Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project Ref. Number	162/12/034
Project Title	The Darwin South East Asian Wetland Restoration Initiative
Country(ies)	Vietnam
UK Contractor	Royal Holloway Institute for Environmental Research
Partner Organisation(s)	Cantho University, An Giang University
Darwin Grant Value	£109, 514
Start/End dates	1 June 2003 to 30 November 2005
Reporting period	1 June 2003 to 31 March 2004 Report 2
Project website	http://www.rhul.ac.uk/Environmental-Research/Research/Darwin/Darwin.html
Author(s), date	Prof. E Maltby, Dr Conor Linstead, Dr Chris Sollars, 29th April 2004

2. Project Background

Wetlands are amongst the most species rich and diverse ecosystems in the world. Furthermore, physical, chemical and biological processes may interact with the structure of the ecosystem to support vital ecological functioning, through which wetlands have the potential to provide essential goods and services (for example, food supplies and flood reduction) of socio-economic benefit. Despite this, significant areas of wetlands in the Mekong Delta, Vietnam have been lost or degraded by agricultural conversion, intensive use or mismanagement. This has led to a loss of biodiversity and a decline in the quality of human life.

During the past 30 years, vast areas of natural wetland, which formerly supported one low-yielding crop of rice per year, have been cleared and replaced with high-yielding varieties of rice giving two or three crops per year. To support this rise in production farmers now use more chemicals and this has had a detrimental effect on biodiversity in wetlands and waterways. The driving force for this change has been Vietnam's determination to achieve self sufficiency in rice production, feed an expanding population, improve rural livelihoods and provide a surplus of rice for export. However, the contribution that wetlands as maintained ecosystems provided to livelihoods and to sustainable development was perhaps not sufficiently examined before these changes were implemented, and their loss has been exacerbated by fluctuations in agricultural returns, particularly the price of rice. Consequently the loss of socio-economic benefits from wetlands may have been far greater than anticipated.

Effective wetland management and/or the restoration of degraded areas could deliver biodiversity conservation and enhancement, sustainable development and wider benefit sharing. However, restoration has been hindered by a number of factors, including: lack of knowledge about the socio-economic benefits (particularly in the short-term) associated with restoration; a lack of human capacity in assessment and restoration techniques; and a need for greater integration of these benefits with existing expertise and science in water and agricultural policies.

Project Purpose and Outputs

The purpose of the project is to build the capacity of wetland managers and farmers to meet commitments to the CBD through the restoration and protection of biodiversity and sustainable livelihoods based on the diversity of wetlands in the Mekong Delta, Vietnam.

RHIER scientists are working with two Vietnamese universities to address three key biodiversity needs in Vietnam:

- Loss of biodiversity associated with wetland conversion
- Problems of rural poverty caused by lack of access to wetland resources
- Lack of human resource capacity to bring about wetland restoration

In addition, the project will help to achieve the three main objectives of the Convention on Biological Diversity (conservation, sustainable development and equitable sharing of benefits) by building the capacity of wetland managers in the Mekong Delta and developing new tools for wetland restoration and sustainable use of wetlands. The project provides an opportunity to apply the Ecosystem Approach, (a requirement of the Convention) in Vietnam in order to establish alternatives to wetland conversion to intensive agriculture and its inherent biodiversity loss, whilst sustaining rural livelihoods.

The specific outputs of the project will be:

1. The training of scientists, farmers and other stakeholders in wetland restoration and management
2. The development of a wide range of practical tools and information resources for Vietnamese scientists and communities, including restoration and management guidelines, together with databases of wetland functions
3. Improved awareness of the requirements of local communities, the biodiversity and functioning of various wetland types and the environmental variables determining their distribution
4. A strategic management and restoration plan for areas of wetland in the Mekong Delta, using the Ecosystem Approach including an analysis of threats, to permit the more effective management and protection of these habitats and assist in the use of this approach to deliver the Biodiversity Convention in Vietnam.
5. Further regional capacity building by the targeted dissemination of project outputs

The only change to the project plan in this reporting period has been the re-scheduling of the fieldwork component. The field data collection in Vietnam has been extended until October 2004 with surveys taking place in alternate months rather than consecutive months, as included in the original proposal. This change has the

advantage of covering a full year and picking up annual changes and is a more scientifically useful sampling strategy than the original proposal. The Darwin Secretariat have been informed of this change.

4. Progress

RHIER began its first major tropical project in Vietnam and Thailand in 1995: the Darwin *Melaleuca* Wetlands Project. The three-year initiative aimed to promote sustainable management of Melaleuca ecosystems in the above two areas, by investigating and demonstrating their values, and applying this understanding to management methods that capitalised on them. Special attention was given to the values associated with Melaleuca biodiversity, and to using UK expertise where it is most needed. The initiative saw five Royal Holloway staff visit Vietnam to carry out research and training activity, the first Vietnamese PhD student (Mr Duong Van Ni) ever registered at Royal Holloway, seven man-months spent at RHIER by two Vietnamese staff, exchange visits between Thailand and Vietnam, and wide publication of the research. Central to this success was the close relationship developed between RHIER and Cantho University, acknowledged in a five-year Memorandum of Understanding on Scientific and Academic Collaboration signed in November 1997.

Links with Vietnam were maintained subsequently through a British Council Higher Education Link programme (1997-2000) between RHIER and Cantho University, which supported a modest three-year programme of training activities in wetland ecology and functional assessment begun in Cantho in 1998. This was followed by a major DFID-funded project (2000-2002), which laid the foundations for a wetland ecosystem management decision support system. This further strengthened the link with Cantho through Dr Ni, and this formed the partnership basis for the current project.

Since the start of this project the following progress has been made:

- An Expert Advisory Committee (EAC) for the project has been established which incorporates local stakeholders in Vietnam. The EAC includes Dr. Tran Hong Ha (Deputy General of the Vietnam Environmental Protection Agency) as Chairman (proposed by Dr Sinh, VEPA Director), Dr Vo-Tung Xuan (Rector, An Giang University), Prof. Maltby (RHIER) and Dr Duong Van Ni (Can Tho University).
- A website has been set up, hosted at RHIER. The website currently contains a summary of the project and contact information and will be expanded as finalised deliverables are produced.
- A series of workshops have been held at Can Tho University: a start-up workshop, Ecosystem Approach workshop and biophysical and socio-economic training.

The one-day start-up workshop was held at Can Tho University on the 3rd November 2003, followed by a two day training workshop on the Ecosystem Approach on the 4th and 5th of November. In total there were 50 participants at these workshops with the majority attending both. The start-up and EA workshops were both attended by Mrs Thanh Binh, who gave a presentation at each. Mrs Thanh Binh is responsible for Vietnam's reporting to the CBD and following on from the workshop Mrs Binh has also requested help from RHIER in reporting to the CBD. As one of the aims of the Darwin programme is to improve reporting to the CBD, this was a key outcome during the reporting period.

The start-up workshop was delivered by staff from RHIER, Can Tho University and An Giang University. It covered:

- an introduction to RHIER and the project
- methods of biophysical research using standard environmental assessment methods adapted for the Plain of Reeds
- socio-economic aspects of wetland research

The Ecosystem Approach (EA) workshop focused on its use as means of facilitating Vietnam to meet its commitments to the CBD. On the first day the workshop covered an introduction to the EA, the Vietnamese perspective on the application of the EA, principles and application guidance and practical examples of the EA. The second day of the workshop was based around group discussions of seven specific questions on the application of the EA in Vietnam. Each group reported back on their discussion and Prof. Maltby summed up using the latest thinking on the EA. The proceedings from the workshops are currently in preparation.

Following these workshops, training workshops were held on the 11th to the 18th November 2003 on the biophysical and socio-economic survey techniques needed for the fieldwork. These workshops covered:

Biophysical

- site selection
- ecological techniques
- vegetation description and recording
- soil sampling
- identification of soil types and description
- sampling for water quality

Socio-economic

- Participatory Rural Appraisal methods
- Planning for socio-economic data collection
- Understanding people's livelihoods
- Surveys of economic status
- Collecting information on habits, attitudes and knowledge about wetlands
- Use of questionnaires
- Interview techniques – open and closed questions

Biophysical data are being collected on three wetland types:

- *Melaleuca* swamp forest
- Mangrove *(Rhizophora* dominated)
- Wet grassland (lowland grassland)

Within each of these wetland types, three 'treatments' or 'states' are being studied:

- Degraded
- Pristine/reference
- Integrated (aspects of both degraded and pristine sites)

For vegetation sampling a 1 hectare plot at each site is divided into 20m x 20m sub-plots. Two of these sub-plots are randomly selected. Within each of these sub-plots the species present and percentage cover are recorded for 10 randomly placed 1m x 1m quadrats. Where the plots contain woody vegetation 10 random co-ordinate

positions are chosen and data are recorded on the four nearest neighbours on height, diameter, stem form and fertility indicators.

Soil description includes the soil moisture condition and the identification and description of a soil sample (soil type, particle size, organic material characteristics and pH).

Two water quality surveys have been carried out (December and February) covering 25 sites. Samples from the December survey have been analysed and the data have been provided to RHIER (see Annex 3). Analysis of the February samples is continuing and will be available shortly. The water quality parameters being covered are:

pH, conductivity, salinity, turbidity, biological oxygen demand, dissolved oxygen, nitrate, nitrite, sulphate, phosphate, ammonium, E. coli and coliform counts.

Socio-economic data are being collected at six villages, two in each of the three field areas (Can Gio Mangrove Biosphere Reserve, Tram Chim National Park and Lang Sen District). At each location one village in the core area of the reserve/national park and one in the buffer area are surveyed. The data are collected according to the methods developed at the November 2003 workshop with household surveys based on prepared questionnaires and the use of Participatory Rural Appraisal techniques.

One socio-economic survey has been carried out (December 2003) which has collected important baseline data on the demographics of the districts, the income and income generating activities of the households, their use of natural resources and perceptions on the importance of the wetland areas (draft report contained in Annex 4)

Some difficulties have arisen as a result of a change in personnel at RHIER which necessitated a change in co-ordinator for the project. While this has not significantly impacted on the delivery of the project outputs over this reporting period, the changes in personnel may affect the timing, but not the production, of project outputs over the early part of the next reporting period (see Annex 2 for updated gantt chart). Other difficulties have arisen as a result of technical communication problems which, for practicality, have predominately been through email.

Year/Month	Description
August 2004 – March 2005	*Preparation of materials for stakeholder training workshops*
November 2004[1]	*8 Vietnamese trained by UK experts in small workshops for biophysical and socio-economic data analysis and its interpretation and presentation and training material production. Training materials will include biophysical, socio-economic and water quality methods for the functional analysis of wetlands (theory and field guides). The values (short and long term socio-economic and biodiversity values) of wetland ecosystems; management and/or restoration guidelines.*
December 2004	*Project dissemination workshop/conference for 20-30 key participants with wider dissemination objectives. Presentations of the project findings of wetland functioning and the values (socio-economic and biodiversity) of restored/ managed areas (support materials will be available in leaflet and poster form as well as fully supported on the website). Guidelines for management/restoration presented and biodiversity priority areas identified and discussed. To contain a training element for 5-10 key decision-makers through a wetland educational trail at the demonstration site established and improved in Hoa An . Case studies on experience in application of the Principles of the Ecosystem Approach written up for publication and disseminated through the CBD Clearing House Mechanism. Strategic management plan drafted.*
December 2004	*UK and Vietnamese staff to prepare 'training trainers' workshops, develop the educational trail and demonstration site (labelling plants, products and areas). Prepare timetables and materials.*
January 2005 - March 2005	*Vietnamese trainers to carry out a series of workshops aimed at a variety of stakeholders involved in or with an interest in wetland management/restoration, education and decision making. Interested parties include the Women's Union and the Farmer's Union, DOSTE officials and University students.*

Table 1 Workplan for the next reporting period

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

No previous reviews have carried out as this is the first annual report for this project.

6. Partnerships

Collaboration between all the project partners has been good since the beginning of the project. RHIER staff have visited the Vietnamese partners twice over the course of the last year for an initial project set-up meeting and to run workshops. Dr Khiem, Dean of Economics and Business studies at An Giang University and lead partner on the socio-economic elements of the project has visited Royal Holloway to sign an

[1] *Originally planned for June 2004. Awaiting approval for change in timing from Darwin secretariat and DEFRA.*

Memorandum of Understanding with the College on behalf of the Rector of An Giang, Dr Vo Tong Xuan.

Photograph 1 Signing of the Memorandum of Understanding between An Giang University and Royal Holloway

Collaboration with other projects in the host country is also progressing. One of the field sites for the project in the Plain of Reeds is also part of the monitoring network for an IUCN Mekong Wetlands Biodiversity project. Two representatives of this project attended the Ecosystem Approach workshop held in November 2003 and contributed to the discussion.

RHIER and the Vietnamese project partners are in the early stages of developing a decisions support system project which will build on the results of this project and contribute to furthering its aims beyond its completion.

The Vietnamese project partners invited a wide range of interested parties to the start-up and Ecosystem Approach Workshops held in November 2003. These included local and provincial officials and VEPA staff with responsibilities impinging on wetland management. This was augmented by the establishment of contact prior to the workshop by a visit from RHIER staff (assisted by staff at the UK Hanoi Embassy) to Dr Sinh, General Director, Vietnam Environmental Protection Agency (VEPA) and other VEPA staff in Hanoi. (VEPA is the CBD Focal Point for Vietnam). As a result, Mrs Le Thanh Binh, who runs the CBD Focal Point office in VEPA, attended the start-up and Ecosystem Approach workshops, participated in group discussions and gave two presentations. Following the workshops, further contact has been maintained with Mrs Binh, and discussions are in progress concerning possible RHIER involvement in Vietnam CBD focal point training, partly funded by the UK Embassy, Hanoi.

Promotion and support from commercial and other sources:

During the year a significant effort was made to promote the project and the Darwin Initiative and raise additional support from major commercial concerns in Vietnam, e.g. BP Southeast Asia, Shell, Prudential, HSBC, World Bank (Hanoi), Castrol/BP and Unilever. As a result, BP agreed to offer to translate some workshop materials and Kerry Taylor, Environmental Advisor, and Vo Thu Hoai, Communication & External Affairs Coordinator, BP Southeast Asia, agreed to attend the Ecosystem Approach workshop, but were prevented from doing so at short notice due to ill health. Preliminary discussion have also been held with Dr T V Luong , Water, Environment and Sanitation (WES) Office, UNICEF East Asia & Pacific Regional Office, Bangkok, on possible UNICEF support for a health-related aspect of the work

to be developed, and this, together with further efforts to secure additional support from other sources, will be pursued by the Project Coordinator during his next visit.

7. Impact and Sustainability

Despite the early stage of the project it is having a significant impact in Vietnam. In a letter to Prof. Maltby, Dr Sinh (General Director of the Vietnam Environmental Protection Agency) stated that he 'appreciated [the] effort and contribution of the Darwin project to [the] biodiversity conservation of our country. I strongly believe that the project will achieve its goals successfully'. As stated earlier there is also increased interest from Mrs Binh, who runs the CBD Focal Point office in VEPA, in the potential for the project increasing capacity in her office.

RHIER are currently pursuing funding for a follow-on project which will include the Vietnamese project partners. This project will build on the current Darwin Initiative and a prototype decision support system for wetland management already developed at RHIER This prototype DSS integrates biophysical, livelihood and health analyses in the Mekong Delta and the aim of the planned project is to develop this prototype into a practical management tool.

8. Post-Project Follow up Activities (max 300 words)

Project is not nearing completion.

9. Outputs, Outcomes and Dissemination

The following outputs were agreed in the Project Outputs Schedule for this reporting period:

1. establishment of an expert advisory committee
2. production of a newsletter
3. establishment of a basic project website
4. project start-up workshop
5. Ecosystem Approach workshop
6. workshops for biophysical and socio-economic data collection

All these outputs have been achieved except the production of a newsletter. However, a one page flyer and a leaflet have been produced for project which were not included in the original output list.

The principal dissemination activities in the host country were the start-up workshop and Ecosystem Approach workshop held in November 2003. These workshops were attended by representatives of a range of organisations including NGOs, universities, government departments and the environmental regulator.

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	*Quantity*	*Description*
6A	*68*	*Training in Ecosystem Approach –*
		Training in socio-economic and biophysical data collection techniques -
6B	*39*	*50 attendees at start-up and EA workshop*
		18 attendees at data collection workshops
7	*2*	*Instructions on field techniques*

		Presentations
8	*14*	*Preparatory trip in July 2003*
		Start-up workshop – November 2003
		Ecosystem Approach workshop – November 2003
		Biophysical and socio-economic techniques training – November 2003
14A	*3*	*Start-up workshop – November 2003*
		Ecosystem Approach workshop – November 2003
		Biophysical and socio-economic techniques training – November 2003

Table 2: Publications

*Type * (e.g. journals, manual, CDs)*	*Detail (title, author, year)*	*Publishers (name, city)*	*Available from (e.g. contact address, website)*	*Cost £*
No publications were scheduled for this reporting period				

10. 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 schedule)*	*Expenditure*	*Balance*

11. Monitoring, Evaluation and Lessons

Over the reporting period the project has been monitored and evaluated through regular visits to the Vietnam for meetings and workshops. The first project visit in July 2003 was to discuss in detail the project objectives, milestones, partner responsibilities and deliverables according to the proposal and exchanging knowledge on the current position of both the UK and Vietnam on the Ecosystem Approach (EA), the concept which underpins the broad aims of the project. During the second visit in November 2003 three workshops were held – a start-up workshop, and Ecosystem Approach workshop and biophysical and socio-economic methods training workshop (described above).

The indicators of success for these workshops are that they address identified training needs in Vietnam and that senior representatives from all the relevant stakeholder groups are present. The purpose of the project is to build capacity in Vietnam for reporting to the CBD and the application of the Ecosystem Approach. To this end it is a good indicator of the success of the project to date that Mrs Thanh Binh, who is responsible for Vietnam's reporting to the CBD, attended the workshops and gave presentations. Following on from the workshop Mrs Binh has also requested further help from RHIER in training on reporting to the CBD. In Mrs Binh's presentations she made the following recommendations, all of which this project is tackling:

1 Need to raise awareness about the ecosystem approach
2 Need for strengthening research about ecological systems, e.g. about functions and about the relationship between different components of systems
3 Need to promote the application of the ecosystems approach in the development and design of action plans, programmes and projects.
4 Need to integrate the objectives of conservation and socio-economic development.
5 Need to promote multi-stakeholder, inter-sectoral co-ordination.
6 Need to promote participation of the community in ecosystem management.

12. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum)

■ ***I agree for ECTF and the Darwin Secretariat to publish the content of this section***

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2003/2004

Project summary	***Measurable Indicators***	***Progress and Achievements April 2003-Mar 2004***	***Actions required/planned for next period***
Goal: *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve* • *The conservation of biological diversity,* • *The sustainable use of its components, and* • *The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources*			
Purpose *To build the capacity of wetland managers and farmers to meet commitments to the CBD through the restoration and protection of biodiversity and sustainable livelihoods based on the diversity of wetlands in the Mekong Delta, Vietnam.*	*1. Short and long-term socio-economic benefits derived from (restored) wetlands.* *2. Tools and educational demonstrations for evaluating, managing/restoring wetland functioning.* *3. Identification of priority sites for potential restoration and establishment of wetlands* *4. Skills and ability for sustainable management of wetland resources.* *5. On-going training programs established.*	*The principal achievements in this reporting period have been against purpose indicators 4 and 5. The series of workshops run in November have contributed significantly to the skills and ability of the participants for sustainable management of wetland resources and form the initial steps of on-going training programs.*	*Over the next reporting period the principal purpose level indicators that will be addressed will be 2 and 4, through the development of data analysis training and the production of training manuals and tools*
Outputs			
1. Trainers trained: wetland functioning and restoration techniques, Ecosystem Approach training.	*Reports produced, training attendance monitored and progress posted on web-site.*	*Start-up workshop held for 50 participants. (3/11/2003)* *Training workshop on the Ecosystem Approach delivered to 50 participants.(4-5/11/2003)* *Training workshops held on bio-*	*Key actions for the next reporting period are the convening of:* • *a data analysis workshop to assess and analyse the data collected by the local project partners*

		physical and socio-economic survey techniques(11-18/11/03) for approximately 8 and 10 participants respectively.	• *a dissemination workshop* • *stakeholder training workshops*
2. Scientific and socio-economic databases of wet-land biodiversity and values	*Outputs from the analysis of field research described and catalogued on a database.*	*Two biophysical and one socio-economic surveys have been completed.*	• *Complete the field data collection* • *analyse data and compile into database*
3. Materials produced to support training and build awareness.	*Published materials as an output of the data collection, analysis and expert knowledge.*	*Outputs from the start-up workshop and Ecosystem Approach training workshop are being compiled into a proceedings which will be posted on the website.*	• *Publication of outputs from November 2003 workshops on the project website.* • *Production of material for stakeholder training workshops.*
4. Stakeholder engagement and capacity building between university and research staff in Vietnam and other areas in SE Asia.	*Capacity building through project research and training program.*	*The start-up, Ecosystem Approach and survey techniques workshops have contributed to this output*	*Dissemination and stakeholder training workshops to be held in December 2004 – March 2005.*
5. Production of case study for inclusion in CBD Clearing House Mechanism and on website, draft strategic management plan, improved demonstration site	*Case study accessible on CBD website, draft plan circulated to relevant stakeholders, improved demonstration site accessible*	*No outputs scheduled for this reporting period*	*No outputs scheduled for the next reporting period*

Note: Please do NOT expand rows to include activities since their completion and outcomes should be reported under the column on progress and achievements at output and purpose levels

Project summary	Measurable indicators	Means of verification	Important assumptions
Goal: *To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve* • *the conservation of biological diversity,* • *the sustainable use of its components, and* • *the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources*			
Purpose *To build the capacity of wetland managers and farmers to meet commitments to the CBD through the restoration and protection of biodiversity and sustainable livelihoods based on the diversity of wetlands in the Mekong Delta, Vietnam.*	*1. Short and long-term socio-economic benefits derived from (restored) wetlands.* *2. Tools and educational demonstrations for evaluating, managing/restoring wetland functioning.* *3. Identification of priority sites for potential restoration and establishment of wetlands* *4. Skills and ability for sustainable management of wetland resources.* *5. On-going training programs established.*	*1. and 2. Training materials; workshops (manuals; AV; website).* *3. Facilitation of the methods needed for the identification of sites through project notes and reports.* *4. Training materials; workshops (manuals; AV; website)* *5. Improvements to a potential training centre in Hoa An, Vietnam.*	*1 + 2. Sites can be identified, accessed and sampled.* *3. Successful engagement and facilitation of relevant wetland managers and farmers.* *4. Engagement of significant stakeholders, workshop participation of motivated trainees, subsequent wider dissemination* *5.Continued relationships between collaborators.*
Outputs *1. Trainers trained: wetland functioning and restoration techniques, Ecosystem Approach training.* *2. Scientific and socio-economic databases of wet-land biodiversity and values.* *3. Materials produced to support training and build awareness.* *4. Stakeholder engagement and capacity building between university and research staff in Veitnam and other areas in SE Asia.* *5. Production of case study for*	*1. Reports produced, training attendance monitored and progress posted on web-site.* *2. Outputs from the analysis of field research described and catalogued on a database.* *3. Published materials as an output of the data collection, analysis and expert knowledge.* *4. Capacity building through project research and training programs.* *5. Case study accessible on CBD website, draft plan circulated to relevant stakeholders, improved demonstration site*	*1. Review of reports from the project, web-site updates.* *2. Multi-variate and uni-variate statistical tests carried out as well as descriptive data analysed and published in manuals, reports and papers submitted for publication* *3. and 4. On-going training course at an established training centre, attendance monitored and web-site updated. Workshop reports and questionnaires posted on web-site.* *5. Feedback from website and draft plan incorporated into final plan and updating of*	*1. Successful engagement of stakeholders. Successful knowledge transfer.* *2. Successful field data collection, a statistically valid sample is taken.* *3. Production of materials.* *4. Regional participants willing and able to travel to Vietnam.* *5. Maintenance of awareness generated by Darwin project*

inclusion in CBD Clearing House Mechanism and on website, draft strategic management plan, improved demonstration site	*accessible*	*website*	
Activities *Workshops/Meetings and* *Training* *Field Research* *Training Materials* *Dissemination and publicity material*	***Activity Milestones (Summary of Project Implementation Timetable)*** *Yr 1: Project planning; task allocation, identifying locations and relevant permissions (May-July '03); Training on socio-economic and natural scientific field techniques and methodologies, survey design (Nov '03); Yr 2/3: Training on the analysis of data (July '04); Dissemination workshops (training trainers from SE Asia) (Dec '04-Mar '05).* *Methods and protocols for habitat and socio-economic surveys to be established July '03, sites identified and mapped Aug '03. Field research to be carried out between Dec '03 to June '04. Identify priority habitats throughout field research.* *Analysis of data and collation of field surveys and other relavent information by Nov '04. Production of manuals for training workshops Nov '04; database and website available by May '05* *Final reports; publications as manuals in Vietnamese and English by Sept '05. Website containing the training information and database May '05. Facilitation of demonstration sites May-Sept '05*		

Annex 2 Updated Gantt Chart

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
Activity																														
Establish stakeholder network																														
Confirm study sites and permissions																														
Initial project workshop																														
Ecosystem Approach training workshop (results to feed into COP8)																														
Flooding																														
Training workshop biophysical surveys																														
Training workshop socio-economic surveys																														
Biophysical and socio-economic surveys																														
Training workshop data analysis																														
Data analysis and report writing																														
Production of material for stakeholder training workshops																														
Dissemination workshop																														
Stakeholder training workshops																														
Demonstration site and educational trail facilitation																														
Material Produced																														
Website production/updates																														
Newsletter/press releases/6-monthly and annual reports																														
Field manuals produced																														
GPS for field sites (mapping produced)																														
Biophysical and socio-economic survey data produced																														
Papers submitted for peer reviewed publication																														
Training manuals and tools produced																														

Annex 3 Water quality analysis (December 2003)

Sample No.	Site	pH	EC (mμ/cm)	Salinity (‰)	Turbidity (NTU)	BOD (ppm)	DO (ppm)	$N\text{-}NO_3^-$ (ppm)	$N\text{-}NO_2^-$ (ppm)	$S\text{-}SO_4^{2-}$ (ppm)	PO_4^{3-} (ppm)	NH_4^+ (ppm)	E.coli (CFU)	Coliform (CFU)
1	CG1	7.4	30100	18.9	290	7	0.8	0.4	0.0	290	0.42	0.19	N.D.	88
2	CG1	7.6	29800	18.6	60	3	4	0.2	0.0	272	0.12	0.06	N.D.	87
3	CG1	7.7	29800	18.6	49	5	4.64	0.0	0.0	272	0.11	0.04	N.D.	190
4	CG2	7.5	34700	21.9	13.5	4	4	4.5	0.0	290.9	0.04	0.07	N.D.	N.D.
5	CG2	7.8	34600	21.8	6.5	4	4	0.0	0.0	300	0.03	0.06	N.D.	30
6	CG2	7.3	34500	21.8	15.8	5	4.8	0.0	0.0	308	0.04	0.04	N.D.	36
7	CG3	7.1	17260	10.3	12.0	3	6.24	4.0	0.0	63.6	0.04	0.1	N.D.	750
8	CG3	7.6	19070	11.4	3.0	3	7.68	1.0	0.0	120	0.01	0.07	N.D.	75
9	CG3	7.1	24600	15.0	8.8	2	4.64	0.0	0.0	181.8	0.04	0.06	N.D.	120
10	LS2	3.1	1975	0.9	80.0	8	0.0	0.0	0.0	220	0.01	0.34	N.D.	N.D.
11	LS2	3.5	975	0.3	204	2	0.0	0.0	0.0	105	0.03	0.35	N.D.	N.D.
12	LS2	6.8	230	0.0	28.0	3	5.04	0.0	0.0	30.0	0.01	0.86	N.D.	51
13	LS3	7.1	745	0.1	8.0	20	7.56	0.5	0.0	78.7	0.14	19.16	N.D.	600
14	LS3	3.3	2460	1.1	5.6	30	0.0	0.0	0.0	163.6	0.03	6.87	N.D.	N.D.
15	LS3	7.2	271	0.0	3.0	16	4.64	0.0	0.0	44.5	0.03	1.29	N.D.	150
16	LS1	6.9	178	0.0	1.0	4	5.12	0.0	0.0	16.4	0.01	0.07	N.D.	100
17	LS1	7.3	175	0.0	1.0	3	10.48	0.0	0.0	17.0	0.01	0.04	N.D.	84
18	TC2	7.3	102	0.0	6.0	3	2.24	0.0	0.0	7.80	0.02	0.05	N.D.	59
19	TC2	8.4	151	0.0	1.0	15	6.72	0.0	0.0	10.0	0.04	0.13	N.D.	230
20	TC2	8.5	197	0.0	8.0	6	5.56	0.0	0.0	15.5	0.12	0.47	31	120
21	TC3	6.4	354	0.0	0.6	6	10.64	0.0	0.0	45.5	0.05	0.48	N.D.	150
22	TC3	5.0	445	0.0	0.8	7	5.76	0.0	0.0	59.1	0.06	0.26	N.D.	180
23	TC1	8.4	117	0.0	1.2	5	6.96	0.0	0.0	7.30	0.02	0.06	N.D.	63
24	TC1	7.9	115	0.0	2.0	3	7.16	0.0	0.0	4.50	0.02	0.05	N.D.	59
25	TC1	6.9	164	0.0	11.8	3	5.52	0.0	0.0	14.1	0.06	0.49	N.D.	140

Notes: N.D.: No detected

- Sample No 1 to 9: Cangio Biophere reserve.
  - Sample No 1 to 3: Taken from Mangrove forest (completely protected, CG1)
  - Sample No 4 to 6: Taken from Mangrove forest + shrimp culture (medium disturb, CG2)
  - Sample No 7 to 9: Taken from extensive shrimp ponds (converted to extensive shrimp production, CG3)
- Sample No 10 to 17: Lang Sen wetland area .
  - Sample No 10 to 12: Taken from Melaleuca forest (medium disturb, LS2)
  - Sample No 13 to 15: Taken from rice field (completely disturb/converted to agriculture production, LS3)
  - Sample No 16 to 17: Taken from protected area (completely protected, LS1)
- Sample No 18 to 25: Tramchim National Park
  - Sample No 18 to 20: Taken from zone A3 (medium disturb, TC2)
  - Sample No 21 to 22: Taken from rice field (completely disturb/converted to agriculture production, TC3)
  - Sample No 23 to 25: Taken from protected area (zone A1, completely protected, TC1)

The same numbered samples will be applied for whole sampling period.

Annex 4 Report on socioeconomic surveys conducted in December 03

Using the methods developed during the training workshop in Cantho in Nov 03, the socioeconomic team conducted household survey based on prepared questionaires and PRA exercises at Can Gio (Can gio Mangrove Biosphere Reserve), Tam Nong (Tram Chim National Park) and Tan Hung (Lang Sen) districts. In each study district, sample households (10 households from each hamlet) and households attended PRA sessions selected from the same sites where samples for soil and water were taken.

Following are preliminary summaries of data from household survey and PRA's.

1. Household survey:

1.1. Demographic

Site	*Zone / village*	Average household size (person)	Average household labor (person)
Tram Chim (Tam nong)	Phu Tho C	4 – 5	3 - 4
	Phu Tho B	5 – 6	4 - 5
Lang Sen (Tan hung)	Core	4	2 – 3
	Buffer	4 – 5	2 – 3
Can Gio	An Thoi Đong	4 – 5	3 – 4
	Tam Thon Hiep	6	4 - 5

1.2. Most common income generating activities (% of households)

District	Tam Nong		Tan Hung		Can Gio	
Zone / village	Phu Tho C (%)	Phu Tho B (%)	Core (%)	Buffer (%)	An Thoi Đong (%)	Tam Thon Hiep (%)
Farming	50	100	45.5	45.5	18.2	8.3
Melaleuca cultivation	37.5		27.3	18.2		
Selling labor	12.5		9.1	18.2	36.4	33.3
Fishing			9.1	18.2	9.1	16.7
Trading					9.1	8.3
Shrimp cultivation					9.1	16.7
Fish raising			9.1			
Nipa leaves					9.1	
Broom making					9.1	
Contract fee						16.7
Total sample	**8**	**11**	**11**	**11**	**11**	**12**

1.3. Exploitation of natural resources

Fishery

District	Village	Number of households in sample	Quantity per year (kg/household)
Tam Nong	Phu Tho C	1/8	1020
	Phu Tho B	3/11	453
Tam Hung	Core zone	8/11	755
	Buffer zone	11/11	1195

Can Gio	An Thoi Đong	4/11	980
	Tam Thon Hiep	8/12	374

Catching of natural fishery is the most important source of food and income. Other activities of exploitation of resourse include collecting fuel wood, collecting grass to make broom and nipa leaves to make thatch roof.

1.4. Household income

Estimates of average annual income from sample households

District	***Village***	**Mean income (mil. VNĐ/household/yr)**
Tam Nong	Phu Tho C	46.2
	Phu Tho B	47.5
Tam Hung	Core zone	32.3
	Buffer zone	12.3
Can Gio	An Thoi Đong	5.4
	Tam Thon Hiep	8.4

Seasonal migrants involved mostly in selling labor and catching fishery. Some in-migrants lease land to grow shrimp, raising ducks, collecting wood.

1.5. Views of local people on wetland

1.5.1. Importance of wetland:

District	**Important (%)**	**Not important (%)**
3. Tam Nong	57.9	42.1
Tan Hung	63.6	36.4
Can Gio	87.3	21.7

- **Reasons why wetland is important**
  - Protecting wild animals, aqua-culture resource.
  - Improving livelihood and economic benefit of households.
  - Retaining water to prevent forest fire.
  - Reducing acidity and salt in soil.
  - Preventing tidal and wind erosion.
  - Habitat for fish and wild animals.
  - Providing wood and log.
- **Reasons why wetland is not important**
  - People can not go into forest for exploiting natural resources.
  - Lost land for production (especialy in Tam Nong district).

1.5.2. Recommendation of people for wetland conservation

- **Tam Nong district – Dong Thap province.**

- Planting forest
- Forbiding overexploitation
- Protecting rare birds
- Forbiding forest tree cutting.
- Enhancing awareness.

- Retaining habitat for *Sarus crane*
- Improving livelihood.
- Improving job for local people who live around the area.
- Preventing fire

- **Tan Hung district – Long An province.**
  - Effective administration at provincial level.
  - Increasing protection, forbiding of fishing by small net.
  - Compensation for lost land that is used for construction or conservation.
  - Waste management especially plastic bags.
  - More effective implemention of law
  - Building road for children going to school

- **Can Gio district – Ho Chi Minh city**
  - Training on awareness of importance of conserved forest
  - Forbiding destructive fishing methods such as by electricity
  - Protecting water resource.
  - Not to built dikes for shrimp cultivation
  - Protecting fauna and flora
  - Allowing forest thinning for fuel wood.

2. PRAs

PRA tools, activity calendar and trends analysis, were used to collect information from communities on sources of income, dependence on natural resources and the change of these through time.

2.1 Cần Giờ

Two hamlets Tam Thôn Hiệp and An Hòa in An Thới Đông village differ in living conditions and settlement history. Households in Tam Thôn Hiệp hamlet were resettled by government program, moved from protected forest areas. These households were allocated land and houses. On the other hands, households of An Hoa are mainly long-time settlers.

Many people of Tam Thôn Hiệp involved in shrimp culture. Main production activities include shrimp culture, animal raising and fish catching. First shrimp crop is from December to March and second crop from May to September. Migrant laborers from other provinces, many from far away provinces in the central and northern regions, involved mainly in selling labor (working in shrimp pond building and pond maintenance) and catching fish. Period of having highest income: April to June coincide with shrimp harvesting period and difficult period, especially for hired workers, is from November to January.

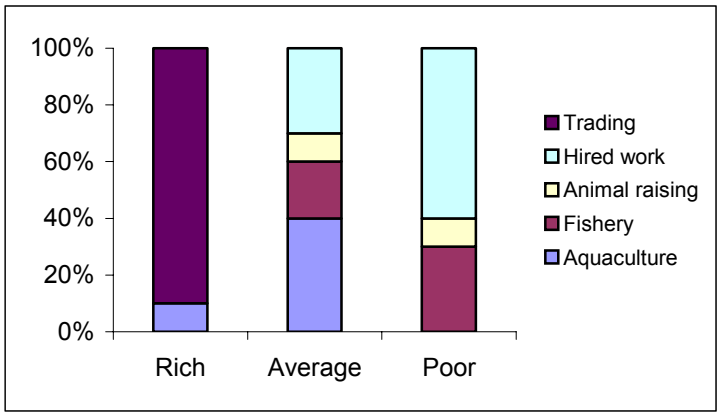
Fish allowed to catch: shrimp, fish, crab (most common), shells. In contracted forest area, people are allowed to harvest nipa leaves.

Pig raising is popular. Average number of pig per household from 5 to 10 heads. Some households have commercial scale of pig raising, with more than 100 heads.

Most important production activites at An Thôn Hiệp hamlet, ordered by people during PRA session

Activities	Score
Aquaculture	26
Pig raising	9
Catching fish	11
Harvesting nipa leaves	4
Honey collection	2
Catching snake	1
Hunting wild pig	1
Hunting other animals	1
Fuel wood	1
Hired work	1

Income structure by wealth group



Historical milestone at An Thôn Hiệp hamlet

Defoliation during the war	Before 1968
Forest cutting	1975
Establishing state farm (now the reserve area)	1978
Forest cutting	1990
Replanting forest	1980 - 1995
Resettling people who live in protected forest area	1997
Allocation of forest area and land	2000 onward
Improving forest protection awareness. Encourage aquaculture and animal raising	2000 onward

Trends at An Thôn Hiệp hamlet as reported by people attended PRA

	Trend	**Reason**
Income from fishery	decreased	High mangrove density, overfishing
Aquaculture	decreased	
Hired work	Unchanged	
Income from forest protection	Increased	Policy
Forest area	Increased	Replanting, steward contracting, exploitation forbiden, thinning not allowed.
Salinity	Decreased	More trees
Salt making	Decreased	Lower salinity
Wild animals	Increased	More forest trees
Forest protection awareness	Increased	Policy measures

In contrast with Thôn Hiệp, about 30% of rice farmers in An Hoa remain in rice farming, others have shifted to shrimp (rice from May to October, shrimp from Nov. to March), planting of nipa. Hired work and fish catching whole year round. Difficult months for people living by selling labor: Aug-Dec due to less available work. Months of income inflow: Feb-March.

The establishment of the Can Gio Mangrove Biosphere Reserve do not have negative impacts on livelihood of local community.

	trend	**reason**
Livelihood	Improved	Can grow shrimp, improved infrastructure: roads, market.
Job opportunity	Improved	Better infrastructure, availability of credit.
Dependence on	decreased	Not allowed.

forest resources		
Fishery	Decreased	Overfishing
Wild animals	Increased	protected
Soil conditions for crop growing	deteriorated	Salt intrusion, more acidity due to less fresh water.
Water quality	deteriorated	Period of fresh water availability decreased from 8-9 months/year to 4-5 months per year.
Roads, schools, health care centers	more	

- Dependence of livelihood on natural fishery and aquaculture.
- Development of shrimp culture increased demand for hired work, improved income of poor people living by selling labor.
- Tourism is developing but still having little impact on local livelihood.
- The period from Aug. to Dec.: low demand for hired work, more pressure on harvesting natural resources.

2.2 Láng Sen (Tan Hung district, Long An province)

Two selected sites for data collection: Cả Sách hamlet in the core zone and Hamlet one in the buffer zone, both in Vĩnh Lợi village, Tân Hưng district belonging to the Đồng Tháp Mười Melaleuca ecological zone.
In the buffer zone, main production activities are rice cultivation, animal raising, and fresh water aquaculture (snakehead). One rice cropping from Dec. to Feb., fish culture from April to Dec., natural fishing from July to Nov. Seasonal migrants (Sept.-Nov.) from An Giang and Dong Thap and other places come to the area for fishing. Lean income months from Nov. to Jan. and income abundant months: Feb. (rice harvesting period).

Income sources of the rich group: melaleuca planting and rice culture.
Income sources of the poor group: rice culture (70%), selling labor (15%) and fishery (15%).

Medicinal plants available at buffer zone, Cá Sách hamlet, Vĩnh Lợi village, Láng Sen. *(will ask plant biologist to translate).*

plant	**Indication**
Gai mướp	Gan
Nhãn lòng	An thần
Dứa gai	Gan
Cỏ trầu trầu	Mát gan
Cứt heo	Huyết áp
Cứt quạ, khổ qua	Bệnh phụ nữ, kinh nguyệt không đều
Nga	Huyết trắng

Time trends at Cá Sách hamlet

event	**trend**	**Reason or impact**
Livelihood	Improved	More rice planting, credit, fishery
Dependence on the protected areas	More	People from other regions
Fishery	Decreased	Dike building, overfishing

Hired work	decraesed	Seeking job in other places
Water quality	decreased	Land preparation, chemicals from rice culture
Soil condition	Improved	Acidity flushed to canals
Transportation	improved	Available motor boats
health	improved	Health center, more availability of medecines

Income structure of local cummunity: 50% from rice, 20% from animal raising, and 20% from hire work and melaleuca planting.

Important events:
1989: building of Cả Nổ canal, cost partially contributed by local people => reduce fire risks, irrigation of rice fields, and easier transport. Households moved to live along the canal.
More melaleuca planting.
More acidity flushed to canals from land preparation for rice growing.
Low access; water transport is the only mean of transport.
Challenge to establishing protected area: people depend heavily on natural resources, seasonal migrants, conflicting interest with people invested in melaleuca planting,

2.3 Tràm Chim, Đồng Tháp
Two selected sites for data collection: Phú Thọ village, Phú Thọ C village, Tam Nông district.

Phú Thọ village: with relative food protection dikes. Main production activities: double rice cropping – winter spring season from Nov. to March, summer crop from May to Aug. Fish cultue from April to Nov. Hired work mainly in rice production. Seasonal migrants come to the area during rice harvesting period and catching of natural fish.
Income sources of the rich group (having large landholding, equipment): 80% from rice.
Income sources of the poor group: 50% from selling labor, 50% from catching fish.
High porvety incidence
Important events: high flood in 2000, 2001, 2002. Heavy damage to houses, roads, famine.
Construction of Đồng Tiến canal: 1958 and dredged in 1998
Establishment of state farm in 1878, no compensation.
Trends:

- Income: decerased due to lost of land for setting up state farm.
- More irrigation facilities
- Dependence on protected area: reduced. (30% of local people having land in the protected areas)
- More schools:
- Extension service relatively inproved.
- Health conditions: deteriorated due to drinking water from canal contaminated by discharge from rice fields and fish ponds.
- Livelihood of local people do not depend on Tram Chim National Park.

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Phú Thọ C village: No flood protection dike. One rice crop from Dec to March. Upland crop from April to June. Fishery from April to Dec. Hired work mainly in rice culture. Aquaculture from July to Nov. Seasonal migrant laborers seek work in rice cutting.

Income sources:
Rich group derives income mainly from rice, service and planting of eucalyptus.
Average group and poor group have 60% income from hired work, 10 % from rice, 10% from fishery and 10% from animal raising.

Events:
Establishment of national reserve area: 1985.
Electrification: 1987.
School building in1999.
Road construction: 2000.

Trends:
More rice production.
Dependence on national park decreased.
Seasonal migrants: harvesting natural resources
Compromising interest of people living in the buffer zone with interest of national park.

2. Planning for the next rounds of socioeconomic survey:
Suggestions for deviation from the original plan: variation of socioeconomic activities of communities at study sites seems to be larger across stakeholders than across months within a season. It is suggested that we can increase the sample size of households and PRA sessions in each round of survey and to reduce the frequency (number of rounds). This deviation from the original plan is also more feasible in terms of budget constraint.
We suggest that the number of rounds of socioeconomic survey to be reduced from once every two months (6 rounds) to 4 rounds, two in dry season and two in the rainy season.
For the dry season, we plan to conduct the next survey in second week of March. Data from the first two rounds will be analysed and reported in the May workshop.
The remain two rounds of the we season will be in July and September.