

The Rufford Small Grants Foundation

Final Report

Congratulations on the completion of your project that was supported by The Rufford Small Grants 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 | Rajat Ramakant Nayak |
| Project title | Consumer control and vegetation response: the fire-vegetation-grazing dynamics in the Western Himalayan landscape |
| RSG reference | 10102-1 |
| Reporting period | July 2011-December 2012 |
| Amount of grant | £6000 |
| Your email address | rajat@feralindia.org |
| Date of this report | 3 rd January 2013 |

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 |
|--|--------------|--------------------|----------------|--|
| To document the traditional grazing and fire management practices and spatial extent of grazing and fire in the landscape. | | | Fully achieved | We used informative questionnaire surveys between July 2011 and September 2012 to collect information on grazing and fire practices. In this survey we covered more than 25 villages within the study area. |
| To understand the role played by fire and grazers, alone and in combination, in structuring the Western Himalayan landscape. | | Partially achieved | | Although we gathered information on vegetation patterns across grazing and fire gradients, we think that, for a better understanding of fire-vegetation-grazing dynamics, long-term studies within an experimental design covering different seasons and simulating different traditional grazing and burning practices are necessary. |
| To determine the effects of over-grazing and increased fire frequency on ground vegetation composition. | | | Fully achieved | We sampled areas with high grazing intensities and high fire frequencies fires to determine their effects on ground vegetation characteristics. |
| To determine the acceptable levels of human activities by way of grazing and /or fire from the point of view of biodiversity conservation. | | Partially achieved | | We would like to treat our observations cautiously, as it is obtained over a single sampling year and without any control over other intervening factors. To define any acceptable levels of human activities in the landscape we strongly believe that an experimental approach and long-term studies are essential. |
| To develop strategies involving local people for long term monitoring and ensuring the persistence of existing biodiversity. | | Partially achieved | | We involved local people throughout the study. A few were trained in field with data collection. Through constant dialogues with the local people we were able to convey our findings on role of grazing and fire to a larger population. The next task would be to redesign existing grazing and burning practices, to meet the goals of biodiversity conservation and sustainable livelihood in changed management regime. This should be informed by results from a robust experimental design. |

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled (if relevant).

The difficulties we faced during the project tenure were largely related to financial constraints. A sudden increase in the daily wages of local field assistants was a major setback for our study. We changed our sampling strategies and reduced the number of spatial and temporal replications to tackle this problem with the limited amount of funds we had.

An extended winter season this year also delayed the field season and extended our stay in the field thus incurring additional costs.

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

- a) *Distinct traditional grazing practices and the recent changes.* Grazing in this landscape is characterised by seasonal migration. Livestock is grazed in high altitude grasslands, called *tach*, from summer (April) till the beginning of winter (October). Livestock is brought back to villages during October, and the whole winter is spent in the village grazing grounds called *ghasni*. Every village has its own *ghasni* as well as a favourite *tach*. Since the formation of Great Himalayan National Park in 1999, many of these villages are restricted from entering their allotted/traditional grazing grounds which is now within the National Park. As a result, livestock from these villages are now forced to graze in *tach* belonging to other villages. This has resulted in a very high density of livestock in a few *tach*. Villagers expressed a concern over such kind of grazing, as they believed that it has resulted in over-grazing of these sites leading to deterioration of vegetation.
The use of fire was mainly restricted to village grazing grounds, *ghasnis*, and fire was not used at high altitude grasslands.
- b) *First attempt to address the consequences of conservation efforts.* This is the first study attempting at evaluating the success of conservation efforts in the landscape, in terms of recovery of ground vegetation after the declaration of the national park in 1999. We tried here to compare our data with previously collected data on ground vegetation before grazing restrictions were imposed. We documented 95 species of ground flora, herbs, shrubs and grasses, from 170 transects laid across different grazed and ungrazed high altitude grasslands. We found an increase in naïve number of species in both grazed and ungrazed areas when compared with the previously collected data. This comparison also revealed a complete change in ground vegetation composition in both grazed and ungrazed areas. We need more data to derive any conclusions regarding the effectiveness of national park, as we suspect that the observed changes in species number and composition could be an artefact of inadequate representation of seasonal variations in species composition in both the surveys.
- c) *Provides a rationale to revisit our conservation strategies.* The maximum numbers of ground floral species, 38 and 37, were observed in ungrazed high altitude grasslands. The lowest number of species, 15, was observed in a grazed high-altitude grassland. However, we didn't find a correlation between grazing intensity and naïve number of ground floral species in the landscape. This may be because of the influence of other environmental factors on vegetation characteristics in the area. Among the measured parameters, we found elevation to be an important factor in determining the species richness in the landscape. Naïve number of species increased along with elevation. We also found area of the grassland to be influencing number of ground floral species observed, and this number increased with the size of the grassland. We

did not find any significant influence of over-grazing and frequent fires on ground vegetation composition. Even the *tach* which had the maximum intensity of grazing had a high number of species, 36, and we found vegetation not to be significantly different across gradients of fire in the village grazing grounds. An earlier study in the area (Badrish, 2000), before the grazing restrictions were imposed, did not observe any significant difference between grazed and un-grazed sites (Badrish, 2000). Our results indicate that these grassland systems are far more complex than what was known earlier and factors other than grazing and fire also play a role in determining their structure and composition. Thus, forcing us to rethink our conservation strategies in this landscape. In particular, it raises questions regarding the best approaches to conserve biodiversity in these landscapes. We may need to adopt different management strategies for different elevation ranges and soil nutrient and micro-microclimatic conditions. A long-term study within an experimental framework which could simulate the traditional grazing practices and take in to account other environmental factors may provide much important data for determining grazing restrictions and acceptable levels of grazing in the landscape.

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

As we aimed at developing better management practices to ensure the persistence of existing floral-diversity and livelihood of local people in the long run, we involved local communities throughout the project period. Discussion of the project with the local NGO, BTCA (Biodiversity Tourism and Community Advancement Society), was very helpful in designing our study. We identified the spatial distribution and intensity of grazing and fire in the landscape with the help of discussions with the local people, which formed the basis for further field surveys. All our field staffs belonged to the local community and were members of BTCA. They are now trained in using of GPS and collecting data. We had discussed our findings with the local communities, and we expect to develop robust experimental designs and conservation strategies with the inputs and active maintenance of these sites from local communities and the results of this study.

5. Are there any plans to continue this work?

Yes. We do have plans to continue our work in this landscape. A long-term study in this landscape will definitely help in understanding fire and grazing relationships and the systems shaped by these two factors.

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

An interim project report has already been submitted to the Himachal Pradesh Forest Department highlighting the major findings of our work. The objectives and key results of the study were presented, through poster and orally, at the Annual Research Seminar of FERAL (Foundation for Ecological Research Advocacy and Learning) held in Pondicherry on July 2012.

A detailed final report will be submitted to the Forest Department and the Rufford Small Grants Foundation. The report will also be made available on the FERAL website (www.feralindia.org). In the coming season we will share our results with the local communities through interactive meetings. In addition, we are planning to disseminate the project findings through peer-reviewed

journals and popular articles. The results will also be presented in local and international seminars and conferences.

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

The RSG was used over a period of 18 months from July 2011 to December 2012. Initially the work was planned for a period of 14 months (from July 2011 to August 2012). We had to extend the work for four more months (September to December 2012) due to unforeseen difficulties.

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 | 448 | 399 | 49 | We mostly used economic classes for both bus and train, thus, bringing down the travel cost. |
| Lodging | 756 | 813 | -57 | The prolonged winter extended our stay in the field thus increasing the cost incurred towards lodging facilities. |
| Equipments | 28 | 21 | 7 | We used locally made materials and reduced the cost over equipments. |
| Local transport/ vehicle rent | 425 | 371 | 56 | As there were very few motorable roads in the study area, local travel incurred a cost less than we expected. |
| Salary: field assistant wages | 986 | 1236 | -250 | A sudden raise in the local wages affected our sample strategies as well incurred more cost. Money saved under other budgets were utilised for this purpose. |
| Personal cost: Researcher's living expenses | 1907 | 2297 | -390 | An extension in project duration also meant that researcher had to spend more time in the field, increasing the living expenses. Money saved under other heads was used here. FERAL also helped the researcher in the field by providing required monetary support. |
| Personal cost: Living expenses and honorarium for co-researcher and volunteers | 754 | 393 | 361 | We did not use many volunteers as we planned to utilise this amount to pay field assistant salaries and other living expenses. |
| Printing | 27 | 8 | 19 | As mostly electronic copies of |

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|-----------------------|------|-------------|------|--|
| | | | | documents were used to disseminate the results, we did not spend much money in printing. |
| Shipping and postage | 69 | 0 | 69 | As most of the communication took place through electronic media and no costly equipments were imported, no cost involved in shipping and postage. |
| Supplies and services | 340 | 347 | -7 | The slight difference is due to changes in estimated and received exchange rates. |
| Contingencies | 260 | 260 | 0 | - |
| Total | 6000 | 6145 | -145 | FERAL helped with monetary support to meet this surplus cost incurred in the field |

Estimated exchange rate - £ 1= Rs. 74; Exchange rate at the time of receiving: £ 1= Rs. 71.18

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

As stated earlier, there is a need for permanent experimental plots in the landscape to answer several of the questions that could not be answered in the present work. Our preliminary results indicate that these grassland systems are far more complex and other than grazing and fire a number of other parameters play a crucial role in vegetation structuring. Understanding this dynamic needs long term experimental studies, which will be based on the results of present work.

This will help in developing better grazing and fire management practices in the Himalayan landscape.

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

RSGF logo was used in the poster presented during the FERAL Annual Research Seminar held on July 2012. RSGF logo was also used in all the presentations given at the forest department and to the local communities.

The support provided by the RSGF was well acknowledged by the researchers in all the reports submitted to the government authorities. We encouraged several students and young researchers, both national and international, to apply for RSGF grants. We consider RSGF as a good opportunity for the young researchers to begin their career and will help other researchers in applying to RSGF.

11. Any other comments?

It was a nice experience to work with RSGF. I would like to thank RSGF for their constant support throughout the study period.