Darwin Initiative Annual Report

Important note:

To be completed with reference to the Reporting Guidance Notes for Project Leaders – it is expected that this report will be about 10 pages in length, excluding annexes

Submission deadline 30 April 2008

Darwin Project Information

Project Ref Number	16-011
Project Title	Biodiversity & ecosystem functioning: Building research capacity in SE Asia
Country(ies)	Malaysia & other SE Asian nations
UK Contract Holder Institution	The Royal Society South East Asia Rainforest Research Programme (SEARRP) via the University of Wales Swansea
UK Partner Institution(s)	The Royal Society SEARRP • NERC Centre for Population Biology, Imperial College at Silwood Park
Host country Partner Institution(s)	Universiti Malaysia Sabah, Malaysia • Sabah Forestry Department, Malaysia • ASEAN Centre for Biodiversity, Philippines • Yayasan Sabah, Malaysia • WWF-Malaysia • University of Beijing, China
Darwin Grant Value	£199,605
Start/End dates of Project	July 2007 – July 2010
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1st April 2007 – 31st March 2008
Project Leader Name	Dr Glen Reynolds
Project website	n/a
Author(s), date	Dr Glen Reynolds, April 2008

1. Project Background

The forests of SE Asia support much of the region's biodiversity, play a crucial role in the provision of key ecosystem services (watershed protection, soil stabilisation, carbon storage etc) and are an important source of income at both national and local levels. Forest conversion, degradation through unsustainable logging practices and slash-and-burn cultivation are simultaneously having a serious impact on both biodiversity and ecosystem functioning, and as a result the livelihoods of the many SE Asian people who depend upon the forests for income, shelter, water and food are being compromised.

In order to understand the possible impacts of biodiversity loss in tropical ecosystems, the importance of conservation and sustainable management of the SE Asian forests, and the mitigation and reversal of biodiversity losses through habitat restoration, it is of critical importance that long-term biodiversity/ecosystem function monitoring and experimental programmes are established by locally-based research institutes and conservation organisations.

Research on the relationship between biodiversity and ecosystem functioning is only a decade old and to date has been mainly restricted to Western Europe and North America, often taking grassland habitats as model systems. These experiments have demonstrated that biodiversity has a strong influence on ecosystem functioning,

particularly productivity; there is an urgent need to investigate whether similar effects occur in tropical forest systems. However, only very few long-term experiments of this type have been established in the tropics, especially SE Asia.

Our host country and SE Asian partners have acknowledged that this is in large part due to an acute lack of experience and expertise in the design of long-term, large-scale ecological experiments and monitoring programmes. There are no commonly accepted standards in place in SE Asia for establishing databases of biodiversity and ecosystem function measurements. Furthermore, there is a serious lack of capacity within many SE Asian research institutes in the analysis of complex ecological datasets using classical and modern statistical techniques.

This project aims to address these issues through a multi-level training programme involving key research and conservation institutions in SE Asia (plus China) and through collaboration with regional coordinating organisations.

The research (and field training) component of the project will focus on the Sabah Biodiversity Experiment, which is based close to one of SE Asia's leading research stations, the Danum Valley Field Centre (and also the base for the Royal Society SEARRP). This is a unique long-term, large-scale forest biodiversity experiment which aims to test questions relating to the effects of diversity loss on rainforest ecosystems and has been established by the Royal Society SEARRP, NERC Centre for Population Biology, the University of Zurich, Yayasan Sabah, Universiti Malaysia Sabah and the ASEAN Regional Centre for Biodiversity Conservation (now renamed the ASEAN Centre for Biodiversity).

2. Project Partnerships

The Royal Society SEARRP has strong and long-standing links with a number of our project partners – particularly Universiti Malaysia Sabah (UMS), Yayasan Sabah and the Sabah Forestry Department. These institutions have been our main collaborators in Sabah since the inception of SEARRP in 1985. This Project has allowed us to make an increased and tangible contribution, most especially to the Institute of Tropical Biology and Conservation at Universiti Malaysia Sabah, who hosted the Project's opening workshop and training course. We are now implementing an expanded training programme for key UMS staff (funded jointly by UMS and SEARRP) and discussing how best to integrate the training courses developed as part of the Project into the UMS graduate teaching programme.

The Project has also received excellent support from our other partners in Sabah – staff from Yayasan Sabah, the Sabah Forestry Department and WWF-Malaysia attended the first workshop and training course. Unfortunately, no staff were available from the ASEAN Centre for Biodiversity to attend either the opening workshop of subsequent training course due to a scheduling clash with a meeting which they were hosting. However, through UMS, we invited participants from Indonesia and Brunei to take up the places allocated for ASEAN based institutions.

One of our new partners on this Project, the University of Beijing, sent three senior representatives to attend both the opening workshop and subsequent training course. As with UMS, the University of Beijing are interested in incorporating materials developed as part of the Project into their graduate teaching programmes.

The CBD focal point for Malaysia was unable to attend the opening workshop – but will be kept informed of developments on the project.

In terms of external links, we have provided a set of the teaching notes developed for the Project's first course to the Association of Tropical Biology and Conservation's (ATBC) Asian Chapter (www.atbcasia.org). ATBC recently ran their own course on statistical analysis in Kuching, Sarawak aimed at students from across SE Asia. The ATBC course focussed on undergraduate and first-year postgraduate students rather than the teaching staff and more advanced postgraduates targeted by our Project. Given that our teaching programme is in many ways complimentary with ATBC's course (both teach the same analytical techniques using the open source 'R' package), SEARRP provided funds for 10 undergraduate students from across SE Asia to attend the ATBC course. We will continue to share information and teaching materials with ATBC as our courses develop.

3. Project progress

The project has two main components, training and research.

Training

The training component of the Project has progressed well and we have been encouraged by the eagerness of the two universities involved with the project, University Malaysia Sabah and the University of Beijing, to incorporate the teaching materials and methods we will develop during the Project into their own postgraduate teaching programmes. The academic staff attending the workshop/course were particularly receptive to the use of some of the more recent analytical techniques that we described.

On the final day of the training course we held a feedback session to gauge the reaction of participants and get their opinions on the future direction and focus of the Project. The first course was extremely well received with the only criticism, as such, being that the Project would ideally involve more regular advanced-level courses (currently only one course is scheduled each year). It was suggested that more frequent training should be given, especially to those academics who would likely be involved in developing and teaching statistics courses. Within the direct scope of the project this is unfortunately not possible, but in order to at least in part address this issue, SEARRP will be funding Dr Henry Bernhard (who teaches statistics to students in the Institute of Tropical Biology and Conservation, UMS) to attend an advanced statistics course led by Professor Andy Hector at the University of Zurich, Switzerland. This is a one-week residential course and will be held later this month. Professor Hector leads the courses on this project. UMS are also providing funding for Professor Amran Ahmed, Deputy Vice Chancellor, University Malaysia Sabah to attend the Zurich course. Professor Amran leads the development and teaching for statistics courses for all undergraduate and postgraduate students at UMS following science degrees.

Overall, we have been extremely pleased with the project partners' reaction to the training provided so far. We will continue to seek ways in which to address the main criticism of the courses being too infrequent by arranging supplementary courses for key staff from our partner organisations (funded separately from the project).

Research

The research component of the Project involves ongoing data collection and fieldwork as part of the Sabah Biodiversity Experiment. Since the project started in July 2007, this has included:

- Ongoing survival and growth measurements for planted seedlings (all plots)
- Detailed measurements in a number of more intensively measured plots, including the collection of habitat data (canopy openness, vegetations structure, baseline carbon stock, litter-fall analysis etc) and more detailed seedling measurements
- Establishment of associated shade-house experiments to assess the morphological plasticity of dipterocarp seedlings
- Growing and collecting 60,000+ seedlings for re-planting the main experimental plots (due to higher than anticipated mortality when the Sabah Biodiversity Experiment was first established in 2002)

One of the aims in establishing the Sabah Biodiversity Experiment was for it to act as a research 'platform' to be used by scientists from a range of disciplines. We are especially keen that the experiment is utilised by local universities and research institutes. To this end, SEARRP and the University of Zurich have funded and co-supervised two undergraduate students from UMS to undertake research for their undergraduate theses as part of the experiment – Robin Lim Ah Hee, who recently submitted his BSc thesis, and Lo Yen Yee who will start her research in May 2008. Although these students are not directly supported by the Project, they are benefiting through the use of our team of Research Assistants and the experimental infrastructure which are co-funded by the Darwin Initiative.

A number of overseas students registered at the University of Zurich are also working on the experiment (2 PhD, 1 Masters) – the 2 PhD students (Chris Philipson and Philippe Saner) are currently writing up, and the Masters student (Martin Stenflo) completed his thesis in early 2008. Again, while not directly supported by funds from the Darwin Initiative their research has benefited enormously through the overall support provided by the project.

Scientists associated with the Sabah Biodiversity Experiment have presented a poster and 2 papers at international conferences in which Darwin support has been fully acknowledged.

3.1 Progress in carrying out project activities

Project outputs	*Activities in Year 1*	*Progress*
1. Raise awareness amongst scientists, conservationists and forest managers in SE Asia of the latest findings and methods for research on biodiversity and ecosystem functioning and their relevance to SE Asia	1.1 Conduct detailed review of latest international practices and results	Completed as planned
	1.2 Introductory workshop for policy makers, university department heads, senior conservationists etc to introduce the project	Completed – re-timed as approved by Darwin secretariat
2. Develop standard research methodologies and protocols for long term research on biodiversity and ecosystem functioning	2.1 Conduct detailed review of current practices and standards	Ongoing
	2.2 Develop and validate revised research protocols including experimental design, layout, data collection and analysis systems	Ongoing
	2.3 Collect sample datasets for analysis and use in training courses using revised protocols	Ongoing
3. Identify skills gaps amongst post-doc and postgraduate researchers/research managers and conduct linked training courses and field training events to remedy gaps identified	3.1 Conduct detailed skills gap analysis for postgraduate and post-doctoral researchers and research managers	Ongoing – and currently being revised in light of opening project workshop and course
	3.2 Develop and deliver a course on 'Experimental design and analysis for biodiversity and ecosystem functioning'	Completed as planned
4. Identify skills gaps amongst researcher assistants/field staff and conduct linked training courses and field training events to remedy gaps identified	4.1 Detailed skills gap analysis for research assistants and field staff	Ongoing
5. Disseminate results of new analyses, training course curricula and teaching material, and prepare policy level and public awareness materia	5.1 Papers published on research component and associated studies	Ongoing (2 published)
	5.2 Project newsletter	Ongoing (to be posted shortly)
	5.3 Posters and simple publications, including for public consumption	Ongoing (1 poster published)

3.2 Progress towards Project Outputs

We have made good progress in 2007/2008 towards our training objectives and, although the Project has been running for less than a year, we are confident that these will be achieved by the end of the Project.

Progress on the research component of the Project has been especially encouraging and we anticipate a steady flow of refereed journal articles, conference papers, posters and other publications throughout the project. The output of students associated with the Sabah Biodiversity Experiment has been significant during the first year of the Project and we expect more students, both local students and overseas, to work on the experiment over the coming years. Although these students are not funded by the Project, they benefit significantly from the research infrastructure and staff which our Darwin Initiative Project supports.

Assumptions made at the time of application remain valid and we do not anticipate the need to revise these during the coming year.

3.3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Total planned from application
8	UK staff time (5 staff)	± 30 weeks	-	-	-	± 30 weeks	± 120 weeks
14A 14B	Project workshop	1	-	-	-	1	2
5	Data collection on Sabah BioD Experiment	± 9 months	-	-	-	± 9 months	3 years
4C 4D	Training course for 25+ persons	1	-	-	-	1	3
11A 11B	Publications/posters resulting from research component	3 (2 papers, 1 poster)	-	-	-	3	6
16A 16B 16C	Project newsletter	0 (in prep.)	-	-	-	0	3
A1	PhD theses (Associated projects)	2 (writing up)	-	-	-	2	0
A2	MSc theses (Associated projects)	1 (completed)	-	-	-	1	0
A3	BSc theses (Associated projects)	1 (submitted)	-	-	-	1	0

Notes on Table 1:

The additional outputs listed (coded A1, A2 and A3) refer to theses that have been submitted in the project's first year or are currently being written up. These projects have been carried out as part of the Sabah Biodiversity Experiment and while funded externally have benefited directly through the support provided by the Darwin Initiative:

- *Christopher Philipson, PhD thesis: "The functional ecology of Bornean dipterocarps: Testing for resource partitioning by plants". University of Zurich, Switzerland (Status: writing-up)*
- *Philippe Saner, PhD thesis: "Biodivesity and ecosystem services: Carbon sequestration in enrichment planted forests in Borneo". University of Zurich, Switzerland (Status: writing-up)*
- *Martin Stenflo, MSc thesis: "Ecological trade-off in tropical rainforest seedlings: Growth versus defense resonse to light and defoliation among dipterocarp seedlings". University of Zurich, Switzerland (Status: completed 2008)*
- *Robin Lim Ah Hee, BSc thesis: "Quantitative analysis of carbon fluxes in the Sabah Biodiversity Experiment". Universiti Malaysia Sabah, Malaysia (Status: submitted March 2008).*

In Table 2, provide full details of all publications and material produced over the last year that can be publicly accessed, eg title, name of publisher, contact details, cost. Mark (*) all publications and other material that you have included with this report.

Table 2 Publications

Type * (eg journals, manual, CDs)	Detail (title, author, year)	Publishers	Available from	Cost £

Conference paper	The Sabah Biodiversity Experiment: Latest developments and running projects Philippe Saner, 2008	Association for Tropical Biology and Conservation	Publisher (www.atbcasia.org)	n/a
Conference paper	Ecological trade-offs in tropical rainforest seedlings: growth versus defence in response to light and defoliation among Dipterocarpaceae seedlings Martin Stenflo, 2008	Association for Tropical Biology and Conservation	Publisher (www.atbcasia.org)	n/a
Poster*	Effects of predator body size on the mortality of tropical forest tree seeds Yann Haultier, Philippe Saner, Christopher Philipson, Glen Reynolds, Andy Hector, 2007	Public exhibition at the Plant Sciences Centre, University of Zurich		n/a

3.4 Progress towards the project purpose and outcomes

The overall purpose of this project is to: ***Increase and sustain the capacity of SE Asian research institutes and conservation organisations to conduct effective research on the linkage between biodiversity and ecosystem functioning.***

Although this project only commenced in July 2007, we feel that significant progress has already been made towards achieving this objective and the specific outputs which contribute to it. It was extremely encouraging that the initial training course was so well received by our main local partner (Universiti Malaysia Sabah) and that they are prepared to fund additional training for key staff members to supplement the courses provided by the project.

3.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

This project has not yet been running for long enough to assess these impacts.

4. Monitoring, evaluation and lessons

Output measures are listed in Table 1. In summary, we have met or exceeded our output measures in terms of workshop and training course participation.

5. Actions taken in response to previous reviews (if applicable)

Not applicable

6. Other comments on progress not covered elsewhere

7. Sustainability

For the training component of the project, the main output and means of ensuring sustainability would be the incorporation of the course materials developed as part of this project into the teaching programmes of our partner universities. Although the project is at an early stage we are confident that this output will be achieved.

In terms of the research component, the project is providing financial support at a critical early stage of the Sabah Biodiversity Experiment. We envisage that this experiment will run for at least 30 years and act as a major, multi-disciplinary research platform for scientists interested in biodiversity and its influence on ecosystem functioning and carbon sequestration.

8. Dissemination

We are currently working on a project web-page which will be posted on the Royal Society SEARRP and University of Zurich websites. This page will include a Project newsletter and downloadable course materials, teaching notes,

papers and other information on the Project and Sabah Biodiversity Experiment – as well as links to our partner organisations. We plan to have the site running by mid-2008.

9. Project Expenditure

Table 3 Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project application)	Expenditure	Balance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment			
Others			
Salaries (specify)			
TOTAL			

Please note: *This Project is supported by significant co-funding (in all expenditure categories) from the Royal Society SEARRP, University of Zurich and NERC Centre for Population Biology – hence the expenditure of Darwin Initiative funds exactly as budgeted.*

Highlight any agreed changes to the budget and explain any variation in expenditure where this is +/- 10% of the budget.

10. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

I agree for ECTF and the Darwin Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here)

None for this period