

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	Nguyen Hoang Khanh Linh
Project title	Building database of coastal mangroves by GIS and satellite image for serving conservation and restoration in Duy Xuyen District, Quang Nam Province, Vietnam
RSG reference	19449-1
Reporting period	May 2016 – May 2017
Amount of grant	£5000
Your email address	nguyenhoangkhanhlinh@huaf.edu.vn
Date of this report	16/05/17

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
Building databases and distribution map mangrove systems in Duy Xuyen district.				Most of the mangroves in Duy Xuyen district are distributed in the communes of Duy Vinh, Duy Thanh, Duy Nghia. In 1999, mangrove areas covered 0.84% and occupied in an area of 16.8 ha, 3.2 ha and 6.4 ha, respectively. After 19 years, the area of mangroves deceased strongly and occupied only 0, 58% total area of three communes in an area of 15.4 ha, 1.8 ha and 1 ha, respectively. The result shows that mangrove areas in the Duy Xuyen district are small and scattered. Most of mangroves distributed scattered into clusters along canals, river banks, and the coastal zones. The results are displayed in maps.
Investigating the species composition and structure of mangrove forests in Duy Xuyen district, Quang Nam province				The mangroves in Duy Xuyen district have gone through the environment and distributed across different regions that formed sub-regions with distinct species composition. The species composition of the mangrove flora in the communes varies differently. In Duy Vinh commune, the main mangrove species are: <i>Nypa fruticans</i> Wurmb (dù'a nu'óc), <i>Bruguiera gymnorhiza</i> Lam (vẹt dù), <i>Acrostichum aureum</i> L (ráng), <i>Heritiera littoralis</i> Dryand (cui biển). In Duy Thanh Commune, mangrove species are mainly composed of: <i>Nypa fruticans</i> Wurmb (dù'a nu'óc), <i>Acrostichum aureum</i> L (ráng), <i>Acanthus ilicifolius</i> L (ô rô gai), <i>Acanthus ebracteatus</i> Vahl (ô rô trắng), <i>Excoecaria agallocha</i> L. (giá). In Duy Nghia commune, there

			<p>are different mangrove species, including: <i>Nypa fruticans</i> Wurm (dù'a nu'ó'c), <i>Acrostichum aureum</i> L (ráng), <i>Acanthus ilicifolius</i> L (ô rô gai), <i>Excoecaria agallocha</i> L. (giá), <i>Hibiscus tiliaceus</i> (tra), Rhizophoraceae (dù'a nu'ó'c). The dominant mangrove specie in Duy Xuyen is nypa trees, which are widely distributed: in low tidal areas, in high tidal areas, in the area near the mouth of the river and far from the mouth of the river with low salinity. This is a high adaptive mangrove specie with environmental factors at Duy Xuyen district. Besides eight formal mangrove vegetation, there are also nine plants participating in mangroves at Duy Xuyen district, including: <i>Cerbera odollam</i> Gaertn (mớp), <i>Ipomoea pescaprae</i> Lam (muống biển), <i>Cyperus malaccensis</i> Lam (Cói), <i>Cyperus stoloniterus</i> Vahl (Cỏ cú biển), <i>Cyperus tagetiformis</i> Roxb (lác chiếu), <i>Canavalia cathartica</i> Du Petit. Thouars (đậu cỏ biển), <i>Derris trifoliata</i> Lour (cốc kèn), <i>Phragmites vallatoria</i> Lam (sậy), <i>Sporobolus virginicus</i> Lam Kunth (cỏ cáy). Comparing the results of research on mangrove flora in other localities in Vietnam, the mangrove flora in Duy Xuyen district is low in distribution and vegetation diversity, which is typical characteristic of the lowland vegetation in Central Vietnam.</p> <p>Based on sample plots, the Shannon H 'species diversity index varies from 0.45 to 1.27, with an average of 0.84. Thus, the diversity of species composition in Duy Xuyen district was not high. It shows that the composition of mangrove species here is less abundant. In addition, the Simpson index varies in the standard range from 0.29 to 0.63,</p>
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				with an average of 0.39. It means that the number of individual vegetation is not balance, having dominant species.
Finding the influence of the environmental factors to the mangrove				The environmental factors that effect to the mangrove flora in Duy Xuyen district are the salinity, tide, temperature, rainfall, and soil.
Finding the influence of the human impact on the mangrove system in local				The human factors that effect to the mangrove flora in Duy Xuyen district are the conversion of mangrove areas to aquaculture areas (especially shrimp farming), boat shelter from the storm; river bank erosion; over exploitation mangroves for life; the construction of dykes and dams from salinity; the awareness of local people about the role of mangroves;
Proposing measures for the conservation and restoration of mangrove systems in Duy Xuyen district				Proposing solution to conserve and restore mangroves in Duy Xuyen district: managing mangrove areas based on community; selecting and planting more mangrove species based on the database about mangrove areas that created from satellite image and field trip; planning shrimp farm combined with protecting mangrove; developing ecotourism.

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

The second field trip was delayed over one and half months because of the long lasting rain and storms which increased the timeline of the project, as opposed to the 1-year timeframe.

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

- Built the land cover maps of mangrove areas in Duy Xuyen district in 2017 by the object- oriented method for 10 m satellite image, which helps the local officials update the information about the distribution of mangrove areas.
- The database of mangrove areas was transferred to The Office of Natural Resources and Environment in Duy Xuyen district for logically land use planning, restoring and planting mangroves.

- Raising the awareness of local authorities as well as local people about the rapid loss of mangroves and their role in environmental protection.

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

During the three field trips, the staff at Natural resources and Environment Office and local people accompanied the research group to collect data. Through the field time, the staff have an opportunity to approach the GIS and remote sensing technique in mapping land use cover. Besides, the discussions between staff and research group gave them ideas to protect and sustainable exploit mangrove areas within Duy Xuyen district.

5. Are there any plans to continue this work?

Focusing on planning specific shrimp farming areas and controlling the growth rate of shrimp ponds in Duy Xuyen district. Some specific solutions may be considered as follows: (i) Develop shrimp farming models in combination with mangrove planting; (ii) rehabilitation of mangroves in degraded shrimp ponds; (iii) model for improving shrimp pond design in the direction of forestry-fishery combination; and (iv) Mitigation of mangroves on shore of shrimp ponds.

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

The result of this research will be given to the Office of Natural Resources and Environment, Office of Agriculture in Duy Xuyen district with recommending future actions. Based on the results of research, I have already submitted one research paper to the Journal of Science, Hue University and another paper has been submitted to the GIS National Conference. I hope these papers will be published soon.

- Nguyen Thi Hong Mai, Nguyen Hoang Khanh Linh, (2017), Impact of social factors on mangrove forest management and utilization in Duy Xuyen district, Quang Nam province, Journal of Science, Hue University (under reviewing)
- Nguyen Hoang Khanh Linh, Hoang Ngoc Bao, (2017), mapping mangrove areas based on high spatial resolution image by object-oriented approach, GIS National Conference (under reviewing).

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

The period of project was one year from date of receiving RSG fund. In this case, the duration to implement the study is consistent with the plan (12 months).

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
1 GPSMAP® 78sc	200	200	0	
Fee for publishing articles	156	156	0	* Other Funding
*Satellite images and building maps	2000	800	-1200	Due to the quality of SPOT image in study area is low (covered by clouds), Sentinel image was alternately used to process. The rest of money was used to pay for reference data.
Domestic travel costs (three field trips)	300	600	+300	More days spend in the field than envisaged
Accommodation (three field trips)	600	900	+300	More days spend in the field than envisaged
Food (three field trips)	600	800	+200	More days spend in the field than envisaged
Payment to local team for: helping to implement project's activities at study sites such as field surveys	600	800	+200	More days spend in the field than envisaged
Payment for training, meeting and discuss	200	400	+200	More days spend in the field than envisaged
Miscellaneous (communication, newspapers, shoes, medicine, substance print and photocopy, etc.)	300	300	0	
Data analyses and final report writing	200	200	0	
TOTAL	5156	5156	0	* Other Funding: A small funding from our University was be applied (156.44 GBP).

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

The results show that people's livelihoods, local socio-economic development activities have a great impact on the existence and development of the mangrove ecosystem. At the same time, the role of policies and institutions in the conservation and development of mangrove areas is important, and needs to be developed. Therefore, we would like to have more funds to promote and implement the specific solutions that mentioned above.

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

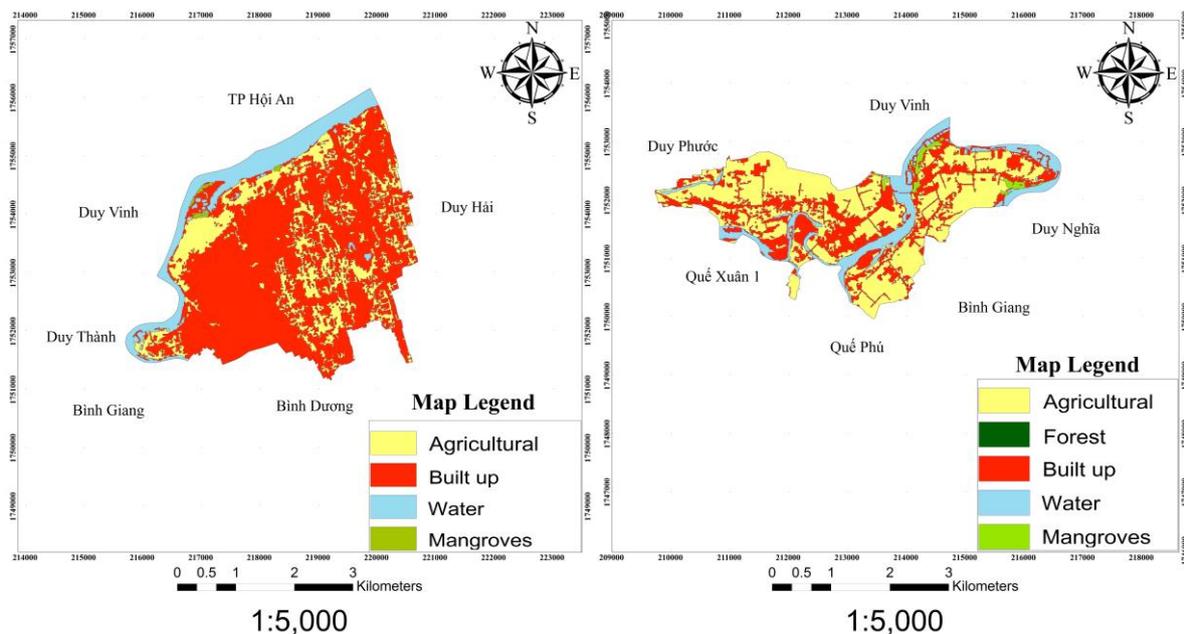
Yes, RSGF was acknowledged in two publications.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

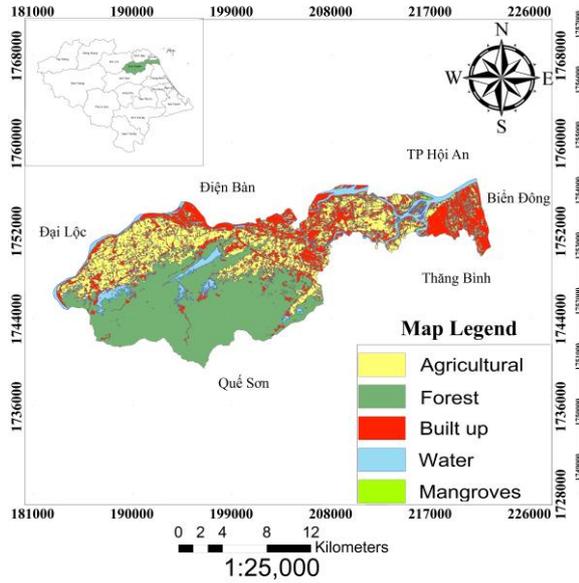
12. Any other comments?

I would like to sincerely thank you the RSGF for your kindness and support to implement this project.

LAND USE MAP OF DUY NGHIA COMMUNE 2017 LAND USE MAP OF DUY THANH COMMUNE 2017



LAND USE MAP OF DUY XUYEN DISTRICT
QUANG NAM PROVINCE IN 2017



LAND USE MAP OF DUY VINH COMMUNE 2017

