

# Digitization of Mushrooms and Lichens collections from Nepal: Bringing Underrepresented Taxonomic Groups into the Global Biodiversity Database

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**Programme:**BIFA

**Project ID:** BIFA5\_023

**Project lead organization:**Global Institute for Interdisciplinary Studies

**Project implementation period:**1/7/2020 - 31/7/2021

**Report approved:** 4/3/2021

## Narrative Midterm report

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### Executive Summary

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This project aims to transfer digitalized data of lichens and mushrooms specimens in two herbarium centres (KATH and TUCH) and a museum (NHM) of Nepal, with proper management (sorting, curating, labelling) into the GBIF platform and provide an immense opportunity to maximise their visibility fulfilling taxonomic and geographical gaps in the global database. As targeted, one dataset is already published showing the details of 1644 mushrooms specimens and six more datasets are in progress.

Activities are being conducted as visualized in a proposal; however, there were some limitations inherent because of this global pandemic/challenging complex and some practical problems encountered, which we addressed bringing new working strategies. So far so good - things are within sketched timeframe and budget.

This project provides an example of excellent teamwork and constant engagement among the four implementing partners arising from policy-making, academia and inter-governmental sectors. We also set networking with diverse audiences (national, regional and international) and secured co-funding to bring additional data (from recent field visit) and IT purchases. For the monitoring and evaluation (M&E), we applied purely two key elements i.e. theory-based evaluation (the content of a project and implementation of planned activities) and value for money evaluation (economy, efficiency, effectiveness and equity of money used).

In the meantime, It is also foreseen that, implementing partners should engage in further broad discussions to identify possible opportunities for making the best possible use of acquired knowledge from this project, which will optimize achievement of results and leverage resources to mobilize and standardize biodiversity data through GBIF.org.

### Progress against milestones

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**Has your project published at least one dataset through GBIF.org?: Yes**

**Dataset published:**

Dataset	DOI
Mushrooms Flora of Nepal at Natural History Museum	<a href="https://doi.org/10.15468/c2sus4">https://doi.org/10.15468/c2sus4</a>

**Has at least one member of your project team received certification following the BIFA capacity enhancement workshop?: Yes**

**Name of the workshop participant:**Shiva Devkota

## Report on Activities

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### Activity progress summary

Until this period, the aforementioned activities are in progress ( except cancellation of earlier planned inception meeting) bringing good deliverables. After an intensive literature review, draft lists of the lichens and mushrooms are prepared and will be updated bringing new species details after this digitization project. One occurrence dataset already published on GBIF portal and more are on the way. So, we are more or less within a designed timeframe.

PI of this project Shiva Devkota has also participated in the GBIF Asia Virtual Summit organized by the Global Biodiversity Information Facility (GBIF) for the Asia region on 20 July 2020 and got well versed of knowledge on why it is necessary to have improved access to data on the rich biodiversity of this Asian region as highlighted on the 20-year review of GBIF (<https://www.gbif.no/news/2020/gbif-20-year-review.html>). Having in-depth knowledge on this digitization process after BIFA virtual workshop as well, and experience from recent field visit (for the generation of new data) have brought the striking idea for next round of BIFA project to apply citizen science approach. Such an approach will enrich numbers of lichens and mushrooms bringing nobilities from different corners of Nepal. Such an approach is also equally important not only to bring scientific information but also to integrate science and society. This is new creativity brought by this project.

### Completed activities

#### Activity name: Literature Review

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**Description:** During this period, an intensive review on available literature based on lichens and mushrooms collections from Nepal were made. Team members were asked to share the bibliographic databases that they have found useful in working with Nepalese lichens and mushrooms. Some of the noteworthy databases found include Web of Science, Scopus, Google Scholar, Digital Library of Commons (<https://dlc.dlib.indiana.edu/dlc/>); Regional database for Hindu Kush Himalayan region (<http://rds.icimod.org/Home/Data?group=17>), National Herbarium and Plant Laboratories (KATH) website etc.

To access grey literature, publications on Nepalese language, local bulletins, proceedings, books and similar grey literature were compiled. For a moment and also for a long run this compilation is helpful to bring mycological knowledge from Nepal in different local, regional and global assessment processes.

Dr. Devkota (main applicant of this project) is also contributing as a research fellow, for the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) / Sustainable use of wild species assessment (2018 - 2022). IPBES is an independent intergovernmental body, having 133 member countries, provides policymakers with objective scientific assessments about the state of knowledge regarding planet's biodiversity, ecosystems and the contribution they make o the people (IPBES 2019). Research process and progress on this planned project on mushrooms and lichens are already helpful to share and discussed the primary findings among the participants of the assessment during Chapters meetings and workshops. This kind of sharing and learning will definitely help to deliver the project's aims to the wider audiences in such a global forum.

Simultaneously, having strong knowledge of such underrepresented taxa, it will be really good to bring noble information and knowledge on IPBES assessment process itself.

**Start Date - End Date:** 1/7/2020 - 31/7/2020

**Verification Sources:** <https://ipbes.net/sustainable-use-wild-species-assessment>

<https://ipbes.net/users/shiva-devkota>

#### Activity name: Attendance of BIFA Capacity Enhancement Workshop followed by Inception workshop

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**Description:** Shiva Devkota, PI of BIFA5\_023 has participated on the 2020 virtual Data Mobilization Workshop for Asia (21-24 July) and completed a course successfully. It was an instrumental training to learn about project planning, data capture, data management and data publishing tools.

<https://www.gbif.org/event/BoAe3g7KjGeJUzC3oxs9v/data-mobilization-workshop-for-asia-2020>

**Start Date - End Date:** 21/7/2020 - 24/7/2020

**Verification Sources:** The basic badge obtained by Shiva Devkota

<https://openbadgepassport.com/app/badge/receive/307289?>

[banner=7f62c7d3951bd8b417195eb1088cb10200d6b0a9baf7d8013546b0329d78d011.png](https://openbadgepassport.com/app/badge/receive/307289?banner=7f62c7d3951bd8b417195eb1088cb10200d6b0a9baf7d8013546b0329d78d011.png)

### **Activity name: Data Additions / Field work (Co-funding)**

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**Description:** A week long field trip was conducted in Jalthal area, Jhapa to collect post-monsoon mushroom species and to document local ethnomycological knowledge. It was kindly supported by the ForestAction (Forest Resources Studies and Action Team) Nepal under the ongoing project framework "Uprating Community Forest management in Nepal: enhancing biodiversity and livelihoods" supported by Darwin Initiative, UK.

Jalthal forest is a biodiversity rich fragmented remnant forest in the densely populated region of eastern lowland of Nepal. The forest is used by around 100,000 people living around it. The surrounding forest is inhabited by ethnic minority Meche people. Meche people have their own language and culture are found only in Jhapa district of Nepal especially around the Jalthal forest. There are several other groups of indigenous people Santhal, Rajbanshi, Rai, Limbu, Tamang and other ethnic groups like Bahun and Kshetri. The forest is an important resource for many people living around the forest and there has not been a proper documentation of natural history and traditional knowledge of the area.

Method of data collection:

Mushroom flora was documented by conducting fieldwork in Jalthal forest which included the following specific methods:

1. Transect walk: We walked along the transect with local people. Potential habitats were observed by team members and the expert. Information about habitat was taken and specimens were collected and a brief note was prepared about the species.

2. Observation in Ghat Gaddi: Ghat gaddi is wood stock/wood pile maintained by Community forest user groups (CFUGs). GhaatGaddhi is a very important reservoir of fungal germplasms and turned out to be an important site to document offseason fungal diversity. The species occurrences and diversity depend upon the host (Substratum) species and also where GhatGaddhi is located i.e under shadow or in open space. As indicated above we have consulted responsible person of each such Gaddhi and recorded their views on mushrooms, seasonal availability and edibility of such mushrooms which appeared in the premise of such GhatGaddhis.

3. We observed stocked logs in following CFUGS: KamalDhara Community Forest, Pathibhara Kaliika Community Forest, Durgavitta Community Forest, Abhimukteshowr Community Forest, Ratmatey Community Forest, Kalimandir Community Forest and Chaukibiran Community Forest

4. Specimen identification: Most of the specimens were examined identified by the expert himself in the field. Unknown plants were identified at National Herbarium and Plant Laboratory by using standard literatures.

5. Interaction program: An interaction program was organized at Durgabhitta CF in Kachankawal rural municipality on 16th December 2020. The program was attended by 17 Participants.

Key results

- A total of 38 species of mushroom species were recorded during the survey, of which 17 herbarium species (of interesting) are deposited at National Herbarium and Plant Laboratories (KATH), Godavary, Lalitpur.

- Wood piles locally called as Ghatgaddi are important habitats for saprophytic mushrooms.

- Meche and Satar people have profound knowledge about identification and use of mushroom.

**Start Date - End Date:** 12/12/2020 - 18/12/2020

**Verification Sources:** <https://www.darwininitiative.org.uk/project/DAR26022/>

<https://www.forestaction.org/programs/index/14>

<https://www.facebook.com/photo?fbid=10158986703142154&set=pcb.10158986715882154>

### **Activity name: Digitization of herbarium at KATH, TUCH and NHM**

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**Description:** Sorting of herbarium specimens at TUCH and KATH completed; lichens herbarium checking by experts at NHM is ongoing; scanning of lichens specimens started at KATH

**Start Date - End Date:** 1/9/2020 - 31/12/2020

**Verification Sources:** <https://www.gbif.org/dataset/bbd4effa-9796-4e0c-8c1a->

## Activity name: Database management and submission to GBIF

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**Description:** The occurrence database of mushrooms based on the herbarium specimens deposited at the Natural History Museum (NHM), Tribhuvan University Nepal has been recently published on GBIF portal. This database contains the records of 1644 mushroom specimens (Ascomycota: 196; Basidiomycota 1448) comprising 89 families, 200 genera and 270 identified species tracing the old record from the year 1967 until 2020.

**Start Date - End Date:** 1/9/2020 - 31/1/2021

**Verification Sources:** <https://www.gbif.org/dataset/bbd4effa-9796-4e0c-8c1a-0b92f6a95907#>

## Report on Deliverables

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### Deliverables progress summary

The main long term objective of this project is to contribute in bringing recent information on much-underestimated taxa like lichens and wild mushrooms in Nepal and to mobilize/deliver the species occurrence data based on information of the collection at the museum and major herbariums centres of Nepal onto GBIF for the wider scientific community. Having a set target of publishing at least six datasets, two data papers and two checklists, so far we are in a good track. In spite of having these unprecedented times, we managed to bring additional occurrences records/data paper on fungi from a very new collection site Jalthal, Jhapa ( so far not a single fungal species were collected from there) and also published a dataset on the GBIF portal. Meanwhile, we are very nearer to publish two more datasets of which 95% of work is already done.

### Progress towards deliverables

## Title: Mushrooms Flora of Nepal at Natural History Museum

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**Type:** Dataset

**Status update:** PUBLISHED

**Dataset scope:** For the wider audiences

**Expected number of records:** 1644

**Data holder:** Natural History Museum, Tribhuvan University (NHM TU)

**Data host institution:** Natural History Museum, Tribhuvan University

**Sampling method:** Based on the herbariums deposited at NHM TU

**% complete:** 100

**DOI:** <https://doi.org/10.15468/c2sus4>

**Expected date of publication:**

## Title: Mushrooms Flora of Nepal at Tribhuvan University Central Herbarium (TUCH)

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**Type:** Dataset

**Status update:** Metadata is almost ready to submit.

**Dataset scope:** For the wider audiences.

**Expected number of records:** 719

**Data holder:** Tribhuvan University Central Herbarium (TUCH)

**Data host institution:** Central Department of Botany, Tribhuvan University, Nepal.

**Sampling method:** Based on the deposited herbariums.

**% complete:** 95

**DOI:**

**Expected date of publication:** 2021-02-10

## Title: Lichens Flora of Nepal at Tribhuvan University Central Herbarium (TUCH)

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**Type:** Dataset

**Status update:** Metadata is almost ready to submit.

**Dataset scope:** For the wider audiences.

**Expected number of records:** 1126

**Data holder:** Tribhuvan University Central Herbarium (TUCH)

**Data host institution:** Central Department of Botany, Tribhuvan University

**Sampling method:** Based on the deposited herbariums.

**% complete:** 95

**DOI:**

**Expected date of publication:** 2021-02-15

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**Title: Lichens Flora of Nepal at Natural History Museum**

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**Type:** Dataset

**Status update:** New additions are being identified. (So the number of records might be different than here presented)

**Dataset scope:** For the wider audiences.

**Expected number of records:** 100

**Data holder:** Natural History Museum

**Data host institution:** Tribhuvan University

**Sampling method:** Based on deposited and newly collected specimens.

**% complete:** 50

**DOI:**

**Expected date of publication:** 2021-03-15

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**Title: Lichens Flora of Nepal at KATH**

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**Type:** Dataset

**Status update:** Digitization is in progress. The real number of records might be different at the end of a process.

**Dataset scope:** For the wider audiences.

**Expected number of records:** 1200

**Data holder:** Department of Plant Resources

**Data host institution:** Ministry of Forest and Environment, Government of Nepal

**Sampling method:** Based on deposited herbariums at KATH.

**% complete:** 50

**DOI:**

**Expected date of publication:** 2021-03-31

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**Title: Mushrooms Flora of Nepal at KATH**

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**Type:** Dataset

**Status update:** Digitization process will start after about a month. The real number of records might be different at the end of a process.

**Dataset scope:** For the wider audiences.

**Expected number of records:** 1600

**Data holder:** Department of Plant Resources (DPR)

**Data host institution:** Ministry of Forest and Environment, Government of Nepal

**Sampling method:** Based on available herbariums at KATH.

**% complete:** 40

**DOI:**

**Expected date of publication:** 2021-04-15

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**Title: Post monsoon mushroom flora of Jalthal forest, Jhapa, Eastern Nepal**

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**Type:** Data Papers

**Description:** A comprehensive list of wild mushrooms recorded from Jalthal, Jhapa is submitted to a JOURNAL OF FOREST AND LIVELIHOOD (JFL) and is under edition.

**Sources of verification:** For the further information: Dr. Lila Nath Sharma, [lila@forestaction.org](mailto:lila@forestaction.org)  
<https://www.forestaction.org/publications/jfl/151>

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**Events**

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**GIIS Monday #webniar series-13. "Wild Mushrooms in Nepal: Plate to Poison"**

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**Dates:** 2020-08-24 - 2020-08-24

**Organizing institution:** Global Institute for Interdisciplinary Studies (GIIS)

**Country:** Nepal

**Number of participants:** 100

**Comments:** This webinar series was mainly focused on wild mushrooms of Nepal, its present status and future prospects. Here, Shiva Devkota also highlighted about ongoing digitization project under GBIF/BIFA framework and also highlighted the importance for the data documentation and visualization.

**Website or sources of verification:** <https://www.youtube.com/watch?v=1INGi6LBA3s&t=1544s>

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**Events**

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## A talk programme by Mycological Association of Washington DC, USA

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**Dates:** 2020-11-10 - 2020-11-10

**Organizing institution:** Mycological Association of Washington DC

**Country:** USA

**Number of participants:** 80

**Comments:** Shiva Devkota presented a live talk from Nepal, sharing his expertise on Nepalese fungi and also describing his recent mycological work with GBIF/BIFA and further plans including Ethnomycological Expedition in Nepal.

**Website or sources of verification:** <http://mawdc.org/event-3907320> / <https://www.youtube.com/watch?v=BtU-sf13QPU>

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### Communications and visibility

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Thank you for providing this opportunity to update every progress on the project webpage. BIFA5\_023 updates are regularly being provided and available on the page:

<https://www.gbif.org/project/1oof3bltISyNanpvIWQYwz/digitization-of-mycological-collections-in-nepal>

Just to add: ICIMOD/HKH-BIF (Hindu Kush Himalayan Biodiversity Information Facility) has just uploaded two of Shiva Devkota's mushrooms pictures into its newly designed webpage. ICIMOD is an associate member of the Global Biodiversity Information Facility (GBIF), and HKHBIF is the GBIF-mediated publishing platform that is hosted by ICIMOD. It is a regional node of GBIF

Phallus indusiatus is recognized as Species of the Month. We've found it (with much appreciation) as the recognition of understudied/undervalued group of biodiversity. Wild mushrooms research in Nepal carries enormous opportunities/responsibilities as many traits highlighted by modern sciences are yet to be revealed and also equally crucial to minimize mushrooms poisoning risks in Nepal. Hope, with this kind of outreach practice/lobbying, this group will be integrated into research frameworks, resource inventories, and ecosystem services priorities.

<https://www.icimod.org/ecosystem-services/hkh-bif/>

At the end of a project, findings based on project results will be disseminated by organizing a knowledge-sharing workshop, two manuscripts for SI journals, two feature articles and two pages of summary for policymakers (SPM) will be developed.

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### Monitoring and evaluation

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#### Monitoring and evaluation findings

A mid-term evaluation helps to formulate decision-making strategies and also to bind the experience made till days. So far, it is found that the collaborating partners (GIIS, KATH, TUCH and NHM) are in a single framework (though there are several limitations with this COVID) to implement this project and are delivering their activities effectively amidst this pandemic time. However, we realized that there are some areas, which could be addressed to make this kind of digitization programme more friendly (in terms of capital and physical assets). Proper curation and labelling of the herbarium is necessary not only for the future uses but equally essential to gear up the digitization process.

Some of the changes which we introduced than mentioned on a proposal are as below and such changes turned out to be important decisions.

- working from a rented room to overcome the COVID fear;
- an arrangement of desktops for the data entry and,
- the focused work on digitization bringing contributions of five research assistants (Mycologist, Lichenologists, and Digitization Expert)

We are committed for the accountability, learning and dissemination through which our mutual work with GBIF/BIFA "translates" into more effective, efficient and sustainable programme interventions.

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### Impact of COVID-19 pandemic on project implementation

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Amidst this pandemic, we are trying our best to implement BIFA5\_023 taking every care and precaution. Having this stringently hard time, some of the plans have been changed and following

working strategies have been adapted to bring the best.

# As the mass gathering was strictly prohibited, we simply organized thee informal meetings in small clusters each with a single collaborating institution.

# Due Covid period and several limitations for Inception meeting, the allocated inception meeting cost and surplus money from internet service is used to purchase covid preventive health items.

# To maximise our output and to undertake work. we had rented a room for four months period utilizing the pending travel budget (travel restrictions in the public vehicle).

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

