

The Rufford Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Foundation.

We ask all grant recipients to complete a Final Report Form that helps us to gauge the success of our grant giving. The Final Report must be sent in **word format** and not PDF format or any other format. We understand that projects often do not follow the predicted course but knowledge of your experiences is valuable to us and others who may be undertaking similar work. Please be as honest as you can in answering the questions – remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

Please complete the form in English and be as clear and concise as you can. Please note that the information may be edited for clarity. We will ask for further information if required. If you have any other materials produced by the project, particularly a few relevant photographs, please send these to us separately.

Please submit your final report to jane@rufford.org.

Thank you for your help.

Josh Cole, Grants Director

Grant Recipient Details	
Your name	Prabin Bhandari
Project title	Taxonomy, Diversity and Conservation of orchids in Panchase Mountain
RSG reference	22182-1
Reporting period	August 2017 to July 2018
Amount of grant	£4980
Your email address	prabinkb02@gmail.com
Date of this report	July 2018

1. Please indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Establishment of orchid catalogue of Panchase				We conducted nine field visits and prepared a detailed orchid catalogue of Panchase. Now, the orchid species number has crossed 130. A few of the species are still in indentifying process and we are expecting the total orchid number to be 140.
Diversity of orchid in Panchase mountain				Ecological samplings were carried out from 900 to 2500 m along the elevation band. Maximum species richness of orchid was observed at around 1500-1700 m.
School based orchid conservation awareness program				Conservation awareness programmes were organised at a local school 'Shree Bahadure Secondary School', Bhadaure Deurali. An essay competition, relating to 'Orchid and Panchase' was organised in May 2018. Three results sharing workshops were supposed to be organised in different schools of Kaski, Shyanga and Parbat in July 2018. However, the 1 month monsoon holiday in schools forced us to postpone the programmes. The programmes are scheduled to be organised in mid-August 2018.
Public based orchid conservation programs				The villagers and local conservation leaders of Panchase, particularly at Bhadaure Deurali, Bhanjyang, Sidhane and Makwanpur of Kaski District were trained on ecological monitoring of orchid and its conservation importance. However, the conservation programmes were not initiated in Parbat and Shyanga Districts due to time constraints.

Promotion of local economic activities through Ecotourism			An informal agreement has been made with Machhapuchhre Development Organization (MDO); a feasibility survey will be conducted in Panchase, to see if an Orchid Nursery and Biodiversity Trail can be established. The results of this study will help to identify the important habitat of orchids and in identifying the plant species for the proposed biodiversity trail in Panchase.
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

Panchase lies in middle mountain ecosystem, near to Pokhara, where the annual precipitation rate is very high. The heavy rainfall and leech bites during monsoon made the ecological survey tough. The sampling was, therefore, conducted in two different dates, one in August and another in September-October 2017.

Majority of the orchids were in vegetative stage during ecological sampling, thus making the identification job quite challenging. Therefore, the sampling sites were revisited in successive visits for accurate identification of the orchid species.

3. Briefly describe the three most important outcomes of your project.

Outcomes 1: Preparation of detailed Orchid Catalogue

A detailed orchid catalogue of 135 species was prepared based on field collection and secondary data. About ten species were found to be new to Panchase. All these collected samples specimens are deposited at National Herbarium and Plant Laboratories (KATH). The deposited samples will be valuable assets for ongoing Flora of Nepal project. (Figure 1, 2)

Three interesting orchid species (*Listera*, *Odontochilus* and *Tainia* species) were collected during the field course, which are possible candidate for new records for the Flora of Nepal.

Outcome 2: Diversity of Orchids in Panchase

The assessment of ecological study for both epiphytic and terrestrial orchid shows a maximum orchid species richness at around 1500-1700 m in Panchase. *Schima wallichii* was the major host at lower altitude, while *Daphniphyllum himalense*, *Rhododendron arboreum* and *Quercus semecarpifolia* were the dominant host in the upper belt. (Figure 3)

The data generated from this study will be used to inform the conservation planners and concerned authorities with the objective of insuring the long term viability of orchid in Panchase. Also, the semi-permanent plot established at 2000 m will be a site for future monitoring of orchids in Panchase.

The ecological survey along the elevation bands in Panchase shows some serious threats to orchid conservation. The major threats observed were:

1. Habitat fragmentation through haphazard road construction. Some of these trails and roads pass by the critical habitat of endemic and threatened orchids in the core zone of Panchase forest. (Figure 4)
2. Open grazing is another challenge in Panchase. (Figure 5)
3. Over collection: The orchid species especially the members of *Coelogyne*, *Bulbophyllum*, *Dendrobium* and *Thunia* were found to be over harvested by the villagers for cattle feeding. It is believed that the feeding these plants improves milk production.

Outcome 3: Initiation of Conservation campaign and Awareness programs

A conservation campaign was initiated in Bhadaure Deurali, Bhanjyang, Sidhane, and Makwanpur of Kaski District. Series of field visits and conservation campaign were organised which is believed to made the villagers aware of the current status of endemic, native and common orchid species in this area. The importance of conserving wild orchids as well as preserving its habitat was emphasised during the conservation campaigns. An Interview programme was broadcast live in a local FM Station, focusing on orchid and its conservation importance. (Figure 6)

An essay competition was organized in Shree Bahadure Secondary School, Bhadaure Deurali, with active participation of students from grade 6 to 10. The participants were asked to write their essay within 500 words relating to biodiversity, orchid and Panchase. The participants and prize winners were provided with a diary, pen and a conservation messages printed t-shirts. This type of programme at school level will help to generate the future conservationist in the region. (Figure 7, 8, 9)

Besides the school programme and exposure visit, t-shirts with conservation message were distributed among the students, teachers and villagers. An information banner highlighting the Noteworthy Orchids of Panchase was distributed to local schools, community hall and home stay. (Figure 10, 11)

The overall project activities and its achievement were shared in series of workshops and presentations with villagers, schools and college students and concerned authorities. Result sharing presentations and workshop were organised at Bhadaure Deurali, Prithivi Narayan Multiple Campus, Pokhara and in Machhapuchhre Development Organization (MDO), Pokhara.

4. Briefly describe the involvement of local communities and how they have benefitted from the project (if relevant).

The local people of Makwanpur, Ghatichida, Bhanjyang and Bhadaure Deurali were engaged during the orchid monitoring and forest visits. The core habitat of rare, threatened and endemic orchid species were visited during the forest visit.

The forest visit and conservation programmes must have built their capacities and enrich their knowledge in orchid conservation in Panchase. The local field assistants were integral part of our project, leading and guiding us to go to forest, arranging community workshops and providing the logistic support. Besides, the local field assistants were provided daily wages and were gifted a Rufford logo printed t-shirts at the end of project. (Figure 12, 13)

5. Are there any plans to continue this work?

Yes, we are planning continuing this work. The results of this project will give the diversity of orchids and their conservation status. Thus, standing on the present results, the next project will focus on the assessment of conservation status of rare, threatened and endemic species. We are also planning to monitor permanent plot established in this study in next project. Similarly, we will continue our conservation awareness programs in two other districts: Parbat and Shyanga in next phase.

6. How do you plan to share the results of your work with others?

The results of this study are being shared with the local communities and NGO by oral presentation. The project's aims, its objectives and results were also broadcast through a local FM Station. An Information banner on important orchids of Panchase is being installed in different schools, community halls, home-stay and in a local conservation organization. Similarly, the findings of this project were shared with the participants in Rufford Nepal Conference, held in Kathmandu in January 2018. (Figure 14, 15, 16, 17)

As for scientific community, we are looking forward to prepare, at least three manuscripts and are planning to submit in peer reviewed scientific Journals. A short communication material about endemic orchids of Panchase is submitted to MDO, which will be soon published in its monthly magazine '*Prasidha Panchase*'.

7. Timescale: Over what period was The Rufford Foundation grant used? How does this compare to the anticipated or actual length of the project?

The Rufford Foundation grant was used as anticipated from August 2017 to July 2018. A total of nine field visits were organised for data collection and conservation campaigns. The grant amount was used in those field visits and conservation campaigns.

8. Budget: Please provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Travel (Kathmandu-Pokhara-Panchase)	240	270	-30	Three additional field visits were made, other than mentioned in the proposal. Those visits were organized to relocate and collect the newly record orchid species and for conservation campaigns. ((£ 15 x 2 x 9)
Accommodation (Investigator and team members)	700	800	-100	The estimated cost for lodging was slightly higher than expected. Additionally, the three extra field visits increased the overall cost.
Allowances and wages (team members)	700	800	-100	Three extra field assistants were hired for data collection in first two field visits.
Material and supplies (GPS, Herbarium press, pH Meter, Blotting papers, Forms)	805	600	+205	A low price GPS (Holux m.241) and pH meter (Erma PH-035) were bought which significantly lowered the estimated costs.
Awareness campaign (Meetings, Workshop, School programs, T-Shirts, Information Board)	1960	1960	0	Pamphlets were not printed; instead 30 T-shirts and 30 Information banner were distributed in project site. The conservation messages were presented through multimedia projector.
Stationeries & Miscellaneous (Medicines)	575	575	0	
Total	4980	5005	-25	Note: £ 1 = NPR 129.81 (2017-03-08)

9. Looking ahead, what do you feel are the important next steps?

We can create a strong foundation for future work, if we could effectively share the results with concerned authorities. So, our first priority will be sharing the results, by publishing it in national newspapers and scientific journal articles.

We are looking forward to continue this study, particularly focusing on the conservation status of rare and endemic orchids. While conducting conservation campaigns in School, it is felt that, development and implementation of Orchid Conservation Curriculum at local schools will be an effective step in sustaining the future of orchids in natural condition.

An informal agreement has been made with local NGO, Machhapuchhre Development Organization for establishment of orchid nursery with coordination with government institutions and local communities. This will help to conserve the rare and threatened orchid ex-situ. An Orchid Conservation Management Plan is very essential for the effective conservation of this charismatic group in Panchase. The ecosystem services derived from this group cannot be underestimated. Therefore the upcoming work will be focused on developing the management plan and on assessing the ecosystem services including the orchid-pollinator relationship. So, we would like to expand our research, focusing on long term conservation of this group in Panchase and central Nepal.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did The Rufford Foundation receive any publicity during the course of your work?

The Rufford Foundation logo was used during all the awareness activities. We were able to share the Rufford Foundation logo in t-shirts, banner, information board, PowerPoint and poster presentations. The Rufford Foundation was well acknowledged in all the conservation campaigns, which we conducted in villages, schools, college and other organisations including the radio programme. Especially, biology students and teachers of Prithivi Narayan Multiple Campus were curious about this project and the supporting organization.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Mr Prabin Bhandari: Team leader, preparation of field trips and conservation campaigns. Field data collection, data management, report submission and preparation of the manuscript.

Mr Kalyan Shrestha: Mr Shrestha is a master graduate in Botany; is involving from the very beginning of the project. He was heavily engaged in data collection and entry, plant identification.

Mr Dipesh Pathak: Mr Pathak is a M.Sc. Botany student, who contributed in data collection in first field visit.

Ms Gyanu Thapa Magar: Ms Magar is a M.Sc. Botany student, who contributed in data collection in first field visit.

Mr Mandip Adhikari: Mr Adhikari is a B.Sc. Biology student, who is the resident of Panchase area; contribute in ecological survey in second visit.

Mr Ashish Bhandari: Mr Bhandari is an intermediate level student, who serves as a research assistant in entire work from start to end of project.

Mr Hira Lal Gurung: A local resident of Bhadaure Deurali, who was integral part of this project. His responsibilities were to coordinate the meetings and making arrangement of field visits.

Mr Rupesh Gurung: A local resident of Bhadaure Deurali, who is also a local nature guide, help us in ecological survey and make arrangement of logistic.

12. Any other comments?

At the end of PowerPoint presentation at Bhadaure Deurali, during the conservation campaign; an elderly women, one of the participant, come nearby me and told "We used to harvest orchid (*Thur*), believing, it has no use other than fodder; we don't care of conserving it; now we are pleased to know its medicinal use and its ecological function". I was a bit surprised to hear that, and thought, if an hour programme can change the local people perception, what would be the result if we could sustain these types of conservation programmes in each of the biodiversity hotspots of Nepal. This might be a small issue, but is the strong foundation for future research works in Panchase. Regarding this, I would like to express a deep gratitude to The Rufford Foundation for providing this opportunity and making the paper concept into reality.

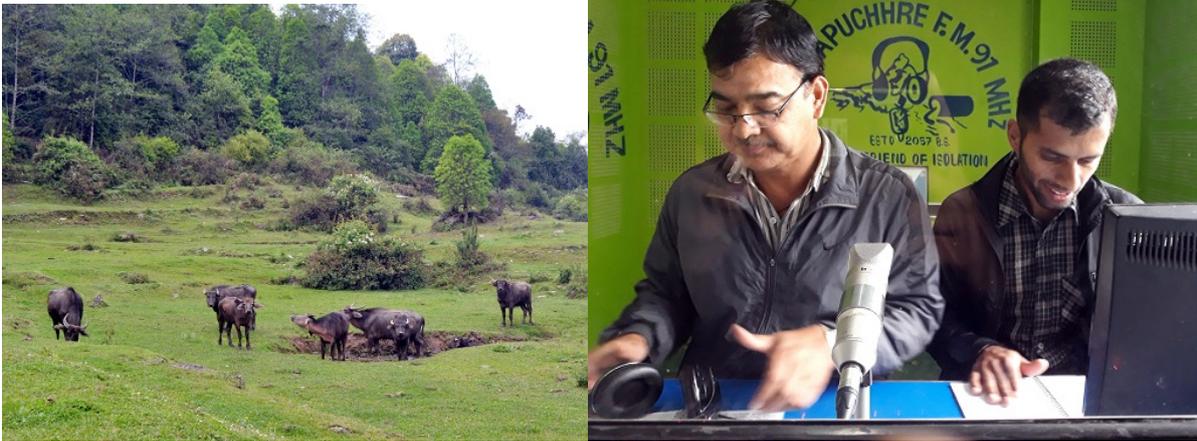
At last, we would like to thank the resident of Panchase area for their kind support and warm hospitality during the entire work. We are also grateful to Machhapuchhre Development Organization (MDO) and Research Centre for Applied Science and Technology (RECAST), Tribhuvan University for their technical support.



Figures 1 & 2



Figures 3 & 4



Figures 5 & 6



Figures 7 & 8



Figures 9 & 10



Figure 11



Figures 12 & 13



Figures 14 & 15



Figures 16 & 17



Figure 18