature surey and data mbolization workshop. 3000 occurrence were added to compensated eailer stated activity. One day data mobization workshop has conducted base on modules developed by GBIF using useCASE . A total of 17 researcher were attened the workshop represents 13 institutions (university and non-governmental

organizations).

Start Date - End Date: 3/2/2023 - 3/2/2023

Verification Sources: Participants attened sheet attached.

Report on Deliverables

Production of Deliverables - Summary

The project proposed four deliverables which included publication of vertebrate species occurrences from camera trapping, R-package onboarding data, online tool to explore and analysis data and draft paper. Only two deliverables were successfully performed. Vertebrate species occurrence from the camera trapping was published through GBIF -<https://doi.org/10.15468/r84kt7> accessed via GBIF.org on 2023-02-28 that published 10322 occurrences. Data paper entitled "CamTrapAsia: 74 full wildlife capture lists from camera trapping studies was drafted as data paper which will be submit very soon to journal.

Production of deliverables

Title: Sharing vertebrate occurrence data from camera traps in Asia.

Type: Dataset

Status update: Data consists 10322 occurrences of vertebrates including mammals, aves and reptiles from 305 locality in 14 asian countries.

Dataset scope: Vertebrate camera trapping }

Expected number of records: 10322

Data holder: Arjun Thapa, Calebe Pereira, Mathew Luskin

Data host institution: Small Mammals Conservation and Research Foundation, Kathmandu, Nepal

Sampling method: Literature review/ MateiralCitation.

% complete: 100

DOI: <https://doi.org/10.15468/r84kt7>

Expected date of publication: 2023-02-26

Title: CamTrapAsia: 74 full wildlife capture lists from camera trapping studies

Type: Data Papers

Description: Data paper drafted and under review with project team member.

Sources of verification: Attached

Impact of COVID-19 pandemic on project implementation

Due to pandemic, workshop venu has changed from Thailand to Nepal.

Events

<https://www.ecologicalcascades.com/gbif>

Dates: 2022-09-27 - 2022-10-07

Organizing institution: Small Mammal Conservation and Research Foundation

Country: Nepal

Number of participants: 3

Comments: Systematically sampling dozens of species across a dozen counties is often beyond individual or even institutional capacity and scope. In Asia, there is growing support for collaborative data-sharing efforts to assemble the necessary wildlife datasets and address the region's acute biodiversity crisis. Camera traps are commonly deployed in Asia's dense tropical and subtropical evergreen forests to sample cryptic charismatic megafauna like tigers and clouded leopards. The bycatch from these relatively standardized landscape-scale single-species surveys is often reported in the published literature, supplements, or stakeholder reports. The region benefits from widespread training programs from governments, NGOs and academics that promote systematically setting cameras, generally, 10-100 cameras set on wildlife or human trails at 20-50cm in a grid with 0.5– 3 km spacing and active for 1-3 months. We collated 119 camera sources/datasets that include 16793 camera stations and 986,673 trap nights covering 12 countries (including Indonesia, Singapore,

Malaysia, Brunei, Thailand, Myanmar, Cambodia, Laos, Vietnam, Nepal, and south China). There are 342,444 records of 387 species belonging to 181 genus and 72 families. Other useful summary statistics and covariates are included such as survey coordinates, trapping effort, numerous environmental covariates, and species traits. The full dataset will available here as a .csv file and with the Global Biodiversity Information Facility (GBIF). We suggest CamTrapAsia's species occurrences can address a variety of ecology and conservation questions, ranging from species ranges and species distribution modelling, threat assessments such as the impacts of defaunation, deforestation, and climate change, and that the total captures per species and relative capture rates (per unit effort or among the community) may be used for community ecology and food web analyses.

Website or sources of verification: <https://www.ecologicalcascades.com/gbif>

Events

Biodiversity Data Mobilization Wrokshop

Dates: 2022-02-03 - 2023-02-03

Organizing institution: Small Mammal Conservation and Research Foundation

Country: Nepal

Number of participants: 17

Comments: Attached workshop schedule and participant list.

Website or sources of verification:

Communications and visibility

For the communication and visibility of the project in broader community, data paper will be published which is important for the researchers who are working species distribution models. Importantly, based on these dataset, the project members is going to draft for peer reviewed paper related contribution of camera trapping studies in sense of Asian biodiversity conservation. That paper will based on designing conservation priority area of the threatened mammals that included species occurrence dataset and environmental parameter. It is expected that such paper will explore wider area in Asian biodiversity conservation. Visibility of the data will regularly track the information used by other users where these information are important for whom.

Monitoring and evaluation

Final Evaluation

The project extracted 10322 species occurrence location from 14 countries of South and South East Asia. Project meets the targets of 300 vertebrate's species from 200 sites. This project shared camera studies from 301 sites and 548 vertebrates' species. However, stated occurrence records including 500000 observations indicated the capture individual's records which might not spatially distinct location. Such information could not meet the target state in the project. Importantly, camera trapping studies are frequency deployed in the Asia but such data were not complied and sparsely available on GBIF. Thus recent published data base is expected to contribute in research, conservation and planning of wildlife in both protected and outside protected area in Asia.

In Asia, comparing to studies on wildlife based on their survey technique, camera trapping is one most reliable information and population studies that is the main strength for the project. Also, such study covered good spatial coverage records of the species among the different countries. However, majority of published literature has excluded the information on the capture history, RAI, effective survey area, and community assemblages. The indicated the weakness of the project implementation. Published information in different native languages and data share complicated by the main authors to others are the challenges of the project. Due to project's unexpected incident, activity are in such condition it difficult give responsibility is difficult when the project partner from the different geographic locations. Such action has hindered smooth function of the project management. During project implementation, taking study permission for the international grant also make complexity to get timely permission to stats study timely due the different country's policies. Project activity plan has changed which is compensated by additional literature survey and data mobilization workshop due to complicated data structure of the different stakeholder.

During proposal developing project to GBIF, there is essential in-depth discussion on the propose activities, availability of human resources and experience and skill of the project team members to achieve propose study related to GBIF. Also, it suggest to conduct a short pilot study on availability data scours before developing project for the GBIF.

Best Practices and Lessons Learned

From the project, I learnt to generate data from the published and grey literature. Data extraction, mining and standardization in R programming. Also, it provides me great opportunity working international collaborator. I get technical and communication knowledge from Co-I and project supervisor. These skills are very helpful for me conduct other GBIF projects relevant species occurrence.

Post Project Activity(ies)

Wildlife study based on the camera trapping is popular tools deployed in the Asian countries. South and South East Asia, cryptic carnivores studies were conducted periodically as a population census, particularly for Tiger. Such study generated a large volume of camera trapping data of other vertebrates that use similar habitat with Tiger. Other direct observation and indirect observational (indirect animal evidences) studies are conducted in the area. Thus, an updating such data to GBIF contribute for the best planning of protected area management, species research and conservation, and developing various conservation projects. Few post project activities are as follows

- Continue update camera trapping based studies at least yearly or half year for continuation of the project
- Collect species occurrence (indirect and indirect observation) primary or secondary information for different vertebrates species
- Compile and generate species occurrence database from the academic thesis at university
- Conduct in-house data mobilization workshop for conservation institution and promote them data contribution to GBIF.

Sustainability plans

BIFA project built a good partnership with collaborator of the project – ECL, Queensland University. The ECL is working in the extraction of camera trapping data globally through primary and secondary sources in collaboration with different institutions. Small Mammal Conservation and Research Foundation is emerging non-governmental organization has conducted various wildlife survey (red panda, pangolin, small carnivores, bats, rodent, otters lagomorph) in Nepal. Both institution will continue to update camera trapping studies information to GBIF once a year. Besides camera trapping, Small Mammals will update species occurrence data from Nepal basically small mammals that would generated from the previous completed project and upcoming project. Recently, SMCRF is expected to update and share the species occurrence database of red panda and Bats. Also, SMCRF will promote other institutions in Nepal to share species occurrence (Butterfly, Fishes, Birds, Amphibian and Reptiles) data to GBIF those who took data mobilization workshop.

GBIF leads the Biodiversity Information Fund for Asia (BIFA), a programme funded by the Ministry of the Environment, Government of Japan. The programme provides supplementary support for activities addressing the needs of regional researchers and policymakers through mobilization and use of biodiversity data.

