

FINAL NARRATIVE REPORT

Guidelines on how to complete this report are included in italics.

Use the information included in your BIFA Full Proposal (reproduced in Annex 1 of your BIFA contract) as a baseline from which to complete this report.

Remember that this report will be made available on your project page on the GBIF website and therefore should not include any contact information, unless you have permission from all mentioned in the report that their contact information can be published.

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Project information

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Institution/network/agency affiliation:	Universiti Kebangsaan Malaysia
BIFA Project ID:	BIFA4_024
Project title:	Implementation of acoustics to fill the gaps of bat biodiversity information for Southeast Asia
Start date and end date of the reporting period:	1 May 2019-April 2020
Country in which the activities take place:	Southeast Asia

Executive summary

Please provide a brief summary of your project's objective(s), its implementation and achievements. You should also describe the context and the approach taken for the final evaluation of your project, and also the key best practices and lessons learnt identified. Remember to include any additional objectives that were defined during the implementation of the project and explain why they were added to the project's initial objectives. In the event of unexpected challenges which have prevented you to reach a planned project objective, please provide explanations and indicate if and how you plan to reach these objectives post project.

(Max. 350 words.)

Bats make up nearly 40% of Southeast Asia's mammal species but have received limited attention in biodiversity studies. To redress this, Southeast Asian Bat Conservation and Research Unit (SEACRU) developed a database for collecting bat locality data across SE Asia and pushing new data to GBIF. Our prior research shows that SE Asian bat data in open-source resources are strongly biased with consequences for models that underpin conservation policy. Fortunately, occurrence data for many bat species can be generated through acoustic sampling. In our review, call descriptions from over 40% of echolocating species have been reported in literature, but none of the recordings are accessible and many of the species occurrence attached are not published. The Hungarian Natural History Museum (HNHM) is establishing the Asian Bat Call Database, which is the first open bat call library in Asia. With a support from GBIF, SEACRU and HNHM are cooperating to assemble existing reference calls from SE Asia and nearby regions, and to capture species location data represented by recordings. By to date, we have introduced the funded project to SEACRU members in our 2019 annual meeting, to global bat researchers at the 18th International Bat Research Conference, and participants in a follow-up workshop. We have developed a standard sheet following the Darwin Core and GUANO standards for allocating species location and recording metadata, a data sharing policy, and *guanocli* (<https://github.com/dsquire/guanocli>), a Python-scripted tool which allow us to edit the metadata attached with acoustic recordings. We made 2-day data cleaning workshop training 40 participants from 9 Asian countries at the Universiti Kebangsaan Malaysia, Malaysia, on 2019 November 30 – December 1. By to date, we have allocated 22 data sets from 18 research teams, together contributing over 7,000 occurrence records of 179 bat species. All data have been cleaned and formatted following DwC, checked by experts for the taxonomy and georeferenced, and then published to GBIF. Currently, we are developing a bioacoustics handbook for SE Asian bats. Our project partners also plan to publish several peer-reviewed papers based on the species data and acoustic recording collected in the present project.

Progress against expected milestones

Please indicate the status of the expected milestones as outlined in Annex 3 of the contract, at the time of final reporting. Please provide links in the sources of verification.

In the event of unexpected delay(s), please provide detailed explanatory notes.

Expected milestones	Completed? Yes/No	Explanatory notes	Sources of verification
Gain certification at BIFA Capacity Enhancement Workshop (Mid-term report milestone)	Yes		Annex 1
At least one dataset has been published to GBIF.org (Mid-term report milestone)	No	The original schedule in the proposal primarily is to collect cleaned and standardized data from the project partners during and after the main workshop, which will be held on this Nov 30 th -Dec 1 st . Since our project aims to collect data from 18 institutes across 8 countries via an integration of databases, a longer preparation time for designing data collection protocol, sharing policy, and training materials is necessary. The late data publishing timeline is expected and has been previously addressed in the full proposal.	Annex 2
All deliverables have been produced (Final report milestone)	No	We finished most direct deliverables, except a webinar for advertising the project to global society of bat research and 3 proposed datasets. The team is organizing the webinar in 2020 August. The three datasets will be published to GBIF by September 2020. All indirect deliverables, primarily derived publications based on the data collected, are still in progress.	
Sustainability and next steps have been documented (Final report milestone)	Yes	The PI will also present the project in the next SE Asian bat conference, which is expected to be held in 2021 summer. The team will continue advertising the project via the proposed webinar and social medias, e.g. Facebook and Twitter	

Activities

Please indicate the status of the activities as outlined in the BIFA Full Proposal (section 4.4), at the time of final reporting.

The table below should be completed in the same way as in the BIFA Full Proposal, but should include information and updates on the status of each activity. Please indicate relevant source(s) of verification and **provide links, or a copy of the source of verification** mentioned if no links are available. Attachments should be provided in the Annex.

In the event of unexpected delay(s), please provide detailed explanatory notes and indicate new planned completion date(s).

Please include any additional activities completed during the implementation of the project that were not originally outlined in the BIFA Full Proposal.

Add rows as required.

Activity name	Expected deliverable	Contribution to goals listed in table 4.3 of the BIFA Full Proposal	Status of activity at final reporting: Completed? Yes / No (inc. % complete)	Explanatory notes, including new planned completion date if necessary	Source(s) of verification
Monthly programmer online meeting	To develop user-friendly and effective tools to mobilize species location data attached to media from HNHM call database to SEABCRU database and then redirect them to GBIF.org	Goals 1, 2, 3	50 %, on track	The call database and bridging tools are still under development and the estimated date to be finish will be in 2020 December as we expected.	
Bimonthly online meeting between programmers and lead scientists	To track the progress of tool development, the designs of the tools fulfil the needs of the expected users and feasible for extended applications in the future, and the format of the data published to GBIF following the GBIF's requirements	Goals 1, 2, 3	100 %, completed		

Activity name	Expected deliverable	Contribution to goals listed in table 4.3 of the BIFA Full Proposal	Status of activity at final reporting: Completed? Yes / No (inc. % complete)	Explanatory notes, including new planned completion date if necessary	Source(s) of verification
Bimonthly lead scientist online meeting	To ensure the project following the proposed timeline, and to discuss contingency plans for risk mitigation; to organize and prepare necessary materials for all proposed activities and events; to generate project reports	Goals 1, 2, 3	100 %, completed		
Face-to-face meeting	To promote the project to the steering committee members of SEABCRU and to update the progress of the project to those already participate in this project	Goal 2	100 %, completed		Annex 03.1-03.4 (pictures)
Data quality control workshop	To work with SE Asia's researchers to collect and format existing data for the proposed databases, primarily focus on data hold by the project partners and SEABCRU researchers	Goals 2, 3	100 %, completed		Annex 04 & 05
Development of an acoustic survey manual	To provide guidelines to the community to develop effective and feasible survey protocols to acquire species location and ecological information for SE Asian bats	Goal 2	33%, on track	The draft is currently in an internal review and likely needs further revisions. The work is delayed because the actual working load is higher than our expectation. Despite the delayed progress, the team decides to postpone the acoustic survey manual until the proposed data papers and one review paper submitted. We think these publications are more relevant to the main goal of this project in mobilizing bat occurrence data to GBIF. Nevertheless, some recommendations of reference call collection based	

Activity name	Expected deliverable	Contribution to goals listed in table 4.3 of the BIFA Full Proposal	Status of activity at final reporting: Completed? Yes / No (inc. % complete)	Explanatory notes, including new planned completion date if necessary	Source(s) of verification
				on our experiences through the present project will be included in the proposed review paper.	
Presenting in scientific meetings	To disseminate the project to broad audiences in Asia	Goal 2	100 %, completed		https://ibrc2019.com/overview-of-the-program/ Annex03.3, 06.1-06.6
Main workshop	To populate the project with global researchers in Asia and to assemblage and format new data collected by SEABCRU members and new participants	Goal 2	100 %, completed		https://qrgo.page.link/YLiWn
Webinar training	To supervise the existing partners and new participants, especially those do not attend any previous workshop to edit the species location data and the metadata of the associated media following stand formats	Goals 2, 3	50 %, on track	The webinar is postponed to August 2020 due to schedule conflicts among our partners for the propose period (January-March 2020), which partially cuased by the impact of the recent coronavirus pandemic.	
Data paper drafting	To promote the datasets generated and the tools developed from the project, including the two databases	Goal 2	100 %, completed	The original plan is to publish papers after the project end. Currently, several project partners are planning to further publish their GBIF datasets to peer-reviewed data journals later. With a support from TAIBIF, the PI will provide a guideline for data paper publication. The guideline will be first introduced in this coming webinar and then upload to open-access cloud platforms, e.g. ResearchGate, to share further. The PI is also planning to write a review paper	

Activity name	Expected deliverable	Contribution to goals listed in table 4.3 of the BIFA Full Proposal	Status of activity at final reporting: Completed? Yes / No (inc. % complete)	Explanatory notes, including new planned completion date if necessary	Source(s) of verification
				focusing based on the acoustic and species occurrence data for a submission to the Mammal Reviews.	
Publishing developed tools	To have broader and longer-term impacts of this project by sharing on the tools developed open science platforms	Goals 2, 3 (indirect)	100%, on track		https://github.com/dsquire/guanocli
Data publishing to GBIF database	To fill taxa and geographic gaps of bat biodiversity in the database and allow global users to access the new datasets through GBIF platform	Goal 3	90 %, on track	21 datasets are published to GBIF by 2020 June 24.	https://www.gbif.org/publisher/768e0109-68c6-4611-b8be-df2ae01aa470

Deliverables

This section should summarize the project deliverables as outlined in the BIFA Full Proposal (section 4,5), at the time of final reporting. Please highlight any changes from the original plans.

If no result has been achieved on a specific point, or in the event of unexpected delay(s), please provide detailed explanatory notes and indicate new planned completion date(s).

Please include any additional deliverables completed during the implementation of the project, that were not originally outlined in the BIFA Full Proposal.

Add rows as required.

a. Data

Details of datasets published and/or pending publication as an outcome of the project. The table below should be completed in the same way as in the BIFA Full Proposal but should include information and updates on the status of each dataset. **Please provide links in sources of verification.**

If the dataset is not yet published, please indicate this as “not published” and provide a detailed explanation, % of digitization and expected date of publication.

Add rows as required.

Title of dataset (title in proposal)	Data type (checklist/occurrences/sampling event) ¹	Estimated number of records (specimens)	Status of dataset: Published / not published and % of digitization and expected date of publication	Data holding institution agreed to publish its data via GBIF.org (Yes/No)	Explanatory notes	Source(s) of verification: DOI or URL
Bats of Kim Hy Natural Reserve, Vietnam (Bat diversity in a karst landscape in Northern Vietnam)	Occurrences	200 (matched)	Published in 2020 June	Yes		DOI: 10.15468/d5xmst
Bats of Phnom Kulen National Park, Cambodia (Bat diversity in Cambodia)	Occurrences	100 (matched)	Published in 2020 June	Yes		DOI: 10.15468/es6q4e
USM-BB17 (Bat Diversity in Penang, Malaysia)	Occurrences	100 (matched)	Published in 2020 June	Yes		DOI: 10.15468/jnp2ch
Insectivorous Bats of Gunung Mulu National Park, Malaysia (Bat Diversity in Gunung Mulu National	Occurrences	200 (the actual number: 650)	Published in 2020 June	Yes		DOI: 10.15468/3g2vbv

¹ Dataset classes: <http://www.gbif.org/publishing-data/summary#datasetclasses>

Title of dataset (title in proposal)	Data type (checklist/occurrences/sampling event) ¹	Estimated number of records (specimens)	Status of dataset: Published / not published and % of digitization and expected date of publication	Data holding institution agreed to publish its data via GBIF.org (Yes/No)	Explanatory notes	Source(s) of verification: DOI or URL
Park, Sarawak, Malaysia)						
Bats from Yunlin, Taiwan (Reference calls (full spectrum) for Taiwanese bats)	Occurrences	100 (matched)	Published in 2020 June	Yes		DOI: 10.15468/2yr925
Bats of Central Mountain Range, Taiwan (Central Taiwanese bats)	Occurrences	100 (the actual number: 101)	Published in 2020 June	Yes		DOI: 10.15468/db3a6d
Bats of southern Vietnam (Bat diversity in the northern and Southern Vietnam)	Occurrences	50 (the actual number: 148)	Published in 2020 June	Yes		DOI: 10.15468/cj6bn3
Bats of northern Vietnam (Bat diversity in the northern and Southern Vietnam)	Occurrences	50 (the actual number: 64)	Published in 2020 June	Yes		DOI: 10.15468/gk4vzy
Bats of Sarawak, Malaysia Borneo (Bat diversity in protected areas of Borneo Malaysia)	Occurrences	300 (matched)	Published in 2020 June	Yes		DOI: 10.15468/kxgrav
Reference call of insectivorous bats in Taiwan (Reference calls (zero-crossing) for Taiwanese bats)	Occurrences	100 (matched)	Published in 2020 June	Yes		DOI: 10.15468/gpnb4g
Hungarian Natural History Museum Asian Bat Call Database (Asian Bat Call Database)	Occurrences	500 (the actual number: 594)	Published in 2020 June	Yes		DOI: 10.15468/zkfx5b
Vietnamese insectivorous bat (IEBR bat call library)	Occurrences	200 (matched)	Published in 2020 June	Yes		DOI: 10.15468/9cuk2h

Title of dataset (title in proposal)	Data type (checklist/occurrences/sampling event) ¹	Estimated number of records (specimens)	Status of dataset: Published / not published and % of digitization and expected date of publication	Data holding institution agreed to publish its data via GBIF.org (Yes/No)	Explanatory notes	Source(s) of verification: DOI or URL
Bat diversity in Taiwan	Occurrences	50 (the actual number: 53)	Published in 2020 June	Yes		DOI: 10.15468/5esr6a
Bats of Bukit Barisan Selatan Landscape, southwestern Sumatra, Indonesia (Bat diversity in SW Sumatra, Indonesia)	Occurrences	125 (the actual number: 1,776)	Published in 2020 June	Yes		DOI: 10.15468/emgg92
Vietnamese bat collection in the National Museum of Zoology (NZM bat call library)	Occurrences	200 (the actual number: 209)	Published in 2020 June	Yes		DOI: 10.15468/7m7knx
MZB Indonesian bat call library	Occurrences	150 (the actual number: 110)	Published in 2020 June	Yes		DOI: 10.15468/vytyyb
Insectivorous bats of Langkawi, Malaysia (Malaysia bat call library)	Occurrences	200 (the actual number: 187)	Published in 2020 June	Yes		DOI: 10.15468/bxrstj
SEABCRU bat call collection	Occurrences & sampling event	200	25% digitized, expected date of publication in 2020 September	Yes	Part of the data digitalized but in separated files and not in the standard format	N/A
Bat diversity in Singapore	Occurrences	100	30% digitized, expected date of publication in 2020 July	Yes	Part of the data is digitalized but in separated files and not in the standard format	N/A
PMCSNHM bat call library	Occurrences	100	70% digitized, expected date of publication in 2020 July	Yes	Part of the data is digitalized but in separated files and not in	N/A

Title of dataset (title in proposal)	Data type (checklist/occurrences/sampling event) ¹	Estimated number of records (specimens)	Status of dataset: Published / not published and % of digitization and expected date of publication	Data holding institution agreed to publish its data via GBIF.org (Yes/No)	Explanatory notes	Source(s) of verification: DOI or URL
					the standard format	
Data not listed in the proposal (by workshop participants and invited partners, 4 data sets)						
Bats of Penang Island, Malaysia	Occurrences	94	Published in 2020 June	Yes		DOI: 10.15468/tn7zxw
Echolocating bats of West Java, Indonesia	Occurrences	100	Published in 2020 June	Yes		DOI: 10.15468/fq4m2n
Bats of Northern Peninsular Malaysia	Occurrences	259	Published in 2020 June	Yes		DOI: 10.15468/4dtajy
Bats in the mountain areas of Taiwan	Occurrences	1,518	Published in 2020 June	Yes		DOI: 10.15468/3g2vbw
Insectivorous bats of Bako National Park and Wind Cave Natural Reserve, Malaysia	Occurrences	134	Published in 2020 June	Yes		DOI: 10.15468/wns3f2

b. Other deliverables

Describe other deliverables (e.g. publication of data papers, analysis, reports etc.) produced by the project. In the event of unexpected delay(s), please provide detailed explanatory notes and indicate if the deliverable(s) are to be produced post-project, and if so, indicate expected completion date(s).

Please provide links in the sources of verification. Attachments should be provided in the Annex.

Name and type of deliverable	Status of deliverable: Completed? Yes / No (inc. % complete)	Explanatory notes	Source(s) of verification
<i>Drafting Acoustic survey handbook</i>	<i>Not completed, 33% completed</i>	<i>Expected to be completed by early 2021 (the 1st draft)</i>	
<i>Drafting data papers</i>	<i>Not completed, 33% completed</i>	<i>Expected to be completed by December 2020</i>	
<i>Presenting the project at scientific meetings</i>	<i>100%, completed</i>	<i>Introduced the project to participants at the 18th International Bat Research Conference in Phuket, Thailand, on July 28th, 2019 and the IBRC post-conference workshop in Hat Yai, Thailand, on August 2nd-6th, 2019.</i>	https://ibrc2019.com/overview-of-the-program/ Annex03.3, 06.1-06.6
<i>Publishing new tools</i>	<i>100%, completed</i>	<i>V 1.1 released</i>	https://github.com/dsquire/guanoctl

Events organized as part of the project

Please indicate the status of the events as outlined in the BIFA Full Proposal (section 4.6), at the time of final reporting.

The table below should be completed in the same way as in the BIFA Full Proposal, but should include information and updates on the status of each event. **Please provide links to any documents or web pages documenting the event(s) in the sources of verification. Attachments should be provided in the Annex.**

In the event of unexpected delay(s), please provide detailed explanatory notes and indicate new planned completion date(s).

Please include any additional events organized as part of the project that were not originally outlined in the BIFA Full Proposal.

Add rows as required.

Event title	Organizing institution	Date held / expected dates	Number of participants	Explanatory notes	Source(s) of verification
Data quality control workshop	Southeast Asian Bat Conservation and Research Unit	28 July 2019	17	Completed	Annex03.1-03.4
Main workshop for populating	Southeast Asian Bat Conservation and Research Unit, Hungarian Natural History Museum, and University Kebangsaan Malaysia	November 30 th - December 1 st , 2019 (2 days)	Up to 40	<p>The workshop was originally planned for 3 days. However, we changed the duration to 2 days due to the following reasons:</p> <ol style="list-style-type: none"> 1. The difficulty to find a 3-day slot for the majority of the project partners in the proposed timeframe. 2. A reduction of the budget due to the decreasing exchange rate between Malaysia Ringgit and Euro dollar. <p>To mitigate the loss of time, we had made a standard datasheet with instruction (Annex04) and sent it to the project partners. We expected the partners to finish the data entry prior to the workshop and then check the data with facilitators during the workshop. They will also serve as trainers to help other participants to work on their data.</p>	<p>https://www.facebook.com/photo.php?fbid=2945810752100490&set=gm.3113461525362149&type=3&theater&ifg=1</p> <p>Annex04, 07.1-07.2</p>
Webinar training	Southeast Asian Bat Conservation and Research Unit, Hungarian Natural History Museum, TAIBIF	August, 2020	Up to 100	A tentative date and agenda will be discussed and planned in a meeting after the main workshop	Annex07.2

Calendar of activities

The calendar should be completed in the same way as in the BIFA Full Proposal (section 4.7) but should also clearly indicate and include any changes (e.g. use of colour-coding to indicate expected changes and/or delays). Please provide explanations for any changes in the “Notes” column. Please provide general comments on the calendar of your activities in the ‘General comments on project implementation’ section.

Activity	2019								2020				Notes
	M	J	J	A	S	O	N	D	J	F	M	A	
Activity: Monthly programmer online meeting	X	X	X	X	X	X	X	X	X	X	X	X	
Activity: Developing web portal for bridging SEBACRU database and ABCD	X	X	X	X	X	X	X	X	X	X	X	*	Will continue until 2020 December
Activity: Bimonthly scientist online meeting	X		X		X		X		X		X		
Activity: Bimonthly online meeting between scientists and programmers		X		X		X		X		X		X	
Mandatory attendance of a project team member to the BIFA Capacity Enhancement Workshop (expenses for attending the workshop are covered by the BIFA programme)			X										
Activity: Face-to-face follow-up meeting for leading researchers and partners			X										
Event: Data quality control workshop			X										
Activity: Species data missing area coverage fieldwork					X								
Data preparation for publishing to GBIF database				X	X	X	X	X	X	X	X	X	
Activity: Development of the acoustic survey manual				X	X	X	X	X	X	X	X	X	
Activity: Presenting the project at an Asia-based international conference for biodiversity science			*										Due to a schedule conflict, the PI represented the project in different events instead of the proposed 2019 ATBC-AP Annual meeting
Activity: Writing mid-term report						X							

Activity	2019								2020				Notes	
	M	J	J	A	S	O	N	D	J	F	M	A		
Deadline for mid-term report – 31 October 2019 Mandatory milestones attached to the mid-term report: <ul style="list-style-type: none"> - Gain certification at BIFA Capacity Enhancement Workshop - At least one dataset has been published to GBIF.org * 						X		*					In the proposal, we scheduled to collect cleaned and standardized data from the project partners during the main workshop, which will be held on this Nov 30 th -Dec 1 st . The delay of data publishing is expected and relevant for our project	
Event: Main workshop							X							
Activity: Data paper drafting and submission						X	X	X	X	X	X	*	In the proposal, we scheduled to finish the manuscript preparation by 2020 March. The fail to achieve this target is primarily due to the underestimate of working load the data cleaning and publication. The current estimated date for data paper submission is August 2020.	
Activity: Publishing new tools to open tool platforms						*	X	X	X	X	X		We finished and uploaded the beta version of the developed tool, guanoctl, to Github earlier than the schedule. New versions will be updated after we have the feedbacks from users in after main workshop	
Event: Webinar training *									X			*	The Webinar will be held on May 10th, 2020. The delay is due to schedule conflict of the lead scientists of the the project, which partially caused by the impact of the recent global coronavirus pandemic.	
Activity: Publishing new species data to GBIF.org									*	*	X	*	We decided to start data publishing earlier due to the high number of the dataset. The multiple data sources could also complicate the data cleaning process	
Activity: Writing final report												X		
Deadline for final reporting – 30 April 2020 Mandatory milestones attached to the final report: <ul style="list-style-type: none"> - All deliverables have been produced - Sustainability and next steps have been documented 												X		

a. General comments on project implementation

(Max. 200 words)

Despite the intense working schedule, we have finished most proposed activities by the funding period. The team collected 22 datasets from 18 research teams, accounting ~7,100 species occurrence data which is nearly double to the amount we proposed (3,500-4,000 records). All data assembled were cleaned and published to GBIF. Two workshops were organized to train project partners and participants to familiar with data sharing policy, designed format, workflow, and the tools we developed. Three presentations at a scientific meeting and two workshops were given to advertise the project. The above activities were primarily finished following the proposed timeline. Such achievements cannot be done without the regular communications between the leading researchers, database managers, and project partners. However, the team is not able to finish all deliverables by the deadline. The fail to hit these targets is partially due to the excessive ambition of the proposal, which included too many activities. Noteworthy, the impacts of the recent coronavirus pandemic to the project partners' administration system and working schedule also make the progress tracking exceedingly difficult since 2020 January. Nevertheless, the team are planning to finish all deliverables after the project with a more practical schedule and internal supports.

Project communications and visibility

Describe the way the results of your project have been and will continue to be communicated and shared with the project stakeholders and broader GBIF community.

Please also review the page describing your project available from <http://www.gbif.org/programme/bifa> and highlight any additional documents, events, news items or links that you would like to add to your page and provide links/attachments in the Annex.

(Max. 300 words)

We have advertised the project via SEACRU's Facebook group, which currently has over 1,600 fans (www.facebook.com/groups/125833910791607), Twitter (<https://twitter.com/EcojoeHuang>), and ResearchGate (<https://www.researchgate.net/project/BIFA-Ecological-monitoring-data-mobilization-Implementation-of-acoustics-to-fill-the-gaps-of-bat-biodiversity-information-for-Southeast-Asia>). The leading researcher has presented this project at the 2019 annual SEACRU meeting, the 18th International Bat Research Conference (<https://ibrc2019.com/>) and 2019 IBRC post-conference workshop (<https://goo.gl/QwAc1t>). We recently released gaunoctl, a new open tool designed for metadata editing of acoustic recordings assembled through this project (<https://github.com/dsquire/gaunoctl>). Further results and outputs of the project, e.g. a standard form of the recording metadata and data sharing policy, and publications, will be also shared and advertised later. The principle investigator has constantly communicated and shared the project progress and materials with project stakeholders via emails and various social media platforms. Moreover, many of our project partners, SEACRU members, and our associates are serving in institutes and organizations that have been involved in establishing biodiversity information carrying capacity in Asia and over the world. For example, eight project partners are based at the leading institutes of national/regional collections of mammals or/and several other taxa (birds, reptiles, amphibians, fish and insects) in Indonesia, Thailand, Malaysia, and Vietnam; Hungarian Natural History Museum has been working on biodiversity research across Asia; Several SEACRU steering committee are serving in local and international NGOs, e.g. IUCN SSC Bat Specialist Group (<https://www.iucnbsg.org/>) and Global Union of Bat Diversity Networks (<https://www.facebook.com/groups/227466605160735/>). Therefore, our project would not only enhance biodiversity data mobilization for Southeast Asian bats but could also expand its influences on broad spatial extent and more diverse taxa and audiences via our network. At last, we will host the proposed training webinar in this August and seek opportunities to present the project in GBIF's annual meeting and other international events. The team is confident that our multi-dimensional strategy in populating the project is solid and will be effective.

Monitoring, evaluation and lessons learned

Please indicate the results of the monitoring and evaluation plans, as outlined in your BIFA Full Proposal (section 4.9), at the time of final reporting.

Ideally this section should also include the following:

- *An evaluation of the project activities and their outputs/deliverables*
- *An assessment of the overall outcomes, impacts of the project and how it contributes to the overall objective of the BIFA programme*
- *Comments on the project implementation and completion, and its efficiency and effectiveness, strength and weaknesses etc.*
- *Any feedback on the project's relevance from the partners and stakeholders*
- *Indications and reasons for any changes which have been made to the project's original plans, and actions to follow-up*
- *Areas of success to build on, after the project's implementation period and best practices that could be useful for the community*
- *Main lessons from the project experience that could be applied in other contexts*
- *Conclusions from your experience during the implementation of the project and recommendations for the GBIF Secretariat or the community to reinforce the success of the project*

(Max. 400 words)

The team has achieved most advertising and training activities, including 3 presentations, 2 workshops and advertisements via social medias. The outputs include over 100 participants and audiences from over 20 countries to the events and approximate 350 reads of the advertisements. We also developed a standard protocol for mobilizing species location data embedded in associated sound recordings from research institutes and museums in SE Asia and nearby Asian countries through two databases to GBIF. The protocol includes data cleaning and formatting, georeferenced and taxonomy checking, and translation of the data to DwC with appropriated licenses before publishing to GBIF. We also developed an open tool for extracting species location data from reference call recordings associated with field observations and specimens. The deliverables include 7,097 occurrence data of 179 bat species (98% of the data are to species level) from 5 Asian countries collected by 18 research teams from 2002 to 2020. Our data represent a significant contribution to open bat diversity information comparing to the existing data in GBIF collected from the same countries and period (3,690 records, c. 70% to species level, Doi: [10.15468/dl.uvzpj4](https://doi.org/10.15468/dl.uvzpj4)). Our success is primarily attributed to the adequate communication and trust among project partners based on the strong affiliation between team members, which built up through the long-term collaborations under the SEABCRU-HNHM network and efforts of all partners. Dissatisfiedly, we are not able to finish all proposed activities likely due to the over-ambitious proposal and the difficulties of coordinating activities for a group with such diverse members from different countries. The recent emerging coronavirus pandemic also slow down our progress since 2020 January, especially most our partners are leading bat experts in the region who have been demanded to involve in national and global bat-pathogen associated assessments. The team is planning to finalize all unachieved activities with internal supports. Noteworthy, instead of focusing on specimen collection at single institute as in previous BIFA projects, we assembled evidence-based observations from multiple organizations across countries via a regional network. We successfully demonstrate the possibility to establish transboundary carry capacity for open biodiversity science in Asia via international NGOs who deepening regional biodiversity works. We also see immediate potential to expand our model to board areas in Asia as many our members, project partners, and workshop participants from Southeast and South Asia have proposed to SEABCRU to host similar training events for acoustic-based biodiversity data mobilization in their countries.

Sustainability plans

Please provide a description of how the partners involved will build on the results of this project in their future work. This could include future collaborative activities, such as plans to complete any unfinished project activities and how the future impact of the project could be monitored and/or measured.

(Max. 200 words).

After the project, the team will continue to promote open science, to collect existing data via our network and new data with the support from Hungary until December 2020. SEABCRU and HNHM will also seek opportunities to obtain funding and resources to further promote the data mobilization, to manage the systems sustainably and to publish the acoustic handbook. Several project partners and project workshop participants are developing proposals on acoustic monitoring, call classifier development, species inventory surveys, and taxonomy research for Southeast Asian bats, particularly on taxa and geographic gaps identified by our results. The species location data and audio recordings from this project could provide baselines to design evidence-based action plans and reciprocally contribute new biodiversity information to our databases and GBIF. The SEABCRU-HNHM alliance can serve as a hub further delivering the concept of data mobilization to a larger geographic extent than Southeast Asia. Many of the former trainees of our previous workshops and projects have expand their research to other Asian regions and continuously contribute to the network. Their participation is expected to benefit the

development of biodiversity data mobilization and transparency in Asia, of which many countries has been identified by GBIF as a geographic gap of biodiversity knowledge.

Annex – Additional sources of verification

Sources of verification are for example links to relevant digital documents, news/newsletters, brochures, workshop related documents, pictures, etc.

1. Annex01: Open Badge awarded to the PI from GBIF
2. Annex02: BIFA04_24 full proposal
3. Annex03.01-03.04: 2019 SEABCRU annual meeting
4. Annex04: ABCD standard datasheet
5. Annex05: SEABCRU data sharing authorization form
6. Annex06.01-06: 2019 IBRC pre- and post-conference workshops
7. Annex07.01-07.02: 2019 SE ABCD & BI workshop