Mobilisation and digitisation of natural history collections at the University of Papua New Guinea, Papua New Guinea

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Programme:BID
Project ID: BID-PA2020-009-INS
Project lead organization: Centre for Biodiversity and Natural Products – University of Papua New Guinea
Project implementation period:1/7/2021 - 30/6/2023
Report approved: 14/9/2023

Final Narrative Report

Executive Summary

Briefly describe:

• Your project' implementation, key achievements and impact

Two significant milestones were achieved in our project. These milestones included training and data publishing. Trainings include:

1) Data mobilisation and enhancement for project lead who was awarded a basic badge, and another one for project staff who were awarded certificates for successfully completing the training before they started the data mobilisation work. This training has provided the necessary skills and tools for the collection managers to confidently commence their data work in their respective collections. Additionally, the project lead was able to guide them in their daily data work with the skills she learnt from GBIF,

2) GIS and Remote Sensing – this course is very useful for our data management, and biodiversity work. The skills and tools will be used to determine the distribution of flora and fauna of our country, and to be able to establish a good understanding of distribution patterns to inform policy makers, conservationists and the community at large.

Publication included four datasets:

1) Plants (327 records) entitled 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277)
2) Snakes (164 records) entitled 'UPNG Natural History Collections Snakes' (https://www.gbif.org/dataset/7aedfa8c-d195-442b-9fbe-02fc5e487010)
3) Weeds (752 records) entitled 'Weeds of New guinea based on UPNG Herbarium Collection' (https://www.gbif.org/dataset/a597a8cd-bd77-4e01-bded-227557f5ab12)
4) Lepidoptera (99 records) entitled 'Lepidoptera data based on UPNG Insect Collection' (https://www.gbif.org/dataset/b3240673-2c22-486c-bb81-0985b19a70d2)

• The context and approach taken for the final evaluation of your project and the main conclusions

The project lead (Janet Gagul) has used a simple evaluation method, which she used to ask project staff to submit reports of their involvement at their different capacities. The reports include each person's experience, what they learnt, what they wished could have been done better. The impact the GBIF project has on them individually in both professional and personal developments, and other general comments. Their reports are attached.

• The key lessons learned and best practices identified

The one key lesson learnt (as documented in the reports submitted by project staff) was teamwork. In this project they have identified that the team is so strong, you don't know who the boss is. Please refer to the reports attached by the GBIF project staff to find out the lessons learnt by each staff.

• Any additional objectives that were defined during the implementation of the project and the reason(s) they were added to the project's initial objectives

Training and capacity building for project staff was essential, but also a core function of the university. Through the GBIF funding we were able to acquire specific knowledge we lacked in our daily responsibilities as Biological Science Division staff of the university. The trainings included 'data mobilisation, data cleaning, data standardisation and data publishing ' and 'GIS Remote Sensing', which are both significant in data management work particularly for Natural History Collections that house significant biological collections from Papua New Guinea.

• Any unexpected challenges which have prevented you to reach a planned project objective and/or implementing an activity and/or producing a deliverable

We were planning to publish two more data sets before the deadline of the project (June 2023). The datasets comprise of insects and weeds data. However, around May and June of 2023, we realised the features of the GBIF IPT have changed complicating the publishing process (according to us). We tried the publishing process for our insect dataset but it kept rejecting. We have followed all the steps we used in our previous publications (plants and snakes datasets) but to no avail. Therefore, we have agreed to ask GBIF if we can continue to publish the insects and weeds data after the completion of the project.

GBIF BID has kindly allowed us to publish the Weeds and Lepidoptera data, and we did successfully. By that time, we have already identified possible errors as pointed to us through the BID feedback, so we published without difficulty. We also sought assistance from GBIF IT Help Desk as was recommended, and Marie from IT Help Desk was very helpful. I would also like to take this opportunity to thank Sanja from the BID Co-ordination team who was very supportive and understanding that it was our first time to work with GBIF and the reporting process can be challenging.

• Any post-project activities

There are a couple important activities we have organised but due to time limitation we are unable to carry out these activities. These activities include a museum visit and R programming training for the GBIF project staff. These activities are crucial for the data management work, and are within the scope of the project, but was not included initially in the proposal. The museum visit will enable staff to learn from staff of the other museums and how they do data management, and to explore possible collaboration as data keepers of important biological collections. The R programming is essential and will teach us how to use it for ease of data analysis and interpretation, which will enable clarity in our explanation to the wider audience.

Progress against milestones

Has your project completed all planned activities?: No

Has your project produced all deliverables: Yes

Report on Activities

Summary of the implementation of the project activities

CBNP activity implementation summary (July 2021- September 2023).

July 2021- Nov 2021

(1) Each collection manager was tasked to plan their activity how they see fit for their collection, and set their work place up for GBIF BID work.

(2) Each manager was requested to provide a brief summary of their collection (last entry date, why it stopped, what program they used to store data/database, how many records (family, genus, species) they have in their database.

(3) They were also tasked to provide some information on equipment/resources they require to progress forward

Information provided by the collection managers became the guide for the project lead to use, and to understand what was required for each collection. That also helped the project lead to provide guidance and assistance they required and to seek further assistance from the institution for the data mobilisation work.

December 2021 - Holiday Period

January 2022 - February 2022

(1) Announcement and invitation were sent out to collection managers, curators and other interested staff for data mobilisation training.

(2) Logistics preparation and organisation of funds for the training. This includes requesting UPNG release funds from GBIF BID project account, bringing of trainer (GBIF mentor for PNG, Penniel Lamei) to UPNG, accommodating him for the duration of training and sending him back.

(3) Training commencement: 14-18 February 2022. Ten people attended the training and attained certificates for participating. Participants were asked to reflect on the training and give their feedback. Some of the things they shared are reported (see report attached).

(4) Project lead drafted and submitted reports (narrative and financial to the UPNG) (see attachments).

March 2022 - May 2022

(1) The data mobilisation training enriched the collection managers, and equipped them with the tools and skills they required to commence the databasing work.

(2) A meeting was called by project lead to plan project activities (10 August 2021, attached as Email#1). In that meeting, each collection manager was asked to talk about their collection. This was useful for the team to know what each person was doing, what needed to be done, in order to plan the way forward as a team. After listening to all, the team decided that we worked on the plants database, which was better, organised, but also contains highest records. Hence, we scheduled time in the day for officers to work on the database. The reason we scheduled times was because these officers have core functions that are required by the university. We had to schedule in such a way, so they did not neglect their functions, or the BID Project work did not interfere with their responsibilities.

(3) Data cleaning of plants database, with 327 records in 9 families published.

(4) Regular meetings were held, to go through the data cleaning, and if there were any issues, what were they, and how do we address them as a team.

(5) Registered to become a publisher on GBIF network (25 May 2022).

(6) Requested SPREP for IPT access to publish (27 May 2022).

(7) Published 327 records from 9 plant families.

(8) Reporting (narrative and financial) by the project lead (31 May 2022)

We have met the milestone deadline by:

(i) Publishing some plants data (327 records). Our first data was published (31 May 2022)

(ii) Submitting reports (both narrative and financial) by 31 May 2022.

June 2022 - December 2022

(1) Post mid-term reporting (June-December 2022), and after our reports were approved by GBIF, the team agreed that we focussed on cleaning the data. Therefore, collection managers paid close attention to the databases in their respective collections. That was because they were confident in the data sorting, data cleaning and standardising because of their experiences previously to meet the mid-term milestones.

(2) Second publication. On 5/8/2023 we successfully published our second dataset, which was 'snakes of PNG based on UPNG collections' (164 records).

(3) Mentoring

Towards the end of 2022 (October) I requested mentoring from GBIF, as sometimes it's easier to talk to people when you need clarity on certain things. The GBIF BID team kindly recommended a mentor (Chihjen Ko) who was very helpful, particularly with advice on data publishing. I am happy I requested for a mentor because talking to others and explaining to them about your project puts you into perspective. Mentors generally guide you to succeed. My mentor was very patient and understanding but also very knowledgeable in data publishing and was technology savvy.

January 2023 - July 2023

In one of the conversations with my mentor we discussed an important idea, which was to pick a theme for dataset to publish. After the discussion I asked the project members for a meeting to brainstorm what to publish and strategise a way forward. We decided that we categorise organisms into groups and clean them. For example, for insects we picked Lepidoptera (butterflies and moths), and for plants (weeds) to work on. That arrangement seemed realistic and that it may warrant further investigation if we continue to work after the project ends. This has resulted in cleaning both datasets and getting them into ready to publish (insects) and almost ready to publish (weeds). We found that strategy working better than trying to clean the entire database by going alphabetically, which was our experience in the first publication (plants data).

(I) Datasets republished:

1)   Plants (327 records) entitled 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277)

2)   Snakes (164 records) entitled 'UPNG Natural History Collections Snakes' (https://www.gbif.org/dataset/7aedfa8c-d195-442b-9fbe-02fc5e487010)

(II) New datasets published:

1)   Weeds (752 records) entitled 'Weeds of New guinea based on UPNG Herbarium Collection' (https://www.gbif.org/dataset/a597a8cd-bd77-4e01-bded-227557f5ab12)

2)   Lepidoptera (99 records) entitled 'Lepidoptera data based on UPNG Insect Collection' (https://www.gbif.org/dataset/b3240673-2c22-486c-bb81-0985b19a70d2)

(III) Training – GIS and Remote Sensing

(IV) Data cleaning still continuing

Activity: Training and capacity building for BID project staff

Description: A data mobilisation training was conducted for project staff
Start Date - End Date: 14/2/2022 - 18/4/2022
Verification Sources: A training report was submitted to our institution. This report is attached here with GBIF records.

Activity: Republication of plants data

Description: The plant collection currently holds the highest number of records compared to the other collections (entomology, zoology, fish) at UPNG natural history museum. However, we all joined forces to focus on plants data to get some data out for publishing. A total of 327 records from 9 plant families were published on 30 May 2022.

However, non-critical issues were supposed to be addressed, and we did by fixing column shifts and date format. We have republished on 28 August 2023.
Start Date - End Date: 30/5/2022 - 28/8/2022
Verification Sources: Nine plant families comprising 327 records were republished (28 August 2023). This can be downloaded from GBIF website, as 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277). DOI 10.15468/28p7hc

Activity: Republication of snakes data

Description: A total of 164 records of snakes from PNG was cleaned and published on 03 March 2023. This data is based on the data from UPNG zoological collection. However, non-critical issues were supposed to be addressed about the published data, and we did by fixing the date format, column shifts and republished on 06 September 2023.
Start Date - End Date: 3/3/2023 - 6/9/2023
Verification Sources: Snakes of PNG data comprising 164 records was republished on 06th of September 2023. This data can be down loaded from GBIF website as 'UPNG Natural History Collections Snakes' (https://www.gbif.org/dataset/7aedfa8c-d195-442b-9fbe-02fc5e487010). DOI 10.15468/ayqccx.

Activity: Publication of Insects data

Description: Insects data especially Lepidoptera (butterflies and moths) were cleaned and published through GBIF IPT.
Start Date - End Date: 1/3/2023 - 7/9/2023
Verification Sources: Lepidoptera (99 records) entitled 'Lepidoptera data based on UPNG Insect Collection' has been published. Go to the following GBIF website to download (https://www.gbif.org/dataset/b3240673-2c22-486c-bb81-0985b19a70d2). DOI 10.15468/28p7hc

Activity: Publication of weeds data

Description: The weeds of PNG data has been retrieved from the main UPNG herbarium data and has been cleaned and published on 06 September 2023.
Start Date - End Date: 28/5/2023 - 6/9/2023
Verification Sources: The weeds data (752 records) entitled 'Weeds of New guinea based on UPNG Herbarium Collection' was published on 06 September 2023. Visit the GBIF website to download data (https://www.gbif.org/dataset/a597a8cd-bd77-4e01-bded-227557f5ab12). DOI 10.15468/28p7hc.

Activity: GIS and Remote Sensing Training

Description: Project staff attended GIS training recently. This training was essential for the data work to determine flora and fauna distribution patterns in PNG.
Start Date - End Date: 26/6/2023 - 7/7/2023
Verification Sources: A certificate from one of the project staff (Dan Kundun) and the GIS program is attached.

Activity: Engagement of casual data entry staff

Description: A casual engagement was arranged to assist collection managers in their respective collections. The casual staff is Maria Gorea, a biology graduate from UPNG who was engaged for 4 months (March - June 2023). She spent 1 month in each collection (zoology, entomology, herbarium, fish).
Start Date - End Date: 1/3/2023 - 7/7/2023
Verification Sources: Her report is attached for verification. This report also contains her experience with the GBIF project, and how this project has impacted her life.

Report on Deliverables

Deliverables - Summary

Product deliverables

Significant milestones for the project were training of staff and data publishing, which were completed successfully. Although data mobilisation work was totally new to us, we were able to achieve the important milestones.

Deliverable 1. Training: (i) BID Capacity Enhancement, (ii) GIS Remote Sensing
Deliverable 2. Publication of four datasets. See below:

1) Plants (327 records) entitled 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277). DOI 10.15468/28p7hc
2) Snakes (164 records) entitled 'UPNG Natural History Collections Snakes' (https://www.gbif.org/dataset/7aedfa8c-d195-442b-9fbe-02fc5e487010). DOI 10.15468/ayqccx
3) Weeds (752 records) entitled 'Weeds of New guinea based on UPNG Herbarium Collection' (https://www.gbif.org/dataset/a597a8cd-bd77-4e01-bded-227557f5ab12). DOI 10.15468/28p7hc
4) Lepidoptera (99 records) entitled 'Lepidoptera data based on UPNG Insect Collection' (https://www.gbif.org/dataset/b3240673-2c22-486c-bb81-0985b19a70d2). DOI 10.15468/28p7hc

Apart from the important activities that were completed successfully, there were additional activities we could not deliver, and the reasons for not delivering is stated beside each below:

1) Conference – we did not identify relevant conferences to attend within the country.
2) R programming training – we planned for first semester break but postponed to end of 2023
3) Museum visit – was planned for first semester break but postponed to second semester break which is end of year
4) Journal publication – we could not find time to draft papers, as working with chaotic data provided no time flexibility.

Deliverables produced by the project

Dataset deliverables

Herbarium – preservation of plant specimens

Dataset type: Occurrences

Dataset scope: Preserved plant specimens arranged alphabetically in families in folders. Inside each folder, genera folders are arranged alphabetically, with the species in them. This information is entered in XLS spreadsheet in the computer. Out of the 23000+ records, we have published the following: 1) Plants (327 records) entitled 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277). DOI 10.15468/28p7hc 2) Weeds (752 records) entitled 'Weeds of New guinea based on UPNG Herbarium Collection' (https://www.gbif.org/dataset/a597a8cd-bd77-4e01-bded-227557f5ab12). DOI 10.15468/28p7hc. A total of 899 records for both datasets have been published from plants data.
Number of records: 899
Data holder: UPNG CBNP
Data host institution: University of Papua New Guinea
% complete: 4%
Status update: Two plants datasets have been published, with a total of 899 records for both: 1) Plants (327 records) entitled 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277). DOI 10.15468/28p7hc 2) Weeds (752 records) entitled 'Weeds of New guinea based on UPNG Herbarium Collection' (https://www.gbif.org/dataset/a597a8cd-bd77-4e01-bded-227557f5ab12). DOI 10.15468/28p7hc
DOI: 10.15468/28p7hc
Expected date of publication:

Zoological collection – preservation of mammals, reptiles and amphibians, and fishes specimens

Dataset type: Occurrences
Dataset scope: Preserved zoological specimens arranged alphabetically in 'orders' in jars and labelled. Information of the specimens is entered into the computer, in an XLS spreadsheet. Out of the 13000 records, we have published 164 records of snakes data entitled 'UPNG Natural History Collections Snakes' (https://www.gbif.org/dataset/7aedfa8c-d195-442b-9fbe-02fc5e487010). DOI 10.15468/ayqccx
Number of records: 164
Data holder: UPNG CBNP
Data host institution: University of Papua New Guinea
% complete: 1%
Status update: A total of 164 records of snakes from the zoological collection has been successfully republished on 06 September 2023 entitled 'UPNG Natural History Collections Snakes' (https://www.gbif.org/dataset/7aedfa8c-d195-442b-9fbe-02fc5e487010). DOI 10.15468/ayqccx
DOI: 10.15468/ayqccx
Expected date of publication:

Entomological collection – preservation of insect specimens

Dataset type: Occurrences
Dataset scope: Preserved insect specimens arranged alphabetically in 'insect orders' in boxes and labelled. Information of the insect is entered into the computer, in an XLS spreadsheet. Out of the 14000 records, we have published 99 records of Lepidoptera data which includes butterflies and moths. The published data is entitled 'Lepidoptera data based on UPNG Insect Collection' (https://www.gbif.org/dataset/b3240673-2c22-486c-bb81-0985b19a70d2). DOI 10.15468/28p7hc
Number of records: 99
Data holder: UPNG CBNP
Data host institution: University of Papua New Guinea
% complete: 1%
Status update: A total of 99 records of Lepidoptera data from the 14000 insect collection has been successfully published on 07 September 2023 entitled 'Lepidoptera data based on UPNG Insect Collection' (https://www.gbif.org/dataset/b3240673-2c22-486c-bb81-0985b19a70d2). DOI 10.15468/28p7hc
DOI: 10.15468/28p7hc
Expected date of publication:

Other deliverables

Data mobilisation training

Dates: 2022-02-14 - 2022-02-18
Organizing institution: Centre of Biodiversity and Natural Products, University of Papua New Guinea, in collaboration with the Forest Research Institute
Country: Papua New Guinea
Number of participants: 10
Comments: Report for training was submitted to the Biological Sciences Division, School of Natural and Physical Sciences at the University of Papua New Guinea. Refer to attachment.
Website or sources of verification:

Meetings

Dates: 2022-03-01 - 2022-05-31
Organizing institution: Centre of Biodiversity and Natural Products, University of Papua New Guinea
Country: Papua New Guinea
Number of participants: 5
Comments: We have had regular meetings to discuss project progress, challenges and to plan way forward after our data mobilisation training in February 2022. Find attached email correspondences, and meeting minutes and agencies.
Website or sources of verification:

Preparing newsletter articles

Dates: 2022-03-01 - 2022-10-30
Organizing institution: Centre of Biodiversity and Natural Products, University of Papua New Guinea
Country: Papua New Guinea
Number of participants: 4
Comments: Each team member has been tasked to select an animal or plant of choice and write about them. One member has drafted an article on Dwarf Cassowary. Find this document attached.
Website or sources of verification:

GIS Remote Sensing training

Dates: 2023-06-26 - 2023-07-07
Organizing institution: Environmental Sciences Division, UPNG
Country: Papua New Guinea
Number of participants: 3
Comments: This training was essential for our data work, because in order to determine flora and fauna distribution patterns of PNG, we will utilise GIS skills and tools to provide this important information.
Website or sources of verification: Certificate of one of the three members is attached for verification. The GIS course program is also attached.

Events

Casual data entry engagement

Dates: 2023-03-01 - 2023-07-07
Organizing institution: Centre for Biodiversity and Natural Products, University of Papua New Guinea
Country: Papua New Guinea
Number of participants: 1
Comments: The causal engagement was crucial to progress further in the data work. The collection mangers have indicated they needed help and so we agreed and recruited a casual staff to help with data entry in the data mobilisation work. She spent 1 month in each collection (March - July)
Website or sources of verification: Report from the casual staff (Maria Gorea) is attached

Communications and visibility

(I) The following published data have been widely accessed by GBIF community and other broader scientific community, which we are delighted about:

1) Plants (327 records) entitled 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277). DOI 10.15468/28p7hc
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(II) Project activities and results will be communicated in relevant forums and conferences. Although, we have not identified any relevant conferences yet, we are hoping to present our work in the near future acknowledging GBIF in all presentations, both oral and written.

(III) We are hoping to make a presentation to the Biological Sciences staff at UPNG, of the GBIF project and what we have achieved in the two years (2021- 2023).

(IV) We will also do presentations to donor agencies or government departments within the country to seek further funding to continue the data mobilisation work. In all these, GBIF will be acknowledged for its support.

(V) Documents uploaded include:

A) Events (e.g., data mobilisation training certificates), which happened from 14-18 February 2022,

B) Badge attained by attending BID Capacity Enhancement workshop (attached),

C) GIS and remote Sensing training program and certificate (June 26 - July 7 2023), and

D) Reports from GBIF project staff on impacts GBIF project had on them both professionally and personally.

Monitoring and evaluation

Final Evaluation

Here we document our achievements, the impacts the BID project had on us individually, and the implementation and the deliverables of the project.

Two significant milestones were achieved in our project. These milestones include, 1) training, and 2) data publishing. There were two important trainings that the project staff took:

i) Data mobilisation and enhancement for project lead who was awarded a basic badge, and another one for project staff who were awarded certificates for successfully completing the training before they started the data mobilisation work. This training has provided the necessary skills and tools for the collection managers to confidently commence their data work in their respective collections. Additionally, the project lead was able to guide them in their daily data work with the skills she learnt from GBIF,

ii) GIS and Remote Sensing – this course is very useful for our data management, and biodiversity work. The skills and tools will be used to determine the distribution of flora and fauna of our country, and to be able to establish a good understanding of distribution patterns to inform policy makers, conservationists and the community at large.

Publication included four datasets (two republished and two new).
1) Republished – plants (327 records) and snakes (164 records)
2) New publication – weeds (752 records) and insects (99 Lepidoptera records)

In terms of project evaluation and key conclusions drawn from the project, a very simple but effective approach was used by the project lead (Janet Gagul). The project lead has asked the full time and casual project staff to submit reports of their involvement at their different capacities. The reports include each person's experience, what they learnt, what they wished could have been done better. The impact the GBIF project has on them individually in both professional and personal developments, and other general comments. The reports from the staff are attached.

Many lessons and best practices have been learnt throughout the project. Here are some of the important ones:

i) team work
ii) sticking to activity and time plan
iii) reporting
iv) meeting deadlines
v) checking in on team mates/colleagues
vi) regular meetings

Of the lessons learnt, the one key lesson that stood out was teamwork. In this project the staff have indicated that the team was so strong, they did not know who the boss was.

Training and capacity building for project staff was essential, but also a core function of the university. Through the GBIF funding we were able to acquire specific knowledge we lacked in our daily responsibilities as Biological Science Division staff of the university. The trainings included 'data mobilisation, data cleaning, data standardisation and data publishing ' and 'GIS Remote Sensing', which are both significant in data management work particularly for Natural History Collections that house significant biological collections from Papua New Guinea.

There were a couple additional important activities we have organised, but due to time limitation we are unable to carry out these activities. These activities include a museum visit and R programming training for the GBIF project staff. These activities are crucial for the data management work, and are within the scope of the project. The museum visit will enable staff to learn from staff of the other museums and how they do data management, and to explore possible collaboration as data keepers of important biological collections. The R programming is essential and will teach us how to use it for ease of data analysis and interpretation, which will enable clarity in our explanation to the wider audience.

Best Practices and Lessons learned

Many lessons and best practices have been learnt throughout the project. Here are some of the important ones:

i) team work

ii) sticking to activity and time plan
iii) reporting
iv) meeting deadlines
v) checking in on team mates/colleagues
vi) regular meetings

Of the lessons learnt, the one key lesson that stood out was teamwork. In this project the staff have indicated that the team was so strong, they did not know who the boss was.

Training and capacity building for project staff was essential, but also a core function of the university. Through the GBIF funding we were able to acquire specific knowledge we lacked in our daily responsibilities as Biological Science Division staff of the university. The trainings included 'data mobilisation, data cleaning, data standardisation and data publishing ' and 'GIS Remote Sensing', which are both significant in data management work particularly for Natural History Collections that house significant biological collections from Papua New Guinea.

Post Project activities

There were a couple additional important activities we have organised, but due to time limitation we are unable to carry out these activities. These activities include a museum visit and R programming training for the GBIF project staff. These activities are crucial for the data management work, and are within the scope of the project. The museum visit will enable staff to learn from staff of the other museums and how they do data management, and to explore possible collaboration as data keepers of important biological collections. The R programming is essential and will teach us how to use it for ease of data analysis and interpretation, which will enable clarity in our explanation to the wider audience.

Sustainability

Sustainability Plans

We have gained much attention lately in our data mobilisation work, and we acknowledge GBIF for giving as an opportunity to provide data to the scientific community at large. Visibility for our institution and our work was greatly lacking prior to the GBIF project, but now the interest to collaborate has increased. We have had people from all over the world enquiring to provide internship programs or to collaborate with them. For example, we had two students (one from UK, and one from Italy) seeking internships in our collections.

We are also hoping to collaborate with other museums and herbaria to learn from their staff, and how they do data management, and to explore possible collaboration as data keepers of important biological collections. We are hoping to teach them the importance of data cleaning and standardisation for publication, and inform them of the data credibility and integrity we learned about Darwin Core Terms (DwC).

The data work will not end here, as the collection managers have gained important skills and tools in the project, and they are keen to continue after the project. Therefore, data entry, data cleaning, standardisation and publishing, and curation of the collections will continue to progress. Data management will become part of the daily responsibilities as employees of the university. The various important skills gained in this project have enhanced the capacity of the staff. This will enable leverage in their daily general data management work. Funding to sustain the data work will be included in the division budget through its annual Schools/Divisions budget allocation. Furthermore, our centre will continue to fund raise to sustain the operation of the collections.

Impact of COVID-19 pandemic on project implementation

Project commencement and progress has been delayed in the beginning due to Covid-19. The Covid-19 scare had put much stress on project members, and has delayed progress to certain extent as working from home was difficult for collection managers that required physical specimens, and access to work computers on a

daily basis. Despite this challenge, we managed to work as hard as we could to clean some of our data for publication. To date we have published four datasets:

1) Plants (327 records) entitled 'UPNG Natural History Collection Plant Family Acanthaceae to Anacardiaceae' (https://www.gbif.org/dataset/70eea0dd-92cb-4e40-b8cc-3c3913641277). DOI 10.15468/28p7hc

2) Snakes (164 records) entitled 'UPNG Natural History Collections Snakes' (https://www.gbif.org/dataset/7aedfa8c-d195-442b-9fbe-02fc5e487010). DOI 10.15468/ayqccx

3) Weeds (752 records) entitled 'Weeds of New guinea based on UPNG Herbarium Collection' (https://www.gbif.org/dataset/a597a8cd-bd77-4e01-bded-227557f5ab12). DOI 10.15468/28p7hc

4) Lepidoptera (99 records) entitled 'Lepidoptera data based on UPNG Insect Collection' (https://www.gbif.org/dataset/b3240673-2c22-486c-bb81-0985b19a70d2). DOI 10.15468/28p7hc

This was possible once all members of the project understood the publishing process, and have agreed to focus on cleaning their respective datasets.