

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

Main contact person and role:	Djunijanti Peggie, as coordinator for the project at MZB
Institution/network/agency affiliation:	Entomology Laboratory, Museum Zoologi Bogor (MZB), Research Center for Biology, Indonesian Institute of Sciences – Lembaga Ilmu Pengetahuan Indonesia (LIPI)
BIFA Project ID:	BIFA4_037
Project title:	Data mobilization of Indonesian butterfly collections at Museum Zoologi Bogor, Indonesia
Start date and end date of the reporting period:	15 May 2019 until 31 July 2020
Country in which the activities take place:	Indonesia

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.)

This project covers data mobilization of Indonesian swallowtail butterfly collection at Museum Zoologi Bogor (MZB), Indonesia. Before the project started, it was difficult to quantify the number of butterfly specimens at MZB because about 95% of them did not have the registered individual catalog number. Under the IndoBioSys project, with Dr. Christoph Häuser, we explored QR code application as unique identifiers to complement specimen digitization. For this project, digitization including the application of QR codes for Papilionidae specimens at MZB have been undertaken by hired assistants and permanent staff. We have learned together and have implemented a great workflow that ensure safety for the specimens and maintain high productivity. The BIFA workshop in July 2019 has had a great impact on implementation of this project. To date, all specimens of Papilionidae have been sorted, identified, validated, given QR code and MZB-Lepi number, registered, photographed (a male and a female from each locality for each species), geo-referenced, and uploaded to GBIF. Data of 8,835 Papilionidae specimens -exceeding our initial target of 7,000 specimens by almost 40%- have been mobilized in twelve datasets of genera of Papilionidae to GBIF for wider use and greater advancement of knowledge. After the work restriction due to Covid-19 pandemic was gradually lifted about mid-June 2020, we resumed our pending work and mobilized 948 specimens of highly traded non-Papilionidae butterflies

which include the protected species *Cethosia myrina* (of Nymphalidae), *Hebomoia* (of Pieridae), and *Idea* (of Nymphalidae).

Challenges for this project included initial administrative matters of opening bank account and acquiring computers and cameras. We experienced some trouble with InaBIF system in February 2020 so that some genera were published without photographs, which have been updated. The Covid-19 pandemic has hindered us from completing the work on time. Starting March 16, 2020 we could not go to work with the specimens, but fortunately we could have an extension of work, so we could complete all works before the end of July 2020. This first year's BIFA project brings the percentage of our digitized and mobilized butterfly data to about 17% of the estimated 58,000 MZB's butterfly specimens.

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	We did not get the certification at first apparently because many assignment files were not uploaded properly and thus the trainers could not access them. We did the assignments of Use Case 2 and Use Case 3 again thoroughly.	https://openbadgepassport.com/app/badge/info/170085
All datasets have been published to	Yes, all datasets of	Datasets of: <i>Chilasa</i> butterfly	url for <i>Chilasa</i> dataset: www.gbif.org/dataset/d13e5b4c-e838-4244-8ac1-dfe1d75e2f48

Expected milestones	Completed? Yes/No	Explanatory notes	Sources of verification
GBIF.org	Papilionidae have been completed. Three additional datasets of Indonesian endemic and highly traded non-Papilionidae species have been mobilized as well.	collection at MZB was published on 23 October 2019, <i>Cressida</i> and <i>Meandrusa</i> were published on 24 October 2019, <i>Atrophaneura</i> and <i>Trogonoptera</i> on 29 October 2019, <i>Lamproptera</i> on 4 December 2019, <i>Losaria</i> on 6 December 2019, <i>Pachliopta</i> on 17 December 2019, <i>Graphium</i> on 3 February 2020, <i>Ornithoptera</i> on 4 February 2020, <i>Troides</i> on 6 March 2020, <i>Papilio</i> on 10 March 2020, <i>Cethosia myrina</i> (of family Nymphalidae) on 15 July 2020, <i>Hebomoia</i> (of family Pieridae) on 14 July 2020, <i>Idea</i> (of family	<p>url for <i>Cressida</i> dataset: www.gbif.org/dataset/2ce88946-0fb0-413a-b513-e87d735a0e29</p> <p>url for <i>Meandrusa</i> dataset: www.gbif.org/dataset/46b22f62-bd4f-4157-8a57-f97cf22fda9e</p> <p>url for <i>Atrophaneura</i> dataset: www.gbif.org/dataset/6676b3f8-e389-4911-aa09-2e04f964a419</p> <p>url for <i>Trogonoptera</i> dataset: www.gbif.org/dataset/3839d127-ff17-4477-9069-2b0746d4bc83</p> <p>url for <i>Lamproptera</i> dataset: http://www.gbif.org/dataset/09a6c040-a452-4f8f-b32b-d7762aa6bc85</p> <p>url for <i>Losaria</i> dataset: https://www.gbif.org/dataset/f53a51f9-ad06-465e-97fd-37ea81a9f732</p> <p>url for <i>Pachliopta</i> dataset: https://www.gbif.org/dataset/ab67e429-389c-43a7-8799-36c67ece82d6</p> <p>url for <i>Graphium</i> dataset: http://www.gbif.org/dataset/2aad3bc7-4765-40ea-b478-3ac3cb53ff72</p> <p>url for <i>Ornithoptera</i> dataset: https://www.gbif.org/dataset/ed6df385-67ec-4872-ad25-e6e76ca2dcb1</p> <p>url for <i>Troides</i> dataset: https://www.gbif.org/dataset/76471ac1-dde9-4b57-aa77-f305503bc4db</p> <p>url for <i>Papilio</i> dataset: https://www.gbif.org/dataset/24a02aae-d6b8-40c8-8f90-64eb3e780f2b</p>

Expected milestones	Completed? Yes/No	Explanatory notes	Sources of verification
		Nymphalidae) on 16 July 2020.	url for <i>Cethosia myrina</i> dataset: https://www.gbif.org/dataset/d0122ed5-6ed8-430e-86ee-b4d45a6bc2bb url for <i>Hebomoia</i> dataset: https://www.gbif.org/dataset/a71c3da3-4cf3-48f2-a468-f2c0b3189db2 url for <i>Idea</i> dataset: http://www.gbif.org/dataset/e40070cf-6626-4cd0-8e85-cfe6067aecb0
All deliverables have been produced (Final report milestone)	Yes	A manuscript on the Indonesian Papilionidae checklist has been prepared by Christoph Haeuser and me, which greatly benefited from the extracted data of MZB collection. This will complement data paper of MZB's Papilionidae specimens that we are going to publish, either separately or in combination with the checklist.	Draft of manuscript
Sustainability and next steps have been documented	Yes	A workshop to introduce this data mobilization	Report of the workshop was provided to GBIF Secretariat

Expected milestones	Completed? Yes/No	Explanatory notes	Sources of verification
(Final report milestone)		project was conducted on 24 February 2020. After this project, we will continue to work on other families of butterflies, thanks to the second year support of BIFA project.	

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
Learn, get familiar, and adopt a data management system which can be compatible worldwide	Data base system for specimen registration will be selected, based on Darwin core system.	We adopt the data management system using Excel sheet with columns in accordance with Darwin core. Images are taken, cleaned, and the links to	The skills for specimen data management have been acquired.	The skills to manage specimen data have been acquired, including data interpretation, data cleaning, and data publishing.	Fig. 1

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
		images are provided as extension in the associatedMedia column.			
Sort, validate, and make the specimens available for data registration and photography	Butterfly specimens will be ready for data entry	We have sorted, identified, and validated all unmounted and mounted papilionid specimens.	100% specimens of unmounted and mounted Papilionidae have been sorted, identified, and validated to species level and subspecies level. All specimens for the three datasets of Indonesian endemic and highly traded non-Papilionidae have been		Figs. 2 – 4

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
			sorted, identified, and validated.		
Fully develop and implement specimen registration system including: give QR code to each specimen, enter data on specimen labels to spreadsheet on computer, take photograph of upperside and underside of the specimen with the	Credible data base will be available	Specimen registration system have been fully developed and implemented. Each specimen is given QR code and the same MZB number. This is used as the occurrenceID of Darwin Core. Photographs of upperside and underside of selected	All MZB Papilionidae specimens have been registered. All MZB specimens of <i>Cethosia myrina</i> , <i>Hebomoia</i> , and <i>Idea</i> have been registered.		Figs. 5 – 11

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
labels (decide how many specimens per species to be photographed) This will be done also to unmounted specimens in envelopes		(representatives of each locality) male and female mounted specimens were taken, complete with the labels.			
Add data of life history and biology based on existing LIPI's butterfly garden on site	Additional data will be available	Data of <i>Papilio peranthus</i> at the captive-breeding facility will be made available.	Data of <i>Papilio peranthus</i> at the captive-breeding facility has been published in Treubia journal, December 2019.	Data of <i>Papilio peranthus</i> has been included in the additional dataset of observation records.	http://e-journal.biologi.lipi.go.id/index.php/treubia
Maintain contact and coordination with	Communication and understanding with all	Especially at the early stage of	Suggestions were received about	The results of specimen data mobilization have been	

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
participating partners to ensure the activities are in-line with the collaborative scheme	partners will be achieved	establishing specimen registration system, we have support from MfN and Naturalis.	improving the specimen data registration system.	published to GBIF , with the inclusion of our participating partners.	
Register and upload geo-referenced Indonesian butterfly collection data to GBIF	Butterfly data (family Papilionidae, endemic species, highly traded non-Papilionidae species) of MZB collections will be submitted and made available through GBIF	Datasets of genera of Papilionidae butterfly specimens and datasets of endemic and highly traded non-Papilionidae butterfly specimens will be made available.	Datasets of genera of Papilionidae butterfly specimens have been uploaded to GBIF. Additional datasets of endemic and highly traded non-Papilionidae butterfly specimens have been mobilized as well.		Fig. 12

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
Conduct a workshop on digitizing butterfly specimens	Butterfly enthusiasts can be encouraged to help out and become citizen scientists	The workshop will make people aware of the importance of collection data.	The workshop was conducted on 24 February 2020	Photographs of butterflies submitted by participants of the workshop have been made available to GBIF as observation records to act as supplemental data to specimens.	Figs. 13-14

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	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
Datasets of Papilionidae butterfly specimens at Museum Zoologi Bogor, Indonesia with subsets of genera:	occurrences	At the beginning were estimated about 7,000 specimens, but apparently there have been more.	All published to GBIF	yes		
<i>Atrophaneura</i>	occurrences		Published on 29	yes		https://www.gbif.org/dataset/6676b3f8-

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

Title of dataset	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
butterfly specimens at MZB Indonesia			October 2019, updated in July 2020 (129 records)			e389-4911-aa09-2e04f964a419
<i>Chilasa</i> butterfly specimens at MZB Indonesia	occurrences		Published on 22 October 2019, updated in July 2020 (74 records)	yes		https://www.gbif.org/dataset/d13e5b4c-e838-4244-8ac1-dfe1d75e2f48
<i>Cressida</i> butterfly specimens at MZB Indonesia	occurrences		Published on 24 October 2019, updated in July 2020 (7 records)	yes		https://www.gbif.org/dataset/2ce88946-0fb0-413a-b513-e87d735a0e29
<i>Graphium</i> butterfly specimens at MZB Indonesia	occurrences		Published on 3 February 2020, updated in July 2020 (2,500 records)	yes		https://www.gbif.org/dataset/2aad3bc7-4765-40ea-b478-3ac3cb53ff72
<i>Lamproptera</i> butterfly	occurrences		Published on 4 December 2019,	yes		https://www.gbif.org/dataset/09a6c040-a452-4f8f-b32b-d7762aa6bc85

Title of dataset	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
specimens at MZB Indonesia			updated in July 2020 (143 records)			
<i>Losaria</i> butterfly specimens at MZB Indonesia	occurrences		Published on 6 December 2019, updated in July 2020 (162 records)	yes		https://www.gbif.org/dataset/f53a51f9-ad06-465e-97fd-37ea81a9f732
<i>Meandrusa</i> butterfly specimens at MZB Indonesia	occurrences		Published on 24 October 2019, updated in July 2020 (16 records)	yes		https://www.gbif.org/dataset/46b22f62-bd4f-4157-8a57-f97cf22fda9e
<i>Ornithoptera</i> butterfly specimens at MZB Indonesia	occurrences		Published on 4 February 2020, updated in July 2020 (324 records)	yes	Detailed localities are not given for these CITES-regulated and protected Indonesian species	https://www.gbif.org/dataset/ed6df385-67ec-4872-ad25-e6e76ca2dcb1

Title of dataset	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
<i>Pachliopta</i> butterfly specimens at MZB Indonesia	occurrences		Published on 17 December 2019, updated in July 2020 (627 records)	yes		https://www.gbif.org/dataset/ab67e429-389c-43a7-8799-36c67ece82d6
<i>Papilio</i> butterfly specimens at MZB Indonesia	occurrences		Published on 10 March 2020, updated in July 2020 (4,067 records)	yes		https://www.gbif.org/dataset/24a02aae-d6b8-40c8-8f90-64eb3e780f2b
<i>Trigonoptera</i> butterfly specimens at MZB Indonesia	occurrences		Published on 29 October 2019, updated in July 2020 (41 records)	yes	Detailed localities are not given for this CITES-regulated and protected Indonesian species	https://www.gbif.org/dataset/3839d127-ff17-4477-9069-2b0746d4bc83
<i>Troides</i> butterfly specimens at	occurrences		Published on 6 March 2020, updated in July 2020	yes	Detailed localities are not given for	https://www.gbif.org/dataset/76471ac1-dde9-4b57-aa77-f305503bc4db

Title of dataset	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
MZB Indonesia			(746 records)		these CITES-regulated and protected Indonesian species	
<i>Cethosia myrina</i> butterfly specimens at MZB Indonesia	occurrences		Published on 15 July 2020, updated in July 2020 (65 records)	yes	Detailed localities are not given for this protected species	https://www.gbif.org/dataset/d0122ed5-6ed8-430e-86ee-b4d45a6bc2bb
<i>Hebomoia</i> butterfly specimens at MZB Indonesia	occurrences		Published on 14 July 2020, updated in July 2020 (402 records)	yes		https://www.gbif.org/dataset/a71c3da3-4cf3-48f2-a468-f2c0b3189db2
<i>Idea</i> butterfly specimens at MZB Indonesia	occurrences		Published on 16 July 2020, updated in July 2020 (481 records)	yes		https://www.gbif.org/dataset/e40070cf-6626-4cd0-8e85-cfe6067aecb0

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
Data paper of the swallowtail butterflies of Indonesia as an update checklist	We have not made significant progress on the data paper as we have been focusing our efforts on getting the MZB papilionid specimens registered and digitized.	During the process of sorting, identification, and validating the specimens, we have come across a few records that might be of interest and will give insights to the data paper that we are going to publish later.	
Butterfly observation records based on photographs taken by butterfly enthusiasts in Indonesia and data on life history of <i>Papilio peranthus</i> reared in captivity at LIPI's butterfly garden	Data of <i>Papilio peranthus</i> was published on 31 December 2019 at Treubia journal	Data of the pre-adult stages have been added to the dataset of observation based on photographs from butterfly enthusiasts.	https://www.gbif.org/dataset/4d236e9c-fa04-4a94-9356-382c9f7c84c0
Catalog printout of	90% (in the process of putting new labels on	We will print out data of Papilionidae specimens as	

Name and type of deliverable	Status of deliverable: Completed? Yes / No (inc. % complete)	Explanatory notes	Source(s) of verification
Papilionidae specimen data	each specimen drawer and assigning the position number of each drawer in collection).	"catalog books" when we complete this project	

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
Workshop on digitizing butterfly specimens	Zoology Division, Research Center for	24 February 2020	40 persons	The workshop was conducted successfully.	Report of the workshop was submitted.

Event title	Organizing institution	Date held / expected dates	Number of participants	Explanatory notes	Source(s) of verification
	Biology, LIPI				

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	M	J	J	
Activity: Learn and adopt the data management system which can be adaptable worldwide		X	X													Due to Covid-19 pandemic, we were asked and granted an extension to complete the project until the end of July 2020

Activity	2019								2020						Notes	
	M	J	J	A	S	O	N	D	J	F	M	A	M	J		J
Activity: Sort, validate, and make specimens available for data registration and photography		X	X	X	X	X	X	X	X	X				X		Some scattered specimens were found later so we needed to add them
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													
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										
Activity: Develop (or maintain the few existing) specimen registration system which include: Give QR code to each specimen, enter data on specimen labels to spreadsheet on computers, take photograph of upperside and underside of the specimen with all labels. This will be done also to unmounted specimens in envelopes			X	X	X	X	X	X	X	X	X			X	X	

Activity	2019								2020						Notes	
	M	J	J	A	S	O	N	D	J	F	M	A	M	J		J
Activity: Maintain contact and coordination with participating partners to ensure the activities are in-line with the collaborative scheme	X	X	X	X	X	X	X	X	X	X	X	X		X	X	
Activity: Register and upload geo-referenced Indonesian Papilionidae collection data to GBIF						X	X	X	X	X	X				X	Some scattered specimens were found later so we needed to add them to the database and update the datasets
Activity: Conduct a workshop on digitizing butterfly specimens										X						
Deadline for final reporting – 30 April 2020, extended to 31 July 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		X	I submitted the “final report” at the end of April 2020 but was given an extension until end of July 2020 to complete the work which was interrupted due to work restriction	

a. General comments on project implementation

(Max. 200 words)

All activities went on as expected according to the time line. At the beginning we could not start the project on-time due to administrative matters. The matter of opening bank account and receiving the money took about 6 weeks, and the acquisition of computers and cameras took another 3 weeks. However, while waiting for the processes, I have started curatorial work and we started to hire persons to implement the project in July 2019 and we have been able to maintain a great pace of working together. An IT staff from InaBIF has joined and supported us with the IPT and publication of the datasets. We have accomplished the work of mobilizing 9,783 butterfly specimens, which include all specimens of MZB Papilionidae, all *Cethosia myrina* (Nymphalidae), all *Hebomoia* (Pieridae), and all *Idea* (Nymphalidae). This number exceeds the initially target of 7,000 specimens by over 39%.

At the February 2020 workshop, participants were very happy to contribute through their photographs of identifiable butterflies – complete with spatial and temporal information, and this dataset of observation records has also been uploaded to GBIF. This growing community efforts can be very helpful to obtain records of butterfly species from many unsurveyed areas of Indonesia.

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)

Datasets of each genus within Papilionidae and three other datasets of non-Papilionidae have been uploaded to GBIF. There are some interesting records of some species that will be highlighted further and will be published in scientific journal to complement our data in the comprehensive updated distribution checklist of Papilionidae of Indonesia currently under preparation, and other papers on conservation related matters for individual taxa. Experiences and results from the digitization implementation of the Papilionidae butterfly collection at MZB will be shared more widely, both within LIPI and between other research and collection holding organizations in Indonesia. This will be achieved through regular contributions and communications to the LIPI institutional and organization website(s), newsletters, and social media channels.

The workshop conducted on 24 February 2020 has brought together butterfly watchers and nature enthusiasts. They have been excited about the digitization efforts and are willing to contribute data that can be tapped from the photographs that they had taken about occurrence of certain species of butterflies. This photograph, with known locality and time captured, has complemented the specimen data. We have uploaded an initial dataset to include the photographs that they shared.

I thus expect that the results will encourage other groups and parties to help us continue the work on digitizing other parts of MZB collections. For further communication and dissemination about the project, I would be happy to also liaise with the GBIF Secretariat which will be a great option for me for developing new contacts and gaining further insights.

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)

I am happy to report that all project activities have gone on very well and we can keep up with the schedule, with the extension due to Covid-19 pandemic. For this project, digitization including the application of QR codes – initiated by Dr. Christoph Häuser through IndoBioSys project in 2016 – for Papilionidae specimens at MZB have been undertaken by hired assistants and permanent staff. We have learned together, planned, and implemented a great work flow that ensure safety for the specimens and maintain high productivity. The BIFA workshop in July 2019 has had a great impact on implementation of this project. At the time of project completion, 8,835 specimens of Papilionidae have been sorted, identified, validated, given QR code and MZB-Lepi number, registered, digitized, geo-referenced, and mobilized in twelve datasets of genera to GBIF. We have also mobilized 948 records of endemic and highly traded non-Papilionidae butterflies, i.e. the protected *Cethosia myrina*, *Hebomoia*, and *Idea* specimens.

Some impediments at the beginning included the need to resolve administrative matters with transferring the support money. After we resolved the matter of opening bank account, we still needed to wait for the computers and cameras to be ordered through our purchasing unit.

Despite the delay at the beginning and during work restriction from mid of March through mid of June 2020 due to the pandemic, we have a great team that have kept great working pace to keep up with our objectives. I believe one of the major drives is my constant involvement in the project. I have been committed and have ensured the quality of the work and have kept the work space comfortable for everyone. We have also checked often on our goals and targets to keep track of time and achievement. The drawback to the project was that some drawers of additional specimens to handle were found later in the old cabinets (Figs. 15 – 20), so we needed to identify, register, and arrange specimens into the drawers again, and needed to update the datasets for these additional specimens.

The data digitization workshop held in February 2020 was very helpful. We emphasized on the importance of data sharing and data mobilization. Participants learned that they can share photographs of butterflies through iNaturalist or through us at InaBIF. I believe this growing community efforts can be very helpful to obtain records of butterfly species from many unsurveyed areas of Indonesia.

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).

Some interesting records of some species will be communicated with Dr. Christoph Häuser to complement our data in the comprehensive updated distribution checklist of Papilionidae of Indonesia currently under preparation. Experiences and results from the digitization implementation of the Papilionidae butterfly collection at MZB will be shared more widely, both within LIPI and between other research and collection holding organizations in Indonesia.

After this first year work on Papilionidae, endemic species, and highly traded non-Papilionidae, we will continue to work on other families of butterflies, thankfully a second year of BIFA support has been granted. We have come to realize that results of this magnitude can only be achieved by a fully supported project, particularly because most specimens were without registered number previously and many of them need to be identified correctly. It is expected that the specimen data generated from the project will also provide further stimulus to expand the MZB dataset and digital network.

Annex – Additional sources of verification

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

Dataset of genus *Atrophaneura* butterfly specimens at Museum Zoologi Bogor, Indonesia, published on 29 October 2019 can be found at url:

www.gbif.org/dataset/6676b3f8-e389-4911-aa09-2e04f964a419

Dataset of genus *Chilasa* butterfly specimens at Museum Zoologi Bogor, published on 23 October 2019 can be found at url:

www.gbif.org/dataset/d13e5b4c-e838-4244-8ac1-dfe1d75e2f48

Dataset of genus *Cressida* butterfly specimens at Museum Zoologi Bogor, published on 24 October 2019 can be found at url:

www.gbif.org/dataset/2ce88946-0fb0-413a-b513-e87d735a0e29

Dataset of genus *Graphium* butterfly specimens at Museum Zoologi Bogor, published on 3 February 2020 can be found at url:

<https://www.gbif.org/dataset/f53a51f9-ad06-465e-97fd-37ea81a9f732>

Dataset of genus *Lamproptera* butterfly specimens at Museum Zoologi Bogor, published on 4 December 2019 can be found at url:

<http://www.gbif.org/dataset/09a6c040-a452-4f8f-b32b-d7762aa6bc85>

Dataset of genus *Losaria* butterfly specimens at Museum Zoologi Bogor, published on 6 December 2019 can be found at url:

<https://www.gbif.org/dataset/f53a51f9-ad06-465e-97fd-37ea81a9f732>

Dataset of genus *Meandrusa* butterfly specimens at Museum Zoologi Bogor, published on 24 October 2019 can be found at url:

www.gbif.org/dataset/46b22f62-bd4f-4157-8a57-f97cf22fda9e

Dataset of genus *Ornithoptera* butterfly specimens at Museum Zoologi Bogor, published on 4 February 2020 can be found at url:

<https://www.gbif.org/dataset/ed6df385-67ec-4872-ad25-e6e76ca2dcb1>

Dataset of genus *Pachliopta* butterfly specimens at Museum Zoologi Bogor, published on 16 December 2019 can be found at url:

<https://www.gbif.org/dataset/ab67e429-389c-43a7-8799-36c67ece82d6>

Dataset of genus *Papilio* butterfly specimens at Museum Zoologi Bogor, published on 10 March 2020 can be found at url:

<https://www.gbif.org/dataset/24a02aae-d6b8-40c8-8f90-64eb3e780f2b>

Dataset of genus *Troides* butterfly specimens at Museum Zoologi Bogor, published on 6 March 2020 can be found at url:

<https://www.gbif.org/dataset/76471ac1-dde9-4b57-aa77-f305503bc4db>

Dataset of genus *Trogonoptera* butterfly specimens at Museum Zoologi Bogor, published on 29 October 2019 can be found at url:

www.gbif.org/dataset/3839d127-ff17-4477-9069-2b0746d4bc83

Dataset of *Cethosia myrina* butterfly specimens at Museum Zoologi Bogor, published on 15 July 2020 can be found at url:

<https://www.gbif.org/dataset/d0122ed5-6ed8-430e-86ee-b4d45a6bc2bb>

Dataset of *Hebomoia* butterfly specimens at Museum Zoologi Bogor, published on 14 July 2020 can be found at url:

<https://www.gbif.org/dataset/a71c3da3-4cf3-48f2-a468-f2c0b3189db2>

Dataset of *Idea* butterfly specimens at Museum Zoologi Bogor, published on 16 July 2020 can be found at url:

<http://www.gbif.org/dataset/e40070cf-6626-4cd0-8e85-cfe6067aecb0>



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Figure 1. learned and got familiar with data management system

Figure 2. sorted and identified unmounted specimens

Figure 3. identified specimens in old envelopes

Figure 4. transferred specimens to new envelopes

Figure 5. prepared QR codes

Figure 6. unmounted specimens in new envelopes with museum ID number and QR code

Figure 7. sorted and identified mounted specimens

Figure 8. assigned specimens to drawer according to subspecies and geographic location; take photograph; enter data into Excel data sheet

Figure 9. prepared specimen for photography

Figure 10. new arrangement of well-curated mounted specimens complete with museum ID number and QR code

Figure 11. cleaned the photographs for uniform background colour

Figure 12. published datasets to GBIF

Figure 13. participants at the February 2020 workshop

Figure 14. visit to our workplace at Entomology lab after the February 2020 workshop

Figure 15. additional specimens of Papilionidae in a drawer found later from old cabinets were somewhat made the work slower

Figure 16. drawers of Papilionidae found later which hinder the progress

Figure 17. resumed the work after restriction due to Covid-19 pandemic

Figure 18. resumed the work including updating the database for additional records

Figure 19. newly arranged unmounted specimens in drawers

Figure 20. specimens arranged in drawers and cabinets