Final Evaluation Report

Your Details	
Full Name	Vishal Kumar Prasad
Project Title	Climate-Resilient Conservation: Safeguarding Threatened Amphibians in Uttarakhand's Western Himalayas through Participatory Research and Education
Application ID	43132-2
Date of this Report	20 June 2025

1. 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
To generate comprehensive baseline data on the distribution and ecology of high-altitude amphibians in the Himalayan region through extensive fieldwork. To assess amphibian diversity and produce DNA barcodes for reliable cryptic species identification			✓	> Fieldwork was successfully conducted over nine months under expert guidance, covering more than 240 days. > Surveys spanned numerous distinct habitats, ranging from 300m to 3600m above sea level, across 9 districts of Uttarakhand. > Using DNA barcoding, the study yielded six new amphibian records in the state. Research article under review. > The fieldwork has led to the discovery of two genetically confirmed amphibian species new to science, manuscript in preparation. > Details of these discoveries will be shared upon publication. > This novel data is expected to attract greater conservation attention to the Uttarakhand Himalayas, supporting regional planning, habitat management, and amphibian conservation.
Threat identification included the influence of anthropogenic pressures such as agrochemical use, dam construction, and waste disposal.		✓	✓	> This work is substantially achieved through systematic threat mapping using the IUCN Red List threat matrix. > Key threats identified include agrochemical use, dam construction, waste disposal, pollution and invasive species encroaching on native amphibian habitats. > Our intensive surveys indicate the unfortunate local extirpation of the Dehradun Stream Frog at its type locality, primarily due to habitat loss and stream pollution. > A manuscript documenting these findings and proposing a

				conservation strategy to prevent further decline of this species has been submitted. **>** This work provides critical information to guide future conservation planning and action for Himalayan amphibians.
To engage local communities through participatory research, education, and capacity-building activities aimed at fostering long-term stewardship of amphibian conservation at the regional level.			✓	**>** The project empowered individuals from local communities such as *Jaunsar*, *Garhwali*, *Kumauni* tribes through field research, awareness, ecotourism skill development, and capacity-building to promote long-term leadership of amphibian conservation, and we successfully achieved this objective. **>** Collaborated with the State Forest Department, local forest committees (*Van Panchayat*), local NGO and local universities to build strong conservation networks. Developed connections with local nature tourism groups in Munsiyari, Chakrata, Nainital and Chamoli. **>** Trained 28 local youths from 24 villages across 9 districts in frog identification, call recognition, and the ethics of nature tourism, providing them with employment opportunities and field-based training in amphibian monitoring and ecotourism. **>** Trained over 225 local community members in citizen science using the ***iNaturalist*** app, resulting in over 6,000 online amphibian observations. **>** Strengthened collaboration with the State Forest Department for conservation plan, received permission to study amphibian threats and taxonomy across the state.
To model the impacts of climate change on Himalayan amphibian using advanced climatic				**>** We modelled the impacts of climate change and human footprints on the habitats of 13 Himalayan endemic amphibian species using advanced SDMs. **>** Our results revealed a general pattern of suitable habitat contraction and upward shifts in

niche modelling techniques.			✓	suitable habitats for endemic species, driven by rising temperatures at high altitudes, reduced snowfall, changing precipitation patterns and increasing human footprints. **>** Our analysis highlights a critical tension between potential upward shifts in range and extinction risks due to the limited availability of suitable high-altitude habitats for endemic amphibians. **>** Our results show that invasive amphibians such as *Duttaphrynus melanostictus* are potentially invading the habitats of native species, facilitated by human-induced changes (pollution and habitat loss) and climate change, and are outcompeting native amphibians through greater boldness and behavioural dominance. Research is presented in the World Herpetology Conference (WCH-24) in Malaysia in 2024. The research paper is under preparation. **>** We have mapped priority conservation areas and our team is actively engaging with local authorities to develop mitigation strategies to safeguard amphibians in these threatened landscapes. One of the key sites is Chakrata in Uttarakhand for Critically Endangered *Amolops chakrataensis*.
To formulate a Conservation Action Plan (CAP) with specific, actionable strategies for the protection and recovery of threatened amphibian species.		✓		**>** The amphibian conservation action plan is currently under development. **>** A draft has been submitted to the Uttarakhand Forest Department for review. **>** Two consultation meetings have already been held with forest officials in January and February 2025 to discuss and refine the plan. **>** We are also in contact with the Wildlife Institute of India, the nodal agency, to obtain expert feedback. **>** Once all feedback is integrated, a final version of the plan will be published and officially released as

				an integrated Amphibian Conservation Plan for Uttarakhand.
To disseminate research findings via peer-reviewed journals and mainstream media platforms to raise awareness and build public support for amphibian conservation.			✓	**>** We have worked diligently and published one research paper in Q1 Nature Communications journal that shows we have a cryptic unnamed species in the study landscape. The paper has already been sent to the Rufford office by email. **>** Three additional research papers are currently under peer review, highlighting amphibian diversity, the local extirpation of the Critically Endangered Dehradun Stream Frog, and conservation assessments. **>** Two manuscripts describing new amphibian species are under preparation. **>** A conservation article has been published in regional newspapers to raise awareness. **>** We also participated in a live local radio programme to promote amphibian conservation. **>** Awareness posters were distributed during the conservation workshop held in February 2025. **>** Additionally, we developed a mobile e-booklet detailing key species identification and conservation strategies for State Forest Department staff, which has been circulated across all divisions of the Uttarakhand Forest Department.

2. Describe the three most important outcomes of your project.

a). Discovery of new species and distribution records:

This project led to the discovery of two species new to science (currently being described) and six new state-level records. We generated DNA barcodes for 15 amphibian species in the project, of which nine species are barcoded for the first time. This highlights the project's crucial role in generating scientific data for almost all amphibian species inhabiting the Western Himalayas. Its benefits extend beyond Uttarakhand, contributing valuable knowledge for amphibian conservation across the entire Western Himalayan landscape.

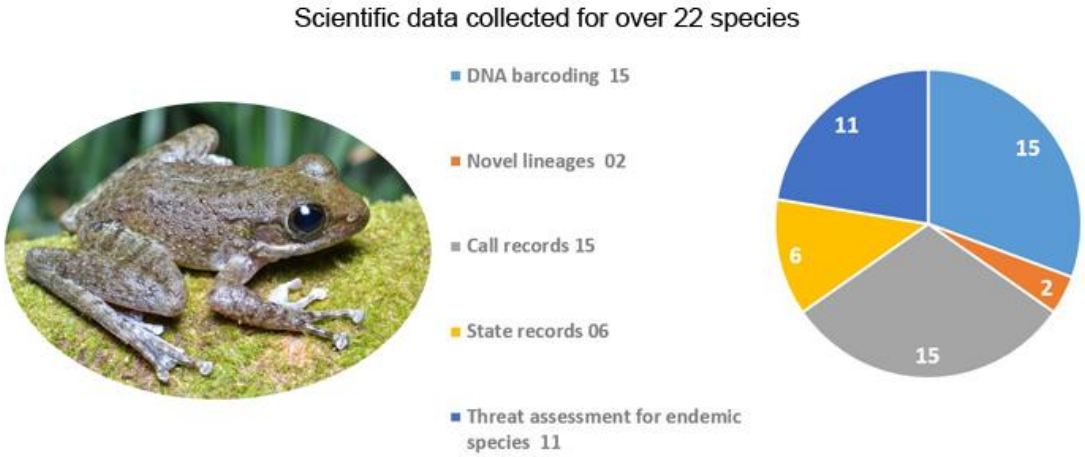

Figure 1: Data collected during the project (2024–2025), covering 22 amphibian species across 9 districts in the Garhwal and Kumaun regions of Uttarakhand.

b). Threat mapping and conservation insight:

Threat mapping is one of the most critical aspects of this project, as many Himalayan amphibians are silently declining under the combined pressures of climate change and habitat loss. We quantified threats for 11 Western Himalayan endemic species, providing essential data for future IUCN Red List assessments. Species like *Nanorana vicina*, currently listed as Least Concern, may be re-evaluated as Near Threatened in future, while the Critically Endangered *Amolops chakrataensis* is expected to gain stronger conservation attention and support.

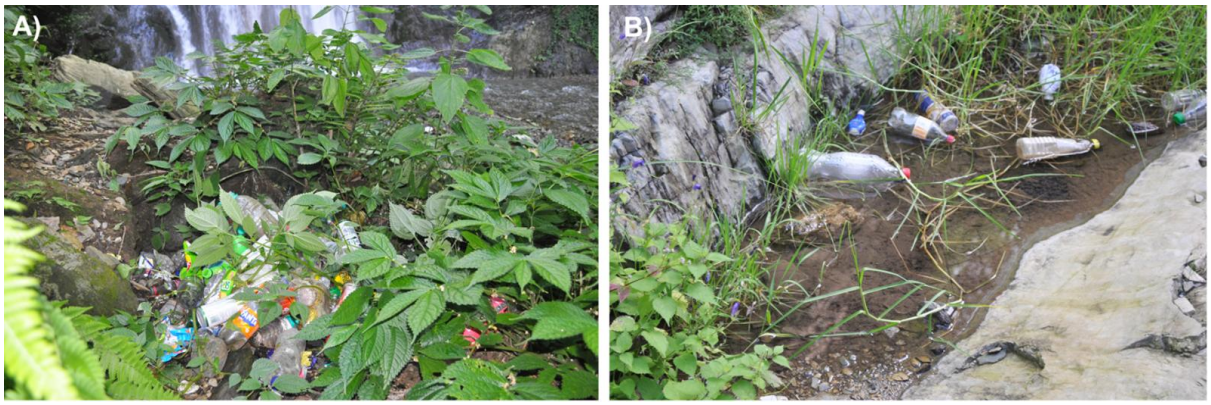

Figure 2: Our team surveyed habitats of Critically Endangered *Amolops chakrataensis* and documented key threats to this species, including pollution, invasive species, habitat degradation, and dam construction on streams — factors that pose serious risks to this range-restricted amphibian.

c). Community engagement and capacity building:

We witnessed great enthusiasm from local communities eager to learn about their native amphibians. The project successfully connected traditional knowledge and folklore with modern conservation science. With guidance from the IUCN Amphibian Specialist Group co-chairs, this work stands as a model example with immense potential to inspire and guide similar conservation initiatives across the region.

Figure 3: Top: Conservation awareness workshop conducted by our team with the State Forest Department, including discussions on the Amphibian Conservation Action Plan (ACAP), held in February 2025 in Dehradun, Uttarakhand. Below: Awareness program held at a local school in Jadi, Chakrata, Uttarakhand, conducted in October 2024.

d) We also collected *Batrachochytrium dendrobatidis* (*B.d.*) swab samples in the field and sent them to the Centre for Cellular & Molecular Biology (CCMB), Hyderabad, Telangana (India), for molecular analysis. CCMB is one of the voluntary nodal agencies for *Batrachochytrium dendrobatidis* (*B.d.*) and *Batrachochytrium salamandrivorans (B.sal)* testing in India and specialises in diagnosing amphibian infections caused by these fungal pathogens. The laboratory is currently processing our samples. We are actively following up, and they will send us the results once the analysis is complete. Based on these results, we will confirm the presence or absence of the B.d. fungus. This work is currently in progress. We will update you once we have results.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

We encountered weather-related difficulties during the project. Logistical and travel challenges arose during field surveys between July and September 2024 due to heavy monsoon rains. Flash floods and landslides in parts of the mountainous landscape of Uttarakhand Himalayas caused delays of a few weeks, restricting our team's ability to reach project sites on time. Broken roads and disrupted connectivity hindered project activities for several weeks. We addressed these challenges by working closely with local volunteers, who provided timely updates on weather conditions and road accessibility in their villages. This local support allowed us to better plan our field visits and minimise delays, saving both time and resources.

4. Describe the involvement of local communities and how they have benefitted from the project.

The project strongly empowered local communities, including *Jaunsar*, *Garhwali*, *Raikwals*, and *Kumauni* tribes, by actively involving them in field research, capacity-building, and awareness activities, fostering long-term leadership in amphibian conservation across Uttarakhand. Throughout the project, we hired and provided hands-on training to 28 local volunteers from 26 villages at different locations in Uttarakhand. They received practical hands-on training in amphibian data collection, threat identification, frog identification, frog call recognition, and ethical nature tourism. This provided valuable part-time employment and enhanced their skills, especially for local nature guides, enabling them to better locate and identify frogs, thereby attracting more eco-herp-tourism customers and promoting sustainable amphibian conservation.

Over 225 local community members from these villages participated directly or indirectly in our citizen science programmes, contributing over 6,000 amphibian records on *iNaturalist* — substantially enriching scientific data on regional biodiversity. We met with village Heads (*Sarpanchs*) and conducted awareness programmes in Pithoragarh, Chamoli, Dehradun and other districts. Additionally, we educated 180 school children in seven schools across Nainital, Dehradun, Wan, Chamoli, Chakrata, and Munsiyari about amphibian conservation and their ecological importance. Hindi and English e-booklets on amphibian identification were shared through WhatsApp groups to build local capacity and raise awareness among villagers. Our collaboration with the State Forest Department was further strengthened through the development of a conservation action plan and permissions for statewide amphibian studies.

Our team also engaged with the local villagers via a live local radio "*Kumaun Vani*" programmes, spreading awareness about amphibian conservation. Notably, we received 42 calls from villagers via WhatsApp (+91 8077987468), seeking help in identifying frogs seen in their fields, homes, and along roads during the monsoon season. This is not a high number, but good to begin with.

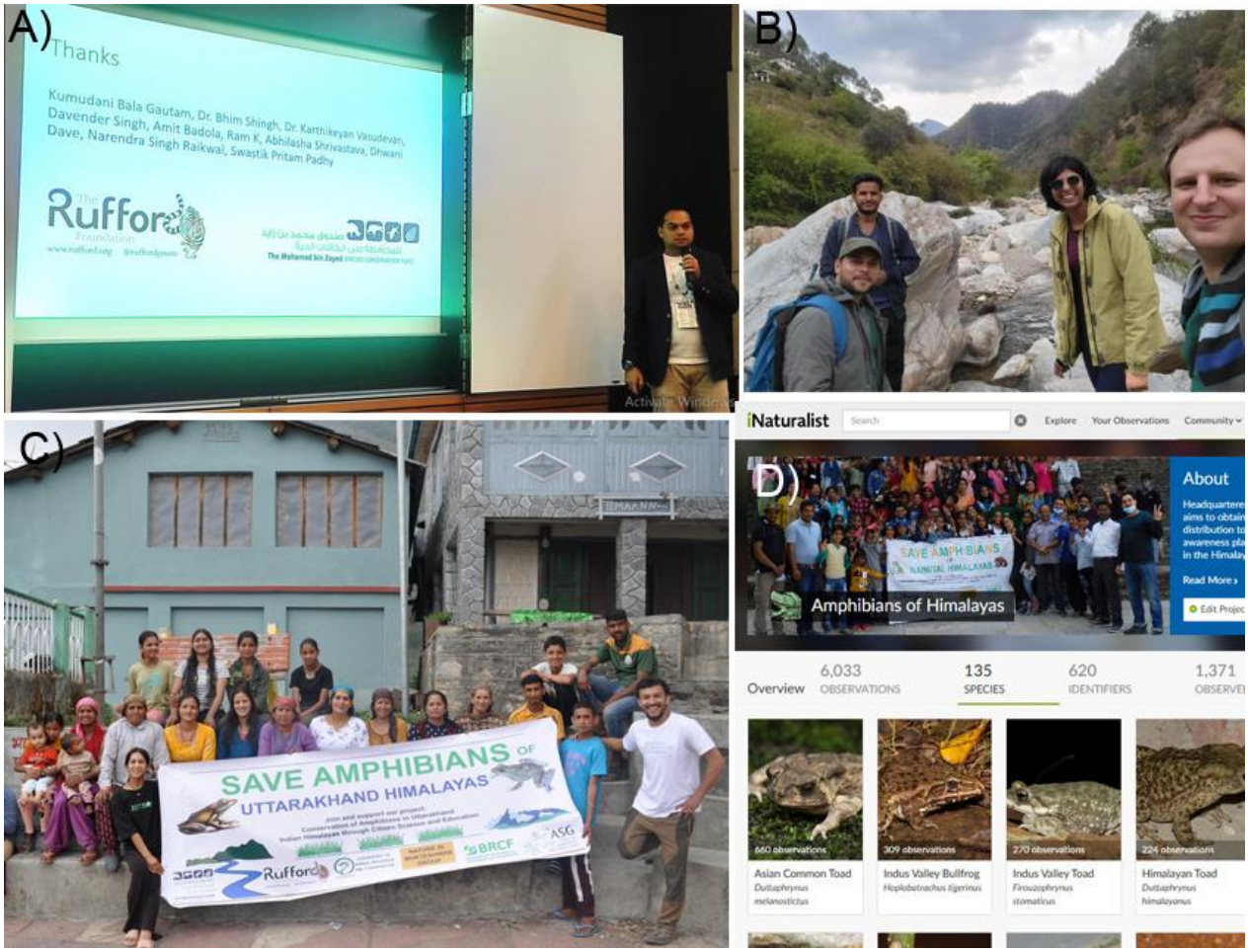

Figure 4: A) Project leader Vishal Kumar Prasad delivered a talk on Himalayan amphibian conservation at the World Herpetology Conference held in Malaysia in August 2024 to raise global awareness and support for Himalayan amphibians. B) Our team conducted a field visit with the IUCN Amphibian Specialist Group Co-chair in Nainital, Uttarakhand. C) Team created awareness about the Critically Endangered Dehradun Stream Frog among Garhwali tribes in Chakrata, Uttarakhand. D) A screenshot of our "*Amphibians of Himalayas*" iNaturalist page, where local citizens have uploaded over 6,000 amphibian observations as part of the project's citizen science initiative.

5. Are there any plans to continue this work?

Certainly. Although all planned project activities have been completed, our research paper writing work and conservation action plan review are ongoing. Our team is motivated to continue this important work. The results from the project have been promising, and we are enthusiastic about advancing amphibian conservation efforts in Uttarakhand. Some activities, such as capacity building and field monitoring, require follow-up to achieve lasting impact. We believe one or two years is short to secure long-term success. We have also received additional support from the Mohamed bin Zayed Species Conservation Fund, and the project's impact is expanding thanks to our dedicated team and guidance from international experts, including the IUCN Amphibian Specialist Group. We have made a strong start, and sustained efforts will be essential to achieve long-term amphibian conservation goals in the region. We are currently working on describing the newly discovered species and developing conservation strategies for their protection in Uttarakhand. Continued support from the Rufford Foundation and other organisations will be vital to maintaining and enhancing this work.

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

We have shared the results of our work through a project report, power point presentation, informative posters, newspaper articles, and a conservation workshop conducted in collaboration with the Uttarakhand State Forest Department. A total of 55 Forest Department officials including the Chief Wildlife Warden (CWW) of Chakrata Division, the Principal Chief Conservator of Forests (PCCF), the Divisional Forest Officer (DFO), and Ranger along with 12 local village Heads (*Sarpanchs*) attended the workshop. Moreover, we shared the project findings through Kumaon Vani Community Radio – 90.4 MHz, reaching a wide range of stakeholders via radio broadcasts. This station covers nearly 500 villages across Nainital, Bhimtal, Almora, Ranikhet, Kausani, Champawat, Devidhura, Pithoragarh, Betalghat, Sheetlakhet, Gwaldham, and Bageshwar, reaching an estimated population of around 3,50,000 local residents in Uttarakhand.

The project report has been submitted to the Forest Department, the NGO Biodiversity Research and Conservation Foundation, and the Wildlife Institute of India. Informative posters have been distributed at over 36 sites, including villages, offices, schools, colleges, and public areas in towns.

Project outputs have also been featured in national newspapers and on radio channels. We have published one research article so far, with three more currently under peer review. The project report will soon be made available on the websites of the Biodiversity Research and Conservation Foundation, the Wildlife Institute of India, the Lab of Animal Behaviour and Conservation, and via our YouTube channel, allowing the public to freely access and read the results.

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

The next important step is to formally describe the two new amphibian species we have discovered and generate media attention to raise awareness about their conservation needs. At the moment, we will not disclose information publicly until the species are formally described to prevent premature exposure that could lead to unregulated collection, disturbance, or habitat pressure. We aim to collect detailed threat data and conduct IUCN Red List conservation assessments. Both species have been reported from village areas outside protected zones, where they face anthropogenic pressures.

Our team plans to expand fieldwork into the northern high-altitude regions of Uttarakhand to document additional endemic amphibians. As the project grows in scope and funding, our priorities include publishing the new species descriptions, engaging the Forest Department by finalising and publishing the Amphibian Conservation Action Plan for Uttarakhand, and advocating for its integration into the Forest Department's management plans. Once included in official planning, these species will benefit from greater protection and government funding for their conservation.

We also aim to support the reassessment of all 12 endemic Western Himalayan amphibian species by the IUCN Red List. Our climate change modelling shows that these species face increasing threats, and our data will help ensure their conservation status is updated to reflect their true vulnerability. Additionally, we plan to work closely with the Forest Department and local communities to monitor and

protect newly identified suitable habitats in high mountain areas that have so far been overlooked in conservation planning.

Finally, we aim to expand fieldwork and capacity-building efforts across Uttarakhand, seek further financial support, and promote self-sustaining local ecotourism. This will generate employment, empower communities, and foster a trained local workforce committed to amphibian conservation.

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

Yes, we used The Rufford Foundation logo on all printed posters, leaflets, banners, PowerPoint presentations, eBooks, and reports related to this project. The Foundation was acknowledged in our research articles and publications, including the project number, and will also be acknowledged in our upcoming publications. Once these papers are published, we will update you with the details. The Rufford Foundation was prominently acknowledged during all talks and presentations delivered by our team, ensuring strong visibility and recognition throughout the course of our work.

9. Provide a full list of all the members of your team and their role in the project.

1. **Vishal Kumar Prasad (Team Leader)** — Led the execution of all project activities, including planning and conducting fieldwork, threat assessment, awareness programmes, delivering radio talks, and hands-on training for volunteers. Conducted DNA analysis, bioacoustics monitoring, taxonomic work, and managed the organisation of workshops and training programmes. Collaborated closely with the Forest Department, NGOs, and universities; drafted the amphibian conservation action plan and submitted it to the Forest Department; and handled permission applications and official communications.

2. **Dr. Kumudini Bala Gautam (Team Member)** — Coordinated the project, carried out fieldwork, planned and executed workshops, and conducted genetic work and DNA analyses throughout the project.

3. **Davender Singh (Project Intern)** — Assisted with fieldwork, managed communications, promoted project activities, and supported the organisation of awareness programmes.

4. **Amit Badola (Project Intern)** — Led bioacoustics monitoring at field sites and contributed to field data collection.

5. **Dr. Bhim Singh (Team Member)** — Supported field planning and management in the challenging mountainous terrain of the Himalayas and contributed to genetic analyses.

6. **Abhilasha Shrivastava (Team Member)** — Assisted in data analysis and fieldwork planning.

7. **Dr. Amaël Borzée (Co-Investigator, Mentor and Expert)** — Served as the mentor and provided expert guidance in the development of the amphibian conservation action plan.

10. Any other comments?

This project has laid a strong foundation for amphibian research and conservation in the Uttarakhand Himalayas. Beyond meeting our objectives, it significantly increased much-deserved attention for Himalayan amphibians in the region — across media, local communities, nature guides and the Forest Department. The upcoming formal descriptions of new species will further raise the profile of these unique amphibians and bring much-needed focus to the conservation of Western Himalayan amphibians in Uttarakhand. We are grateful to The Rufford Foundation for supporting this project with the grants and enabling us to undertake such important work. We look forward to building on these outcomes through continued collaboration, research, and conservation action.

Figure 5: Field site at 3,600 m asl in the high-altitude meadows of Chamoli, Uttarakhand Himalayas, home to an undescribed endemic amphibian. Our fieldwork revealed that these pristine habitats, previously thought secure, are now threatened by human disturbance and the effects of climate change. This project highlights the urgent need for awareness and conservation of these unique, overlooked habitats.