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	Nadine Ruppert
Project title	Spatial and temporal use of oil palm plantations by wild *Macaca nemestrina* and its implications for mitigating human-wildlife conflicts
RSG reference	16978-1
Reporting period	February 2015- February 2016
Amount of grant	£4516
Your email address	n.ruppert@usm.my
Date of this report	2nd February 2016

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

Objective	Partially achieved	Fully achieved	Comments
Recording of general behaviours of Macaca with focus on feeding and foraging in oil palm plantations by using scan and focal protocol and GPS mapping.		Daily observations of feeding behaviour by means of scan and focal animal sampling in the plantation have been made and analysed.	This past year's survey on the feeding and foraging behaviour of wild macaques in oil palm plantations helped us to shed light on the common misconception that they are a pest to oil palm. In addition to the calculation of their average impact on oil palm harvest, which is minor, we observed an interesting new fact: they hunt for rats, which are in fact the real oil palm pest.
Recording of general behaviours of Macaca with focus on feeding and foraging in adjacent virgin jungle forest by using scan and focal protocol and GPS mapping.		Daily observations of by means of focal animal sampling have been made in the forest and were analysed.	While the macaques forage in the plantation daily they spent the majority of their time in the forest. Daily data recordings and comparison of behaviour between forest and plantation were made. A GIS map is currently being produced that shows the home range area within forest and plantation. Also the average temporal amount they spent in both habitats has been assessed with an average of 2/24 hours a day in plantations).
Raising awareness amongst farmers and community to avoid human-wildlife conflicts.	During several public talks to the community (including oil palm plantation owners) and academic conference presentations (national and international) I presented our current data.		With the newly found fact of rat hunting, I would like to further my study into this topic, to assess the positive impact of macaques as means of pest control. Once sufficient data is available I'd like incorporate this strong argument into real lobby work at the scale of approaching oil palm companies.
Radio-tracking and habituation of more groups.	Full habituation of a second was not successful as one		We are still working towards habituating more groups, however we also needed to find

	group that was collared could not be followed regularly due to very steep rocky terrain within their home range were we lost signal. Apart from that, we were not able to catch a female of another group as either only males entered our traps or none at all, seemingly the targeted group became too smart to enter our traps. The trapping efforts are still in progress but we focus on the habituation of an un-collared group within the home range of our study group that is already allowing us to follow them.		a balance of time budgeting for data recording for this project and following/ tracking/ habituation of a second group during the last year. As we learned from the first group, full habituation can take up to 2 years and is a long-term intensive effort. Thus, we hope to be successful within another year's time.

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

Habituation of a second group by radio-tracking could not yet be carried out as planned but efforts to catch a female and collar her are still in progress. Some field assistants from abroad who signed up as volunteers did not come or got injured, so I had to employ some local students on a short-term basis to run a continuous data sampling. Data collection in the field is always challenging and we faced periods where we could not follow the monkeys into the plantations as they were chased away by workers or intimated by ongoing construction work at the site. However, during the one year course of this study we were able to retrieve a strong data set on the feeding behaviour in the plantations, and also forest. On the whole, I am satisfied with the progress and outcome.

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

In short, our data shows that:

1) The behaviour of the macaque group varies significantly between habitats, with more time being spent on feeding and foraging in the plantation than forest; while they mainly use the forest for social activities and resting.
2) Although (1) implicates a high amount of feeding in the plantations, their diet choice there is very variable, including oil palm fruits and seeds, arthropods, plants and mammals. Their actual impact on the total monthly oil palm harvest within their home range is minor, as calculated from our data set, it is only 0.64%.
3) A very interesting finding is that the macaques actively hunt for rats in the plantation. As during the observations in the plantations we came across almost 70 events of rat hunting. We will now put more focus on that for future data recording in order to argue for pigtailed macaques as pest control rather than pests.

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

We employed several local short-term field assistants who helped with establishing trails in the forest, looking for the monkeys once we lost them and assisting with technical/ mechanical help and local students who learned about primate behaviour and ecological field studies. International student volunteers who came to assist for the project also rented accommodation from the locals and thus contributed to their income. During public talks at the study site I involved local villagers and NGOs to organise primate awareness and education campaigns in the area that are still ongoing, for example there is a “Don’t feed the monkeys”-campaign initiated by my talk to the community at a close mangrove tourist park currently ongoing where macaques became a nuisance to the people.

5. Are there any plans to continue this work?

Yes, although the fist data set is satisfactory by showing a low impact of this species on oil palm harvest, I would very much like to deepen our understanding of their impact on the rat population in the plantation. If we can see a decimating impact on the rat (pest) population, we can argue as biological pest control, just like barn owls or leopard cats are already used for pest management in oil palm plantations. In cooperation with the agrobiology branch of my department (USM), which currently has a project on barn owls in plantations, I would like to team up to approach local oil palm companies to suggest biological pest control management strategies.

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

A manuscript of this 1-year project is currently being written and planned for submission to an international primate related journal (IJP) by end of this month. Furthermore, as a senior lecturer at the local university and secretary of the Malaysian Primatological Society and member of several local environmental NGOs I already have published some magazine articles, given several lectures, public talks and conference talks on this topic and will continue to do so in 2016.

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

It has been used from March 2015 until now and the official grant account with my university will close by 31st March 2016, this is when I will have utilised the whole amount for the still ongoing data collection.

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
Equipment (GPS, radio-tracking antenna and receiver, tablets, binoculars)	2595	1500	+1095	Purchase comprised three Garmin MAP 62s GPS units, two tablets and one binocular. The rest of the equipment (as originally applied for) could be provided by the German Primate Centre during the course of this study.
Rent of accommodation for field assistants	1000	600	+400	Rent of international volunteers was paid by themselves, which contributed to lower project costs; for national students and field assistants I paid accommodation from the grant.
Rent of motorbikes for travel to the study sites and camp.	1400	1800	-400	Rates increased as the motorbikes suffered some serious damage due to the daily use in the plantation, where there is no paved road.
Allowance for local field assistants.	0	200	-200	On short-term basis I had to employ additional local assistants as some of the international student volunteers who originally signed up for this project either failed to come or got injured and could no longer carry out the field work.
Petrol for bikes and car to travel to study site/ camp/ town to buy supplies	0	200	-200	Petrol costs were high and I did not take that into consideration during grant application. As it could not be covered by any other means I paid partly by myself and partly from the RSG.
Total	4995 **(received 4516)**	4300	-216	The RSG account is officially administered by my university with which I have to claim the money. This account is still valid/open until 31.3.2016 and I will claim the remaining sum for expenses for the ongoing field work, such as petrol and rent.

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

Continuing data collection on the behaviour of pigtailed macaques to look out for seasonal changes in the feeding frequency at oil palm plantations, which might be correlated to fruit availability in the forest (first assessment of fruiting trees along forest transects is currently being carried out); initiating a mark-and-recapture study of rats in plantations within and outside the macaques' home range to assess the long-term impact of macaques on rat populations; engaging more local students in working with primate as the interest compared to international students who are applying for the project, is still comparatively low; raising more awareness for primate conservation in Malaysia in general, especially with the threat of extinction of some of the moist charismatic species, like orang-utan, slow loris and siamang; lobbying on a larger scale for the possible positive impact, or at least neutral impact**,** of Pigtailed macaques (*Macaca nemestrina*) in oil palm plantations to discourage farmers from hunting them.

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

Yes. Your logo is displayed at my homepage www.macaca-nemestrina.org and Facebook page "Macaca Nemestrina Project", and was used for acknowledgment as cooperation partner and funding institution for this project in several talks: talk at USM-Bio Seminar April 2015, public talk on primate conservation for Malaysian Nature Society (MNS) May 2015, International Biodiversity Conferences USM-Kyoto University September 2015, talk at Malaysian Primatological Society (MPS) Grand Annual Meeting October 2015, USM-DPZ (German Primate Center) student workshop on primates November 2015, talk at USM-Academia Sinica Workshop November 2015, talk to the community on primate conservation December 2015. During every of those talks I raised awareness for this topic and will continue to do so in the coming year.

11. Any other comments?

This projected was also supported by the German Primate Centre (DPZ) and a new MoA with John Moores University Liverpool is currently being drafted.