

## 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](mailto:jane@rufford.org).

Thank you for your help.

**Josh Cole, Grants Director**

Grant Recipient Details	
Your name	Firmann Aldy
Project title	Identifying critical mutualisms between a threatened megaherbivore (Sumatran rhinoceros) and a threatened ecosystem
RSG reference	10108-1
Reporting period	July 2011 – June 2012
Amount of grant	5628
Your email address	<a href="mailto:firmandid@yahoo.com">firmandid@yahoo.com</a>
Date of this report	30 September, 2012

**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
Identify plant species eaten and dispersed by rhinoceros over one fruiting season		X		It was difficult to obtain reliable information on fruiting seasons in the study region and local people reported that the season is unreliable. According to the information we had prior to the study our study period should have overlapped the fruiting season. However, few plant species were fruiting at that time and we were only able to identify eight plant species for which rhino ate the fruit (61% of plant species that we recorded to fruit at that time).
Initial description of seed deposition patterns		X		We were more successful at finding rhinoceros dung than we expected. We found 48 dung, most of which were in forest (60%) and shrub habitat (31%). Ten latrines were found (areas where rhinos defecate repeatedly), and 35% of sampled dung were in these latrines. Since we missed the peak fruiting season, we gathered data primarily on dung deposition rather than seed deposition.
Identify plant species that may be dependent on rhinoceros for dispersal		X		Seven of the plant species whose seeds were found in dung were small to medium in size (5-9 mm long) and were probably dispersed by other animals. One species had larger seeds ( <i>Garcinia mangostana</i> 20 mm long), but this species is unlikely to be reliant on rhinos for dispersal, since other animals consume it at other sites.
Creation of a reference fruit and seed collection		X		We collected measurements and descriptions for 13 plant species that fruited during the study period. These were all we found fruiting at that time, but we have indicated this is partial achievement because it was not the peak fruiting season.

Collection of DNA samples			X	We successfully located 16 dung (33% of all dung) that were less than 2 days old. DNA samples were collected from these and the samples have been stored for analysis later.
Trial of camera trapping (cameras funded from elsewhere, but set-up was possible because of the Rufford grant)			X	After receiving funding from Rufford we decided to purchase cameras to trial their use for the follow-up study. Funding for the cameras was given to Ahimsa Campos-Arceiz from the University of Nottingham Malaysia Campus, but the trial was conducted at the same time as data collection on dungs. The trials were successful, and have helped in planning the follow-up study.
Overall objective of determining whether a study on rhinos and seed dispersal is feasible.			X	Although we missed the peak fruiting season at the study site the pilot study fulfilled the objective of determining whether a longer term study is feasible. We were able to determine the best study regions to conduct the study and we know that a longer-term study will generate sufficient data to evaluate the role of rhinos in seed dispersal. Observations during the pilot study also suggest that rhinos play other important ecological roles, and we believe this study should be broader to encompass these.

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

The main difficulty we found during the project was determining the peak fruiting period prior to the study. Information on this was sparse and even after the study began local people reported that fruiting periods were often unreliable. Although this meant few data were collected on seed dispersal during the study, the fact we were able to locate numerous dungs ensured the study was valuable. Since we spent less time than anticipated counting and measuring seeds, we maximised the information we gained from the pilot study by collecting data on other signs generated by rhino (feeding on vegetation, footprints, wallows) and setting-up the camera traps; in total we found 138 independent signs of rhino activity and these have been invaluable in planning the follow-up study.

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

(i) *Preliminary evaluation of the potential reliance of other biota on the Sumatran rhinoceros.* Observations made during the pilot study made us aware of the potential importance of Sumatran rhinoceros as ecological engineers – through their impact on vegetation, trail formation and maintenance of wallows as habitat for other animals. We plan to expand work in this area in the future.

(ii) *Evaluation of feasibility of a longer-term study on the ecological role of Sumatran rhinoceros.* Sumatran rhinos are threatened and we were uncertain whether a long-term study was feasible because the encounter rate with rhinos and /or their sign would be very low. This pilot study showed that a study running over at least one year is feasible and would be successful. It allowed us to determine the best regions for study, and helped develop suitable study methods.

(iii) *Collection of seed dispersal information.* Rhinoceros are not frugivores and we expected their seed dispersal role to be most prominent when fruit was abundant. Hence, the fact we found a variety of seeds in rhino dung, even though our study period did not coincide with a peak fruiting period, suggests that rhinos are likely to play an important role in seed dispersal. Further, a significant number of dungs were deposited in latrines: this is a dispersal mode unique to rhinos and will influence seed and seedling persistence.

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

Our field team always included a tracker from the local community, forest department officer, and a police officer. We were also regularly accompanied by two volunteer undergraduate students who were trained in field ecological techniques. Although our study did not have a big impact in the local community, interaction with our team ensured that the local community benefited to some extent (income and capacity building) from our presence and activities.

**5. Are there any plans to continue this work?**

We have plans to conduct a year-long study on the ecological role of rhinos, and we would eventually like to expand this to include the other megafauna at the study site. We are currently applying for funding.

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

Although we gathered very important data to understand the potential role of rhinos and to plan follow-up studies, we believe the data collected so far is insufficient to ensure a peer-review publication. Also, due to the 'Critically Endangered' condition of Sumatran rhinos and the still on-going poaching pressure, we have refrained from publicising this study with the general public (e.g. through websites, social media, etc.). Our results have been shared with the local authorities, especially with Way Kambas National Park authorities and with YABI (Yayasan Badak Indonesia), the Indonesian Rhino Foundation.

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

The pilot study was conducted over 4 months spread between 10 July and 22 November. Initially, we planned to spend 4 continuous months, but the lack of fruiting plants and the extreme drought in the forest at the end of dry season meant this was no longer the ideal plan. We spread-out data collection over a longer time frame to allow the cameras to be used as well as collect the planned data on dung deposition.

**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
Research permit (LIPI, PHKA (SIMAKSI), and Police)	95	140	-45	
Research assistants (2)	950	950	0	190 /month per assistant. One assistant was hired for 3 months and one for 2 months (190 x 5).
Ranger	500	500	0	125 / month x 4 months
Porter	148	200	-52	50 / month x 4 months
Domestic flights	320	450	-130	Flight expenses increased due to the fact it was not productive to work over the drought period.
Ground transport to field station	188	250	-62	
Car rental and fuel	608	450	+158	Sites accessible by car had less rhino activity, so work was centred at alternative sites.
Boat rental and fuel	428	450	-22	
Accommodation	246	144	+102	
Food	992	670	+322	Time spent in field was reduced, so overall food costs were less. However, funding was primarily used for increased equipment expenses and some food costs were covered by personal funds.

handheld GPS Garmin GPSMAP 62S	241	300	-59	We planned to buy equipment from abroad and send to Indonesia but had insufficient time. Hence, equipment was purchased within Indonesia and was more expensive.
1 x water and shock proof digital camera (+extra battery, memory card)	178	292	-114	
2 x 6-inch calipers (e.g. Carrera Precision)	30	35	-5	
1 x 12-inch calipers (e.g. Carrera Precision)	24	30	-6	
1 x electronic portable balance, 600 g x 0.1g (e.g. Ohaus Scout Pro Portable)	148	21	+127	Ohaus brand not available so a cheaper local brand was bought.
1 x spring balance pesola, 5 kg x 50 g (e.g. Macro Line Spring)	70	80	-10	
1 x sieve kit (e.g. Hubbard 4-sieve kit)	43	90	-47	
Camping equipment (to stay at remote sites)	125	130	-5	
Data collection supplies	245	420	-175	This includes the extra purchase of batteries for the camera traps.
Maps of study area and stationary supplies	49	54	-5	
<b>Total</b>	5628	5656	-28	

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

Before our pilot study was conducted the little information available on the ecology of Sumatran rhinos dated from the 1970s. Since then rhino populations have been in serious decline, and the species is disappearing before we can appreciate the critical roles they play in the ecosystems they inhabit. We were initially disappointed that we missed the peak fruiting season at the study site and, consequently, seed dispersal information gathered was limited. However, the pilot study was invaluable in showing us that a study on the ecological role of rhinoceros was both important and possible. The next step is to obtain funding for and conduct the full-year study on the rhinoceros. We have planned the study, and its results will show that rhino conservation is valuable for both the preservation of the species and the ecosystems in which it exists. This is the overall message we aim to present from the study when we have sufficient data to support this. Once the full-year study is in progress, we will seek opportunities to expand the study to the other threatened megaherbivores in the study area. Given the local extinction of these megaherbivores from most habitats in Asia we believe it is urgent to understand the roles they play, and eventually convey their importance to scientists, conservation workers and local people.

**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?**

No, we have not used the logo yet.

