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	Md. Qumruzzaman Chowdhury
Project title	Assessing the diversity of national red listed vascular plants and hotspots identification at Rema-Kalenga Wildlife Sanctuary, Bangladesh
RSG reference	11191-1
Reporting period	February 2012-September 2012
Amount of grant	£4786
Your email address	qchowdhury@gmail.com
Date of this report	18-2-2013

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 quantify the red listed species diversity in Rema-Kalenga Wildlife Sanctuary			X	We identified total of 66 red listed vascular plants of 35 families and 55 genera in the study area.
To explore their distributional patterns in different habitats within the PA			X	Diversity patterns of red listed vascular plant species were identified both in natural and plantation forests.
To identify richness and rarity hotspots within the PA			X	We identified five rarity hotspots in each of the plantation and natural forests.

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

The study sites are situated in very remote places. Hence, we faced accommodation and security problems during data collection. However, Bangladesh Forest Department's local staffs helped us to overcome these problems.

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

I. Red listed vascular plants in Rema-Kalenga Wildlife Sanctuary

The status of all species was assessed using the National Red List Criteria. We found a total of 66 red listed vascular plants of 35 families and 55 genera in the Rema-Kalenga Wildlife Sanctuary (Table 1). Among the families, Anacardiaceae, Arecaceae, Euphorbiaceae, Moraceae and Verbenaceae are the threatened species rich families. Examples of two species are shown in Figure 2.

II. Diversity and distributional patterns of red listed vascular plants in different habitats of the PA measured

The distribution of red listed vascular plants reveals that in particular the plantation forest consists of 47 species of 42 genus and 28 families, whereas the natural forest has 17 unique species. Highest richness value (18) was found in plot 2 of natural forest and lowest value was observed in sample plot 4 (Fig. 3a). Richness value ranged from 0 to 14 with a mean value of 5.32. In terms of alpha diversity (Shannon Index), mean values were 1.64 and 1.07 for natural and plantation forests, respectively (Fig. 3b). Natural forest had the highest alpha diversity value (2.64) compared to the value of plantation forest, which makes up 2.43 only.

III. Distribution of hotspots in Rema-Kalenga Wildlife Sanctuary

We identified five rarity hotspots from each of the plantation and natural forests. In comparison to the plantation forests, threatened species number was much higher in the hotspots within the natural forests. The threatened species numbers within the identified hotspots are mapped in the Figure 4.

Table 1. Red listed vascular plants in Rema-Kalenga Wildlife Sanctuary

Family	Genus	Scientific name	Life form
Acanthoceae	*Justica*	*Adhatoda zeylanica*	S
Anacardiaceae	*Mangifera*	*Mangifera longipes*	V
	Mangifera	*Mangifera sylvatica*	V
	Semicarpus	*Semicarpus anacardium*	T
	Spondias	*Spondias pinnata*	T
Apocynaceae	*Alstonia*	*Alstonia scholaris*	T
	Holigrana	*Holigrana longifolia*	T
	Willoughbeia	*Willoughbeia edulis*	V
Araceae	*Aglaonema*	*Aglaonema hookerianum*	H
	Homalomena	*Homalomena aromatica*	H
	Steudnera	*Steudnera colocasioides*	H
Arecaceae	*Calamus*	*Calamus tenuis*	C
	Daemonorops	*Daemonorops jenkinsiana*	C
	Didymosperma	*Didymosperma nana*	C
	Liculata	*Liculala peltata*	Palm
Bignoniaceae	*Oroxylum*	*Oroxylum indicum*	T
	Bombax	*Bombax insigne*	T
Caesalpiniaceae	*Cassia*	*Cassia fistula*	T
	Cassia	*Cassia nodosa*	T
Clusiaceae	*Garcinia*	*Garcinia xanthochymus*	T
Combretaceae	*Terminalia*	*Terminalia bellirica*	T
	Terminalia	*Terminalia citrina*	T
Dilleniaceae	*Dillenia*	*Dillenia indica*	T
Dioscoreaceae	*Dioscorea*	*Discoreaprazeri*	V
Dipterocarpaceae	*Shorea*	*Shorea robusta*	T
Elaeocarpaceae	*Elaeocarpus*	*Elaeocarpus robustus*	T
Euphorbiaceae	*Antidesma*	*Antidesma ghaesembila*	S
	Baccaurea	*Baccaurea ramiflora*	T
	Macaranga	*Macaranga denticulata*	T
	Macaranga	*Macaranga indica*	S
	Macaranga	*Macaranga peltata*	T
	Phyllanthus	*Phyllanthus embelica*	T
Fagaceae	*Castanopsis*	*Castanopsis indica*	T
Fabaceae	*spatholobus*	*Butea roxburghii*	V
Guttiferae	*Garcinia*	*Garcinia cowa*	T
Lauraceae	*Litsea*	*Litsea glutinosa*	T
Lecythidaceae	*Careya*	*Careya arborea*	T
Leguminosae	*Albizia*	*Albizia lebbek*	T
	Albizia	*Albizia lucida*	T
	Entada	*Entada phaseoloides*	V
Liliaceae	*Crinum*	*Crinum defixum*	H
Meliaceae	*Chukrasia*	*Chukrasia tabularis*	T
Menispermaceae	*Pericampyllus*	*Pericam pyllusglaucus*	V
	Tinospora	*Tinospora crispa*	V
Moraceae	*Fiscus*	*Fiscus glomerata*	S

	Fiscus	*Fiscu srecemosa*	T
	Fiscus	*Fiscus religiosa*	T
Musaceae	*Musa*	*Musa rosacea*	H
Myrtaceae	*Syzygium*	*Syzygium wallichi*	T
Orchidaceae	*Cymbidium*	*Cymbidium aloifolium*	O
	Vanda	*Vanda teres*	O
Poaceae	*Neonauclea*	*Neonauclea sessilifolia*	T
Rubiaceae	*Paedaria*	*Paedaria foetida*	H
Rutaceae	*Zanthoxylum*	*Zanthoxylum rhetsa*	T
Sterculiaceae	*Pterospermum*	*Pterospermum acerifolum*	T
	Sterculia	*Sterculia villosa*	T
Thymeleaceae	*Aguilaria*	*Aguilaria agallocha*	T
Vaticeae	*Vitex*	*Vitex quadriangularis*	V
Verbenaceae	*Gmelina*	*Gmelina arborea*	T
	Vitex	*Vitex diversifolia*	T
	Vitex	*Vitex peduncularis*	T
	Vitex	*Vitex pubescens*	T
Zingiberaceae	*Amomum*	*Amomum aromaticum*	H
	Amomum	*Amomum corynostachyum*	H
	Hedychium	*Hedychium thyrsiforme*	H
	Curcuma	*Curcuma amada*	H

Fig. 1 Alstonia scholaries

Fig. 2 Spondia spinnata

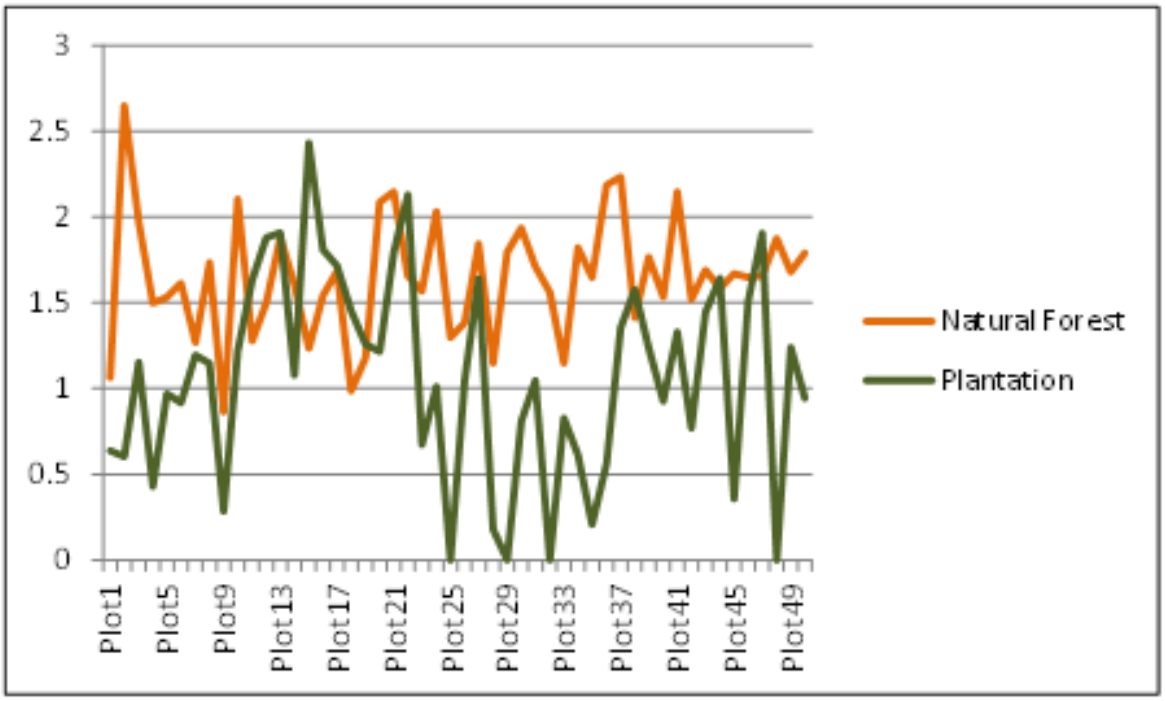

Fig. 3a Threatened species richness patterns in the natural and plantation forest

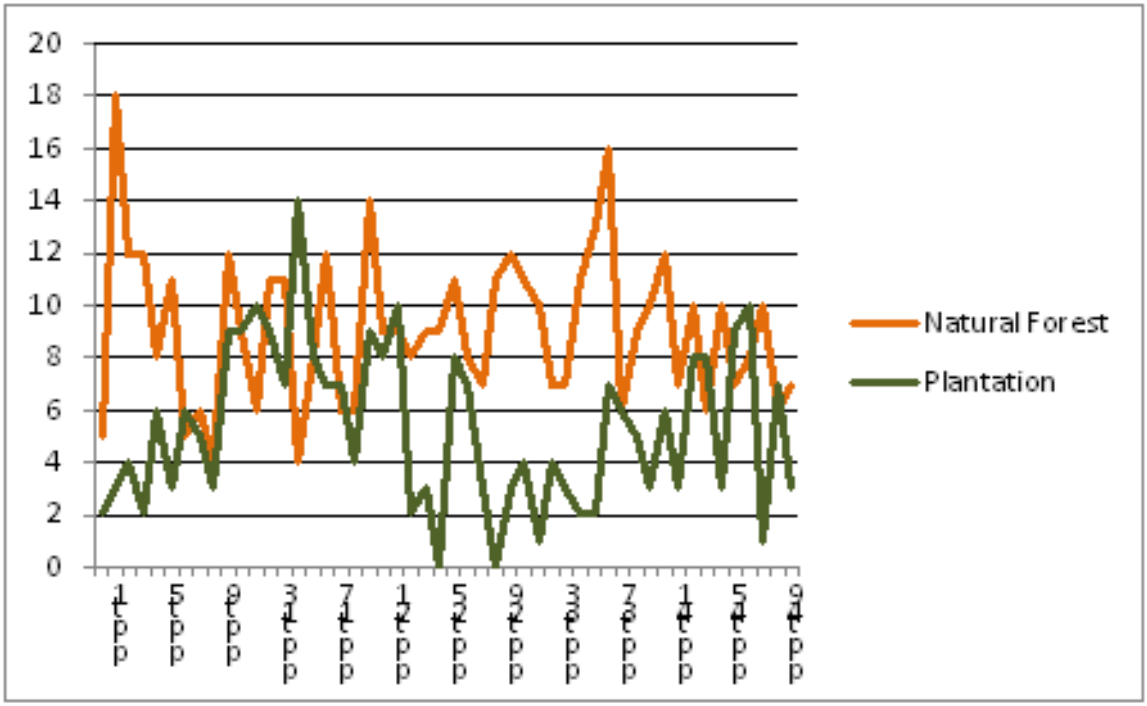

Fig. 3b Threatened species alpha diversity patterns in the natural and plantation forests.

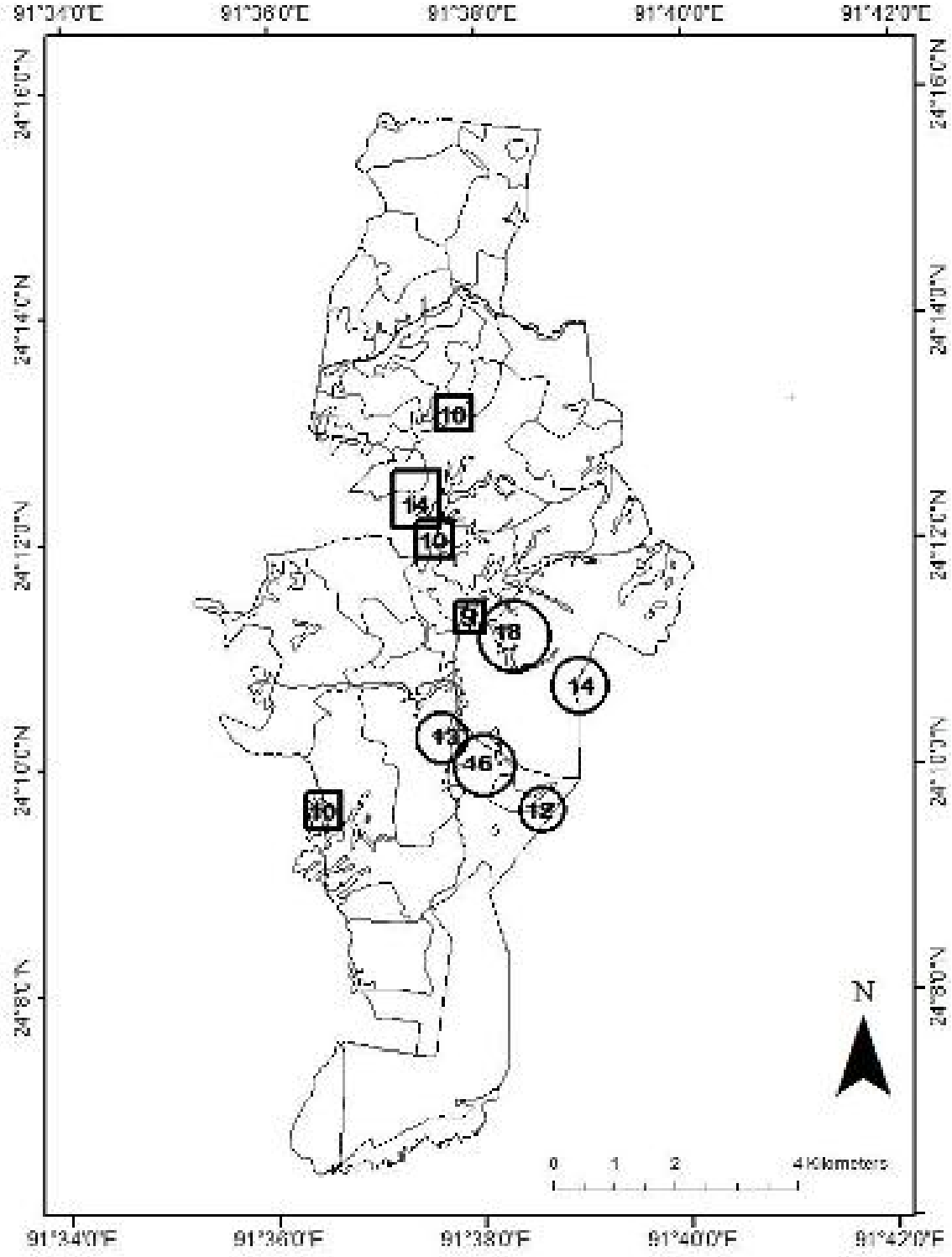

Fig. 4 Hotspots in the plantation (boxes) and natural (circles) forests.

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

During the field survey we found that most of the red listed plant species are threaten by intensified fuelwood and non timber forest products (NTFP) collection and intensive grazing activities. Moreover, the illicit felling and conversion of forestlands into agricultural land is a serious threat leading to habitat loss and forest degradation. We therefore did a community consultation with local people on the red listed vascular plant species in the PA. The present study initiated a better understanding and awareness on red listed vascular plants to the local communities regarding their conservation value and how this effort can help them to enhance and secure their livelihood.

5. Are there any plans to continue this work?

This work documented the red listed vascular plant species and their distribution patterns in the PA that will assist in long term monitoring of the plants. Moreover, identification of hotspots will guide the decision makers in constructing clear and practical strategy for biodiversity conservation in the PAs. We showed positive feedback of conservation of these species to the PA management authority and they are planning to conserve the identified hotspots of red listed plant species.

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

The key findings of the project were shared through a workshop with officials from Bangladesh Forest Department, graduate students from two universities and local NGOs. Moreover, we planned to disseminate the results to wider range of audience through peer reviewed publications in relevant journals. In this context, we already submitted one article titled on "Tree rings in Bangladesh - a Synthesis" in *Tree-Ring Research* journal.

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

The RSG funds were used over a period of 8 months. In this project, we made a baseline survey of red listed vascular plant species in the protected area. In addition, quantification of diversity and distributional patterns of the species in different habitats within the PA will help in implementing habitat specific conservation actions. We are also planning to apply for additional funds (a booster grant) from the RSG to support expansion the project into the surrounding forests area.

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.

Total budget of this study was £6531 and RSG grant was £4786. Rest of the amount covered by the Research center of Shahjalal University of Science and Technology, Bangladesh.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Bank fees	30	30	0	
Research Material and equipment procurement				
Digital Camera	310	315	-5	Adjusted with item no. 8
USB 16 GB each @15 2 Nos.	30	33	-3	Adjusted with item no. 8
Books, maps and relevant documents	400	450	-50	Adjusted with item no. 18

Herbarium materials	100	120	-20	Expended from other than the RSG grant
Raincoat and Rain boot	20	25	-5	Adjusted with item no. 10
Diameter and running tape 2 Nos.	40	42	-2	Adjusted with item no. 8
First aid box	40	30	10	Adjusted with item nos. 2, 3 & 7
Stationery				
Paper, pencils, pen, marker, stand, drawing sheet etc.	70	75	-5	Adjusted with item no. 10
Printing and communication				
Xerox and Computer printing	100	90	10	Adjusted with item nos. 6 & 9
Phone and fax	35	40	-5	Expended from other than the RSG grant
Honorarium for personnel				
Field Assistants 2 Nos. @ 85 £/ month (8x85)	1360	1360	0	
GIS technician 1 no. @ 85 £/ month (1x85)	85	85	0	
Travel				
Travel to field; 2 trips each month (2x8) plus 12 more trips by Research Assistants, Total 32 trips	1200	1313	-113	Three more travel for field assistants to the field & adjusted with item no. 19
Local transport	300	340	-40	Cost increased due to 3 more trips and adjusted with item no. 19
Lodging and food				
Accommodation	900	990	-90	Actual cost increased due to 3 more trips and adjusted with item no. 19
Food	600	668	-68	Extra cost adjusted with item no. 19
Completion workshop				
Workshop	600	550	50	Adjusted with item no. 4
Miscellaneous; Unanticipated cost due to price fluctuation (5% of the total cost)	311			Increased cost has been adjusted with item nos. 14-17.
Total budget	6531			
Total expenditure		**6556**	-25	Additional costs covered from university grant
Total RFG grant received	4786			

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

The project results have formed the base line to go for further important ecological research and conservation actions. Immediate research is needed to model the distribution of individual

threatened species due to environmental changes. Moreover, extensive ecological research with a functional trait-based approach is urgent to understand how local habitat and climatic variations are influencing the functions of the threatened species. The findings of these researches would help the conservation agencies to take very specific actions to preserve these vulnerable species.

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?

Yes – the RSG logo was used in the RSG final report and forwarded to the RSG office, UK. In addition, we will display the RSG logo in the presentation slides of the workshop and community consultation meetings. In addition, the RSG grant was also acknowledged in the submitted article to the *Tree-Ring Research* journal and will forward to the RSG web site after publishing.

11. Any other comments?

We wish to thank once again to RSG for their generous funding. It has made a tremendous difference to what we have been able to achieve in the past year. The fact is that we gained a clear understanding on the occurrence and distribution of red listed plant species in the Rema-Kalenga Wildlife Sanctuary, Bangladesh.