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	Freddy Pattiselanno
Project title	Wildlife hunting, alternative protein sources and biodiversity conservation on the Bird's Head Peninsula (BHP) of West Papua
RSG reference	10569-1
Reporting period	October 2011 – October 2012
Amount of grant	£5987
Your email address	pattiselannofreddy@yahoo.com
Date of this report	1 December 2012

General description

Study has been conducted in two districts: Amberbaken (non-MPA site) including seven villages and Abun district (MPA site) including four villages. Four villages in Amberbaken can be reached by road, while the rest cannot. Abun site can only be reached by boat. A total of 113 hunter respondents have been interviewed, and 33 hunters are collaborated for hunting take survey. For socioeconomic survey, general 116 respondents (including some hunter respondents) were interviewed to obtain overview of the socioeconomic status of households in the study site. Seven middlemen have been approached and interviewed to gain information on the bushmeat market, market routes and the price of bushmeat products from the site.

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
Effects of population density on indigenous hunting at the BHP			√	An assessment on the difference of population density among villages in study sites could be done although; the density within the site is almost similar.
Effects of access on indigenous hunting at the BHP			√	There are 11 villages in the site, and they distributed at the site with road and no road access. However, during the study, the development of road has passed through some villages that previously have been classified into no road access.
Effects of available alternative protein sources on indigenous hunting at the BHP			√	Sites along the coast site have an alternative protein sources. In Abun district that has been designated as MPA site access to the coastal sources was regulated with the MPA's regulation
Detail achievements of this study will be explained further in the next part				

1. **Hunted species, harvest rate and harvest composition**

   Based on the interview, hunters acknowledged four hunting target that usually hunted in the study sites including deer, feral pig, kangaroo and tree kangaroo. Deer is the most hunting target 51% followed by feral pig 44.7% while kangaroo and tree kangaroo was 3.4% and 0.97% respectively. The GLM test show the population has a significant effect ($P<0.05$) on hunting of kangaroo $P= 0.010$ while available of alternative protein sources has also significant effect ($P<0.05$) on hunting of tree kangaroo $P= 0.030$.

   From the questionnaires we distributed, it was found that the average catch result was varied from one to more than five animals per hunting session. Two to three animals captured per session was dominant by 62.7% and the least hunting result was more than five animals per session. The ANOVA indicates population density, access and available alternative protein sources have no impact on harvest rate.

   During the survey we recorded harvest composition from three collaborated hunters in each village. Seven month results from hunting trips of collaborated hunters were recorded

including event with or without preys. Deer was the most harvest animals (150 individuals) followed by feral pig (125 individuals), cuscus (10 individuals), kangaroo (nine individuals) and tree kangaroo (seven individuals). The GLM analysis shows that interaction between access and population has significant effect on the total harvest composition (P= 0.014). As the most hunted species deer is not only supply the need of animal protein for the household, but also provide the demand of bushmeat market around the BHP areas.

2. Hunting patterns and technique used

Hunting patterns in both districts were similar, because the use of prey were for consumption purpose = 51%, commercial purpose = 37% and further processing = 26%. In the villages that access through road was available, both selling and further processing were commonly done to supply market demand from the nearest town. In addition to the use of meat, hunting was conducted once a week = 63.7%, twice a week = 24.8%, fortnight = 7.96% and others or once a month = 4%. ANOVA for hunting patterns reveal that interaction between access and population have significant effect on further processing of the meat (P= 0.032) and consumption (P= 0.008). Furthermore, population density has a significant effect on once a month hunting trip (P = 0.040).

A variety method is used in hunting and usually hunter used more than one hunting technique. Spear and dog are among the techniques that commonly used by about 29%, hunting using arrow and bow 23%, bamboo trap 11.3% and using guns 6.71%. We also found that from the total of 301 individual animals seized during 7 months harvest survey, 73 individuals were caught using spear and arrow and bow, 62 were trapped, 61 were killed by dog, 30 killed by gun and two by using blade. Chi square test (χ^2 = 62.356) shows technique used in hunting and hunting prey have significant effect on hunting activities (P= 0.00).

In fact using guns are prohibited among the villagers however as the remote sites have become more accessible, hunters can be easily access guns as well. Purchasing guns from the nearest town is more common, or using Army and Police member firearm has been possible. In this study using guns in hunting therefore has been documented. However, money is required to purchase bullet and this sometimes became a limitation to use guns in the sites. Those with handful of money often offer bullets and consequently, catch results are shared between gun owners and bullet owners.

3. Consumption rate and consumption patterns of wildlife

Although it was found that the use of hunting results were more on consumption purpose, meal survey has not been possible to carry out. Therefore the consumption rate in this study was only done by interviewing hunter households. The results indicate venison or deer meat was consumed by 40%, pork was consumed by 37% and others including kangaroo, tree kangaroo, cuscus and cassowary meats were utilise only below 10% of respondents. ANOVA for meat consumption reveal that available alternative protein sources has significant effect on venison consumption (P = 0.024).

In the area where Marine Protected Areas were designated, access to the coast resources was regulated, therefore to provide animal protein source for households, bushmeat consumption is an alternative option. Although we recorded 744 chickens, 111 pigs and 86 goats owned by respondents in the study site, those domesticated animals only consumed in particular

occasion, and mostly used as savings that sold for cash immediately required by households for example, sending kids to school.

Consumption pattern was varies among the sites however, wild meat consumption twice a week was the most common pattern by 49% followed by third a week and forth a week by 37% and 14% respectively. This also indicates population density, access and available alternative resources have no effect on consumption pattern.

4. Contribution of hunting on livelihood productions

From a total of 113 respondents in 11 villages, the major occupation of respondents is farmer 77%. Only 7% of the respondents are hunters. Related to hunting, this indicates agriculture play important role in supporting livelihood productions in the study site, and hunting activities only side activities conducted to gain additional income. This agrees with the socioeconomic survey that presents the average crop land ownership about 135,074m^2 per household. The crop land is planted with cacao, coconut, vegetables, betel, peanut, area nut, cassava and banana. ANOVA for major occupation proves population density has a significant effect on forest gatherers (P= 0.037).

We identify income (cash/month) and additional income, although it was not purely obtained from hunting. An average of IDR 5,558,730 was received as an additional income per month (or equal to US$ 556). Other sources of additional income was received from running small business like kiosk, chainsaw operators, bushmeat middlemen, cacao and coconut processing and others. ANOVA for income received by respondents show that available access to alternative protein sources has a significant impact on total additional income per month (P= 0.020).

Indigenous hunting at the BHP areas in fact providing bushmeat to the nearest market in district of Prafi and two nearest cities, Sorong and Manokwari. In Abun middlemen from other parts of Indonesia, South Sulawesi directly connected to hunters and links the hunting site to the market in South Sulawesi. The use of venison for example is further processing into meat ball that has specific consumer in the city.

ANOVA for meat market routes from study sites demonstrate the effect of access, available alternative protein sources and population density on the route from Amberbaken-Prafi-Manokwari (P= 0.000). In addition, access and available alternative protein sources are also effects the market route from Amberbaken to Prafi (P = 0.034) and (P= 0.012) respectively. Direct route from Amberbaken to Manokwari has also been effected by access (P= 0.002) and population density (P= 0.001).

5. Population densities of prey species

Survey on population densities of prey species have been delayed for several reasons. Firstly, we could not reach the study site because of unfavourable weather along the coast sites. Secondly, the election process in the new regency Tambrau as a part of decentralisation and the implementation of Papuan autonomy law cause the situation around the study site was not conducive enough for collecting data within the forest sites. Another reason is the reliance of local people with their nature makes them not fully trust our visit to the forest sites. The highland part of the site was previously surveyed and proved to be mining spots during the Dutch time.

Survey at Abun was done between July and August 2012 along the four villages in the MPA sites. Number of animals encountered in the sites was transferred into the excel format. Deer was sighted 316 individuals, feral pig 161, cuscus 21, bandicoot 16, cassowary 10 and kangaroo nine. Plots in the map are now in progress. Survey at Amberbaken district was carried out from September to October 2012. Data is now finalising before enter the excel format. Further explanation will be given in point 2.

6. Current practice of taboos in hunting

Like any other forest dwellers, native Papuan also depends on traditional use of plants and animals. Related to hunting activities, cultural reasons have been considered in selecting hunting target. In the study site target animals are selected based on their contribution on household consumption and commercial purposes. Therefore animals with large body (deer and feral pig) mass are preferred. However some indigenous mammals are hunted as well, because they have cultural connection that strongly related to taste preferences.

Amberbaken and Abun ethnic groups accommodate hunting with traditional weapons as it was explained previously in point 2. However, the introduce of guns and easy access to purchase guns with small "pellet" bullets as the area is more accessible through roads, increase the use of guns and indirectly has an effect on guns restrictions. Hunting using fire is strictly prohibited, but chasing and driving animals into the seashore and later killed by dogs are common.

Hunting can only be performed in the clan or tribe's tenure. Those who belong to clan or tribe's member are free to hunt in that particular site. However, outsider or non-tribal member have to authorise first before and they should give endowment to land owner (as a symbol they agree to the community regulation), or compensate by sharing hunting results with landowners. Similar situations have also found in utilise coastal resources.

The establishment of roads that connect both districts with other districts along the coastal site slow but sure will have an effect on the current practice of taboos in hunting. Interaction between locals and people from outside the areas possibly alter the practice of local taboos. Exposed into the bushmeat market and connect with middlemen has also trigger local hunters to maximise harvest by using modern weapons, and sometimes killed precious wildlife in the study site. So far we did not notice the market of valuable birds like bird of paradise, cockatoo and parrots.

Both ethnic groups also acknowledged the presence of sacred forests. Access to these forests is restricted and hunting cannot be performed in sacred forests. Sacred forests were served as the place of the departed spirit of ancestors. Related to the sacred places, we find difficulties in conducting survey on wildlife density as we are not allowed to go deeper into the forest site. Our research plots are finally placed about 2 km from the villages that also allow us to do animal sighting.

7. Socioeconomic of the households

From 116 respondents interviewed for socioeconomic survey, 87% respondents have their own house and about 60% are built with half wood wall. Almost all the house (94%) is connected to electricity, because in all village government provided villagers with subsidized electricity from 6pm to 12pm. Households that have an extra activity like kiosk provide themselves with generator for electricity supply during the day time, because the usually sold cold fresh drink

that need refrigerator. Statistical analysis shows population density, access and available alternative protein sources have no effect on house ownership, however interaction between access and population has a significant effect on electricity connection (P= 0.032).

Household member was ranged between 2 and 9 with an average 5 individual member per household. Adult members (16- <65 years) was about 55% and dependant <16 - >=65 years was 45%.

In terms of land ownership, 81% respondents have their private land that usually used as crop land and only 4% belong to group that have no land. Others types of land ownership are grant and tribe and they share about 8% and 4% respectively. Similarly, based on ANOVA all factors have no effect on land ownership as well.

Based on the educational background, most of the respondents 68% finished primary education; about 30% passed secondary level and the rest 6% reached tertiary level of education. The statistical analysis reveals that access, population density and available alternative protein sources have no effect on educational level of respondents in the study site. Survey by WWF (2011) showed five priorities program recognised that would most help household improve its living conditions: (1) scholarships; (2) improved housing; (3) transportation; (4) agricultural support; and (5) business support although there are some variation amongst communities. In fact, there have been many developments in the villages over the past few years. In particular, the provincial and district governments have been investing much more in the area compared to the past. One such important programme is the Rural Development Strategic Program (RESPEK). The provincial government of Papua established Rural Development Strategic Program (RESPEK) in 2006.

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

Travelling to the sites along the coastal needs more adjustment in terms of weather conditions. In the site where access only available by sea, we have to be more careful for trip planning because unfavourable weather had an effect on our survey. To deal with this situation, we travelled by vehicle into the nearest site that cannot be accessed using road and hired local boat to further trip into the target areas. If the situation is not suitable to sail along the coast walking is another alternative.

Respondents have spent their time mostly in the garden so we need to fix the time to meet them for interview. Utilising time when they have regular prayer meeting in the village is found more helpful to interview respondents. We plan to use PEN questionnaire for socioeconomic survey, however during adjustment interview session take more than 15 minutes to complete and it was too complex to answer the questionnaire. We then modified the questionnaire simpler and using RRA and PRA approaches to gather more relevant information from the field.

In the proposed activity, survey on animal density along the road between the village by cut three transect lines 50 m, 100 m and 200 m from the road side respectively. In reality hunting excursion was done into the forest or vertically from the road. Therefore we set our research plots away approximately 2 km from the village into the forest sites.

Local people in the study site always maintain their relationship with the nature. Some places that cannot be accessed are not allowed to visit, thus we only placed two plots in each village. We have to negotiate to have sampling plots within the forest, because we have to find representative sites that could be used as indicator to assess wildlife density in the village. We are only allowed to sampling the animals away 2 km from the village.

We are also not allowed to stay longer in the forest sites, as during the survey the creation of new regency under the autonomy law trigger local conflicts. Amberbaken district that currently including as Manokwari regency areas, has to be included in new established regency, Tambrau. This situation creates two parties that against each other because of the disagreement with the policies. In concerned with real situation in the field, we consider to delay our study on animal density in the site. We just started our survey between September and October 2012.

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

Firstly, we have a description of indigenous hunting along the coast site of BHP with current reference on the current use of wild animals in Papua. It is useful to have clear picture of the contribution of hunting on local livelihood and the impact of hunting on biodiversity. Although respondents in this study were mostly farmers, they still relied on hunting. Hunting not only provides food but also contribute to local livelihood production along the coast site of BHP. (*See an opinion section in Jakarta Post 16 October 2010*)

Secondly, to some extents, access, population density and available alternative protein sources did not have effect on indigenous hunting along the coast site of BHP. However, with the current dynamics of development in the eastern part of Indonesia we assume there will be impact of previous factors on hunting. Since we started this study there still certain village that cannot be reached by road, but when we finished the study all villages in Amberbaken district have been connected with road. (*See an opinion section in Jakarta Post 20 April* 2012). The creation of new regency has also influence on people mobilisation for job requirements. Results from this study at least give a clear description to both local government and communities to anticipate the change of situation in the future.

Finally, from this study we found the common hunting target were mammals that provided large body mass for both consumption and market demand. Integrating agriculture land with livestock therefore is an alternative that should be considered to reduce the reliant on bushmeat. From the ownership background we found respondents who owned domesticated animals such as chicken, pig and goat. Introducing the livestock program may be helpful to support local livelihood production as the price of livestock meat in the nearest districts and town market was also high (*see our publication in Warta Konservasi Lahan Basah Vol. 20 N0. 2, April 2012; opinion section in Jakarta Post 6 November 2012*)

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

Local communities in the study site fully supported our study. Current situation indicate the approach of middlemen into the areas that previously inaccessible increase over time. Although the road condition is not conducive enough for travelling with manual vehicle or motor bike, middlemen can directly penetrated the remote sites with their means of transport. Along with the road

development, local people are more concerned with the effect of connection to the market on harvest rate. At this point, they expect to have real condition of their hunting activities.

During the survey we had informal discussion with the communities and they plan to design local regulation in controlling hunting activities in the study sites. For example, set quotas for hunting and keep inaccessible sites still to maintain wildlife population. Compensation is another option offered during our informal meeting.

They also recognised the importance of traditional knowledge that really supports wildlife conservation indirectly. Encouragement from special autonomy law 21/2001 is important because it accommodated a system of customary management which regulate the rights and duties of indigenous communities towards their natural resources. In a series of meeting with local government and communities we try to explain the urgent of maintaining a practice of customary "adat" law with respect to their natural resources.

5. Are there any plans to continue this work?

Increasing the number of respondents in particular non-hunter respondents is planning to obtain overall picture of hunting in the study site. At the same time hunting for indigenous mammals in the Cenderawasih Bay will be proposed. This is important because coastal site of BHP and some satellite islands in the Cenderawasih Bay have been designated as MPA sites in Papua. It would be better if we could have comparison of some areas within the MPA sites.

Regular monitoring is also planning to continue record on harvest rates especially those that contribute significantly to the market demand. It is predicted the established road will connect the coastal site of BHP and this will have impact on the future harvest rates. Link from Sorong in the west and Manokwari in the east will be met somewhere in the study site near the future.

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

During the study some information have been shared all through national media (see the appendix). I have also have serious discussions with member of bushmeat group at the JCU Cairns, TESS and overseas to sharing the progress of our research. Information on traditional knowledge in connection with wildlife hunting has been presented in the international conference of Society for Indonesian Biodiversity at the Sebelas Maret University at Surakarta, West Java, Indonesia on 23-24 July 2011 and Society for Conservation Biology Oceania Chapter Charles Darwin University at Darwin, Australia 21-23 September 2012. I have also invited to present paper under the theme of managing tropical forest in Papua in the next Institute of Forester of Australia at Canberra on April 2013. Results of this study will also be published in peer review journals.

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

As it was proposed, field work was planned from October 2011 to June 2012. On June when we had our 3 months initial survey funded by Skyrail, JCU and UNIPA, some relevant information have been collected. Therefore, RSG was firstly used in our field work from December 2011 to January 2012 because of unfavourable weather at BHP. We focused to the Amberbaken site that can be reached by road and maximised the data collection. Volunteer students were still at Amberbaken, when we

started socio economic survey from February to April 2012 at Abun district. Funding from RSG was also used to the survey at Abun as well.

Application for additional funding from SFRT was approved on April 2012, to support our colleague who assisted us in the socio economic survey at Abun until June 2012. Between June and August 2012 we tracked the Amberbaken district again for socio economic survey using RSG, while other team was off to Abun for hunting survey supported by SFRT funding. Other team was carried out animal density study at the same time at Abun used RSG. At Amberbaken ecology survey was delayed from September to October 2012 with RSG as well.

Some data that still need to collect by increasing the respondent number will be continued between December 2012 and March 2013 used SFRT and Skyrail. We expect to extend the study to the satellite island around Cenderawasih Bay by applying next batch of RSG.

For this project, we already anticipated the approval of funding by self funded a literature review and other papers and reports that relevant to our study. We also supported by UNIPA and JCU for initial survey. Although our application for funding was rejected by some donors, this study would have been possible because of support from Skyrail, RSG and SFRT that approved at different stages of our study. This is very helpful to share our expenses for the study. Within this activity, 1 student from Animal Science and 3 students from Biological Science voluntarily involved and used an opportunity to collect data for their research thesis too.

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				
3 Binocular Bushnell Premafocus 12x50mm 17-5012	290	275	15	Purchased at the sale session
12 Garmin eTrex H GPS.	1080	900	180	JCU and UNIPA provided each
12 Wild Country 500,000 Candle Power Rechargeable Spotlights	270	270	0	
5 Energizer Lithium Lead Focusing Headlight	160	160	0	
1 Camera Sony (alpha) DSLR-A390L	350	400	50	Get support from the difference of other equipments
5 Trailmaster Simpson Jumbo Hood Sleeping Bags	175	175	0	Got support from other sources
5 NB Portable Self Inflating Camping Mattress	128	120	8	Discount as outdoor store member
Maps and satellite imagery	150	250	100	Support from other sources
Travel				
Local transport (Manokwari-Amberbaken + 8 villages)	570	650	80	Unfavourable weather lead us to have extra trips

Local transport (Hiring a boat to visit 4 sites @ £ 150)	500	450	50	Sometimes local people accommodated us in their boat when moving from one village to another
Accommodation/Per Diem				
Six months house renting @ £1.60/day	289	200	89	Sometimes we live in vacant house in the village
Six months per diem 5 field staff @ £20/month	500	500	0	Students from Universitas Negeri Papua have been involved
Six months per diem 2 investigators @ £50/month	400	400	0	
Supplies				
Stationery + office supplies, etc. (1 package)	125	150	25	We supplied village government with stationery if required
AA cells for GPS, torches and spotlights and camera	100	100	0	Used as contact items in approaching local guides
Printing /photocopying of data sheets, literature & report	150	150	0	Internet access help us in obtaining relevant literatures
Item	**Budgeted Amount**	**Actual Amount**	**Difference**	**Comments**
Miscellaneous items				
Communications-phone, fax, internet, postage, etc.	150	200	50	Received support from others
Project personnel medical expenses & first aid	100	100	0	
Petrol for generator (18l/night for 120 nights) @ £ 0.32	500	400	100	Petrol only used for traveling with boats and camping in the forest sites
Total	5987	5850	658	£ 1 equal to Rp 14,000 and 15,000 fluctuate during the study. The difference of money exchange in Papua was high sometimes up to Rp 3,000 per £ 1 because we don't have money changer, and relied only to national bank

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

We already have data from the study. Although I plan to increase the respondents for general overview of hunting in each village, the next step is to share information we had by publish the results. We are now preparing articles for publication.

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?

I had used the RSGF logo during the presentation in my institution in Papua, meeting with government as well. In the report to the local government I have also used the logo. In each activity related to this study I acknowledged RSGF.

11. Any other comments?

To continue this study, we are planning to apply for the next batch of RSG