



Submit by 13 January 2006

**DARWIN INITIATIVE APPLICATION FOR GRANT ROUND 14 COMPETITION:STAGE 2**

Please read the Guidance Notes before completing this form. Applications will be considered on the basis of information submitted on this form and you should give a full answer to each question. Please do not cross-refer to information in separate documents except where invited on this form. The space provided indicates the level of detail required. Please do not reduce the font size below 11pt or alter the paragraph spacing. Keep within word limits.

**1. Name and address of organisation**

<b>Name:</b> Dr Doreen Winstanley	<b>Address:</b> Warwick HRI, University of Warwick, Wellesbourne, Warwickshire, CV35 9EF.
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**2. Project title (not exceeding 10 words)**

Biodiversity and sustainable development of butterfly production (Lepidoptera) in Guyana.

**3. Project dates, duration and total Darwin Initiative Grant requested**

<b>Proposed start date:</b> 1st July 06	<b>Duration of project:</b> 3 years	<b>End date:</b> 30 <sup>th</sup> June 09			
<b>Darwin funding requested</b>	<b>Total</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/2010</b>
	333629	102208	120769	90442	20210

**4. Define the purpose of the project in line with the logical framework**

To undertake a biodiversity survey of the butterfly (Lepidoptera) community and their host plants, within the Iwokrama International Centre for Rain Forest Conservation and Development Reserve, Guyana, which will form the basis for a conservation strategy and a measure of the potential to set up a sustainable butterfly farming co-operative within the North Rupununi District of Guyana. This survey will involve the collaboration of indigenous Amerindian communities within the reserve and the surrounding North Rupununi District. The ultimate aim is to enhance the livelihoods of the 5000 individuals in the 16 rainforest communities in the Iwokrama forest through the sustainable development of a low-tech butterfly farming industry.

**5. Principals in project. Please provide a one page CV for each of these named individuals**

Details	Project Leader	Other personnel (working more than 50% of their time on project)	UK more	Main project partner or co-ordinator in host country
<b>Surname</b>	Winstanley			Thomas
<b>Forename (s)</b>	Doreen			Raquel
<b>Post held</b>	Principal Investigator			Director of Resource Management and Training
<b>Institution</b>	Warwick HRI University of Warwick			Iwokrama International Centre for Rain Forest Conservation and Development
<b>Department</b>	Microbial Sciences			Resource Management and Training

**6. Has your organisation received funding under the Darwin Initiative before? If so, give details**

Warwick University has been involved previously in several Darwin funded projects e.g. in training Darwin scholars (162/05/126) and setting up a Darwin field station in The Gambia.12009).

**7. IF YOU ANSWERED NO TO QUESTION 6 describe briefly the aims, activities and achievements of your organisation. (Large institutions please note that this should describe your unit or department)**

**Aims (50 words)**

Warwick HRI provides academic excellence in plant and microbial sciences and their application to horticulture, crops and the environment.

**Activities (50 words)**

Warwick HRI provides academic excellence in plant and microbial sciences and their application to horticulture, crops and the environment.

Our research focuses on four key areas underpinned by mathematical biology and informatics, microbiology, plant science, environment and ecology and horticulture and crop systems.

**Achievements (50 words)**

Warwick HRI has earned world-wide recognition in its research through publications and specialised and focused events and conferences. Some projects have resulted in the commercialisation of products and services now utilised by growers and the horticultural industry. The expertise within Warwick HRI is supported principally by UK Government funding.

**8. Please list the UK (where there are partners in addition to the applicant organisation) and host country partners that will be involved in their project and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development. What steps have been taken to ensure the benefits of the project will continue despite any staff changes in these organisations? Please provide written evidence of partnerships.**

**Partners within the UK:**

*Natural History Museum:* The identification services of the Natural History Museum will assist where necessary in the clarification of lepidopteran species and in the classification of new species as necessary. This involvement will mainly occur in year two, during the biodiversity study, and writing of the handbook. The Natural History Museum has a team of entomologists who will assist if there are any changes in staff during the project lifespan.

*Kew Gardens:* Botanists at Kew Gardens will be consulted regarding the identification of unfamiliar host Plants and are willing to offer their services.

*Matthews Payne & Bond LLP:* Dr Katharine Payne, a consultant from Matthews Payne & Bond, has direct experience working in Guyana and with Iwokrama and has a good understanding of the culture and infrastructure in addition to the realities of undertaking research work under local conditions within the rainforest and working alongside the Amerindian communities. This experience will be integral to the success of this project, allowing the UK partners to fully understand the local conditions, become acquainted with the structure and organisation of the host partners as well as personnel involved in the project. To date, Dr Payne has assisted in the writing of the project proposals, setting up links between the host country and the UK partner Institution and is expected to assist with the project communication and co-ordinate the proposed visits to Iwokrama and Warwick HRI as necessary. In addition, Dr Payne has experience with evaluating and determining business models and plans for small businesses. Previous Darwin funding assisted capacity building in entomology at the University and an introductory course on techniques for collecting, identifying, storing and preparing an inventory for and preparing an inventory of insects in Guyana. These specimens were added to Guyana's National collection.

**Partners within Guyana:**

*Iwokrama International Centre for Rain Forest Conservation and Development:* Iwokrama have assisted in proposal development and will assist with project implementation.

Iwokrama is an autonomous non-profit institution established by Guyana and the Commonwealth through the donation of 371,000 hectares of pristine tropical rainforest by the Government and People of Guyana to the International Community.

Its mission is,

*“To promote the conservation and the sustainable and equitable use of tropical rain forests in a manner that will lead to lasting ecological, economic and social benefits to the people of Guyana and to the world in general, by undertaking research, training, and the development and dissemination of technologies.”*

Iwokrama is an international programme that is firmly grounded in the reality of people, who live in tropical forests and whose entire economies rest on the fate of their environment. Iwokrama's long term vision is that there will be a proliferation of successful forest management programmes across the world using Iwokrama blueprints for collaborative management and business models.

*The University of Guyana:* Two MSc students will be enrolled at the University of Guyana and jointly supervised by the University and leading researchers at Iwokrama. The University has an established team of entomologists specialising in the Guyanese fauna (ecologists, sociologists and anthropologists) . Two supervisors will be appointed from the University of Guyana and two from Iwokrama to supervise the MSc students. Support from the University of Guyana will be focused within the first two years. The University of Guyana has strong renowned natural sciences and agricultural and forestry departments who have confirmed that they will give support if there are any changes in staff during the project lifespan.

A comprehensive collection of Guyanese Lepidoptera is available for reference in the Centre for the study of Biological Diversity at the University. New collections of species will also be deposited in the collection and stored at the University for research purposes. Links have been made with the University's herbarium. Copies of all reports and publications will be deposited in the University's library.

**9. What other consultation or co-operation will take place or has taken place already with other stakeholders such as local communities? Please include details of any contact with the government not already provided.**

**Other stakeholders:**

*The North Rupununi District Development Board (NRDDB):* This approval and collaboration of the North Rupununi District Development Board will be an integral part of this project. This is a community-based organisation is composed of village leaders and other community representatives and represents 5000 individuals in the 16 communities of the Rupununi region. Iwokrama has helped the NRDDB to establish formal links between the communities and government agencies.

*Ministry of Amerindian Affairs:* Support and approval has been gained from the Ministry of Amerindian Affairs for this project prior to the commencement of work in the region. The Ministry will be kept up-to-date with developments within the region via the project co-ordinator, Iwokrama and the NRDDB.

*The British High Commission:* Support for this project has been gained from the British High Commission in Guyana. Dr Doreen Winstanley and Dr Raquel Thomas will keep the High Commission informed of all visits from the UK partners to the host country.

*The Smithsonian Institute, Washington, DC, USA:* The comprehensive database on Guyanan Lepidoptera which includes the collection from the Natural History Museum will be made available to the project. In addition, they will assist with identification of potentially new species. There will be no charge for this service. They have kindly offered to send experts to the area for one or two brief visits to assist and instruct on the biodiversity survey and recording. Data and specimens of Lepidoptera will be added to Guyanan lepidopteran database and collection at the Smithsonian and to the NHM where appropriate.

*The Environmental Protection Agency:* The Environmental Protection Agency (EPA) is supportive of the projects and will be kept informed about the developments of this project. They have received a copy of the proposal via Iwokrama. Copies of the handbook produced will be sent to the EPA.

## PROJECT DETAILS

**10. Is this a new initiative or a development of existing work (funded through any source)? Are you aware of any other individuals/organisations carrying out similar work, or of any completed or existing Darwin Initiative projects relevant to your work? If so, please give details explaining similarities and differences and showing how results of your work will be additional to any similar work and what attempts have/will be made to co-operate with and learn lessons from such work for mutual benefits.**

A previous Darwin project (162/07/091) significantly enhanced entomological capacity building at the University of Guyana and provided training courses in insect biodiversity. A large collection of Guyanese Lepidoptera is available in the Centre for the study of Biological Diversity at the University of Guyana. In addition, a comprehensive collection of butterflies (and associated database) resulting from a project on Lepidoptera from Guyana and the Ghiana Shield is also available at the Smithsonian Institute in Washington, USA. This collection has also incorporated the Guyana butterfly collection from the Natural History Museum. These collections, including the collection at the Natural History Museum, and associated expertise will be available and will be a valuable resource for this project. Undertaking a study of the butterfly community composition in the Iwokrama district will help to select butterflies with potential for sustainable farming and could add new species to the lepidoptera collection of Guyana. The production of a handbook of butterfly species with details of their distinct morphological features, life cycle, host plant and production methods will provide a manual for sustainable butterfly farming and for training. Assessing potential for a sustainable butterfly farming co-operative in this area is a new initiative within Guyana and South America. Previous biodiversity projects have focused on diversity within particular groups of Lepidoptera but this project will survey the butterfly community composition as well as identify species with economic potential in the butterfly market. This project will build-upon previous biodiversity and socioeconomic studies and existing knowledge within this area such as information and knowledge of existing rainforest plots and trials, known flora and fauna, and details of previous anthropology studies will be incorporated and utilised into this Darwin project. This project will be modelled on the Kipepeo project near Malindi in Kenya, where since 1993, over 700 butterfly farmers have earned over US\$447,000 in revenues from butterfly exports. The model and methodology of local sustainable exploitation of butterfly species has been highly successful in Kenya and monitoring has shown butterfly farming does not deplete the natural populations of butterflies. Dr Doreen Winstanley and Mr Neil Naish have visited the Kipepeo project and have provided advice directly to the farmer representatives on insect health and this experience (and expertise within the team) will help this innovative project become a success within South America.

**11. How will the project assist the host country in its implementation of the Convention on Biological Diversity? Please make reference to the relevant article(s) of the CBD thematic programmes and/or cross-cutting themes (see Annex C for list and worked example) and rank the relevance of the project to these by indicating percentages. Is any liaison proposed with the CBD national focal point in the host country? Further information about the CBD can be found on the Darwin website or CBD website.**

By determining the variety of lepidopteran species and their host plants in the Iwokrama region and assessing the feasibility for the sustainable farming of butterfly species. A major output will be a handbook describing the variety of Lepidoptera in the area and their lifecycles, host plants and rearing procedures will be the basis for the sustainable production as well as conservation of Lepidoptera in this region. This project will demonstrate that the UK science community is committed to contributing to the goals of the Convention for Biological Diversity (Articles 6(5%), 7 (10%), 8(2%), 10(20%), 12(20%), 13(5%), 15(5%), 17(10%), 18 (5%) and 26 (5%) and sustainable use (12%) theme by: a. training and educating six local staff involved in the project who will become future trainers; b. publication of a Butterfly handbook; c. identifying lepidopteran species in the Iwokrama region c. developing methods and carrying out trials to determine the potential for local sustainable butterfly production and d. assembling a “toolbox” for the continuation of butterfly conservation. This project will contribute to the following themes by encouraging: Biodiversity and

Tourism (the study could contribute to establishing a butterfly house in a similar way to the Kipepeo project, an attraction for ecotourists); Economic Trade and Incentives (by the farming of high value butterflies); and Public Education and Awareness and Sustainable Use and Biodiversity (by publication of the butterfly handbook and through publications and the media).

**The Centre for the Study of Biological Diversity at the University of Guyana will be a valuable resource for this project since it houses the collection of Lepidoptera from Guyana and frequent liaisons are envisaged.**

**12. How does this project meet a clearly identifiable biodiversity need or priority defined by the host country? Please indicate how this work will fit in with National Biodiversity Strategies or Environmental Action Plans, if applicable.**

This project will demonstrate that the UK science community is committed to contributing to the biodiversity goals of Guyana's existing National Biodiversity Action Plan (NBAP) in particular programmes 3, 6 and 8 for the Conservation and Sustainable Use of Guyana's Biodiversity by: a. training and educating six local staff involved in the project who will become future trainers; b. publication of a handbook; c. developing methods and carrying out trials to determine the potential for local sustainable butterfly production and d. assembling a "toolbox" for the continuation of butterfly conservation. Half of the one million acres of protected rain forest in the Iwokrama region has been identified for a wilderness preserve but the other half has been assigned as a sustainable utilisation area for development of sustainable economic activities, such as tourism, timber harvesting and research. This project is ideal in that it addresses two positive drivers of the Darwin Initiative, by expanding the Lepidoptera biodiversity database and providing the tools for a new sustainable farming enterprise.

**13. If relevant, please explain how the work will contribute to sustainable livelihoods in the host country.**

This project will consist of a number of stages, namely; i) biodiversity study, ii) socioeconomic study, iii) handbook production and iv) trialling of butterfly farming system. Training will take place at all stages and all stages will contribute to the sustainable livelihoods of peoples in the host country.

The socioeconomic study will assist in determining the feasibility of building a co-operative between the communities of this region. This study will also evaluate the market potential (both nationally and internationally) for a small butterfly farming business. The combined results of the studies will help to determine if a butterfly farming co-operative is feasible and can be established within this region of Guyana. The farming methods will be sustainable and should not deplete forest populations. All training will be sustainable as it is envisaged that trainees will in-turn become trainers within the region helping to analyse baseline information and the monitoring and evaluation of species and assisting with the breeding and propagation of butterflies in situ. In addition, this information sharing and the production of a handbook will assist ecotourism within the region.

If results of the studies demonstrate that sustainable butterfly farming is achievable within the Rupununi then the tools, infrastructure and farmers involved in pilot trials will be in place to establish a butterfly farming co-operative following the completion of this project. This could contribute significantly to the sustainable livelihoods of the communities in the Rupununi region reducing poverty and raising awareness of the potential value of forest resources. At present sustainable ventures within this region include ecotourism, and exploitation of non-timber forest products (NTFPs) such as the breeding of aquarium fish and the production of balata crafts (a type of rubber) honey and/or crabwood oil (a known medicinal product). Currently the Guyanese government is encouraging , the development and sustainable exploitation of forest resources which have lower impacts on the forest and support community level livelihoods other than expansion of the mining and timber industries which have accelerated degradation in past years.

**14. What will be the impact of the work, and how will this be achieved? Please include details of how the results of the project will be disseminated and put into effect to achieve this impact.**

**Assessment of the potential to sustainably farm high value butterflies for the export market with a**

**view to eliminating poverty in the Iwokrama area by creating sustainable livelihoods and expansion of the biodiversity collection of butterflies in Guyana.**

Dissemination of results and knowledge will occur in three main ways:

- 1) Following training into the methodology of undertaking biodiversity studies, the growing of host plants and the breeding of butterflies it is envisaged that the trainees will disseminate some of this information (and thus become trainers themselves) to the local communities.
- 2) The information and knowledge gained of the about butterfly and moth diversity and host plants will be disseminated through the production of a handbook. This handbook will be distributed to local communities and government agencies, educational establishments such as the University of Guyana and information resource centres such as Guyana's National Library and the library in Iwokrama. This handbook will be published in print and on the internet and copies will be sent to the Darwin Initiative.
- 3) Results of the butterfly farming trial will be disseminated and discussed with the local communities (especially those likely to be involved in the potential co-operative) through local community meetings, workshops and the NRDDB.

**15. How will the work leave a lasting legacy in the host country or region?**

This project will leave a lasting legacy in the host country and region at several levels;

- 1) The production of a handbook will provide future reference to the butterfly species (some of which could be endemic) in this region of the Guiana Shield.
- 2) The educating of two MSc students will help to increase the in-country knowledge of local resources. It is envisaged that these two MSc students could then provide advice to others within the country regarding this research. This in-country expertise will help in providing advice for the enhancement of sustainable development.
- 3) Training of local rangers and Amerindians will be long-lasting in the region, increasing the knowledge of entomological biodiversity within the region and allowing the exploitation of resources sustainably.
- 4) Workshops and village meetings will bring communities together, increasing collaboration between groups.
- 5) If both the biodiversity (which will determine butterfly species and the host plant species in the area and the ease of breeding these species and proof-of-concept studies) and socioeconomic studies (which will examine local community dynamics and establish a business model encompassing market analysis, infrastructure assessment and financial models to determine the feasibility and support for the establishment of a butterfly farming co-operative formation) are supportive and if the local communities wish to be involved in a farming co-operative then this formation could prove to have a lasting legacy in the country.

**16. Please give details of a clear exit strategy and state what steps have been taken to identify and address potential problems in achieving impact and legacy.**

The Iwokrama centre is based permanently within Guyana and is supported by the Guyanese government, thus on completion of the project Iwokrama will still continue to work and interact with the local communities of the region. It is hoped that this project will provide the relevant information for i) Iwokrama to sustainably manage or conserve its butterfly populations and ii) for the local communities to gain enough knowledge about butterflies and methods of breeding and propagation for them to make an informed decision about a potential business opportunity.

It is envisaged that if the communities decide to embrace this potential commercial opportunity then advice and support can be gained from Iwokrama following project completion. International interest has already been expressed through the Smithsonian regarding the purchase of butterflies and Neil Naish from Warwick

HRI who will be designated to this project has knowledge of the international butterfly market.

**17. How will the project be advertised as a Darwin project and in what ways will the Darwin name and logo be used?**

The handbook and all press articles and publications, including presentations given at workshops and conferences will incorporate the Darwin logo and acknowledge Darwin funding.

The handbook describing butterfly species and best butterfly farming practices collating all of the information from the biodiversity surveys will be produced and distributed locally (local communities, Iwokrama field station), nationally (National Library of Guyana, Iwokrama Library, Environmental Protection Agency of Guyana and University of Guyana Library) and internationally (Warwick University library, Warwick HRI library, National History Museum, British Library and the Smithsonian Institute).

**18. Will the project include training and development? Please indicate who the trainees will be and criteria for selection and that the level and content of training will be. How many will be involved, and from which countries? How will you measure the effectiveness of the training and will those trained then be able to train others? Where appropriate give the length and dates (if known) of any training course. How will trainee outcomes be monitored after the end of the training?**

Training will be undertaken at several levels and at various stages of the project:

Trainees will include two MSc students (requirement: these students must have attained a degree in a related subject prior to the commencement of this MSc, in addition students should be willing to live, whilst undertaking research, in the Iwokrama reserve), two rangers (requirements: both rangers must have completed the Iwokrama rangers training programme and be willing to work on a long-term project), two Amerindians (both must be willing to work on a long-term project which may involve spending nights away from their village and have a keen interest research studies, it would be advantageous if at least one of the Amerindians had experience with working with past Iwokrama researchers and the rangers. Knowledge of butterflies would be an advantage), and the Amerindian communities.

The progress of the MSc students will be monitored by both the University and Iwokrama supervisors and reports will be sent to the project leader. Student presentations will take place at project meetings. The progress of the Rangers and the Amerindians will be assessed at the regular intervals and feedback will be provided to the trainees. Trainees will constantly be monitored by Iwokrama staff within the region e.g. on progress on the establishment of the database established and by field survey reports.

The project leader will receive direct feedback during visits to the host country.

All six trainees will attend the training workshops for both the biodiversity study and the socioeconomic study. However, it is envisaged that three trainees will undertake the biodiversity study (one MSc, one ranger and one Amerindian) and the other three will undertake the socioeconomic study (one MSc, one ranger and one Amerindian), although all six trainees will work together as a team to assist each other in research as necessary.

All six trainees will attend workshops which will cover the following topics:

Year	Date	Training	Attendees	Trainer and Location
1	Jul 06	Introduction including logistics of working in the region and GPS	Six trainees	Dr Raquel Thomas (Iwokrama, Georgetown)
1	Jul 06	Introduction to biodiversity and socioeconomic studies	Six trainees	Dr Raquel Thomas (Iwokrama, Georgetown)
1	Jul 06	Existing knowledge of butterfly species in the region	Six trainees	Rangers and Neil Naish (Iwokrama field station)
1	Jul 06	Existing trails and plots in the rainforest	Six trainees	Rangers and entomologist; Neil Naish (Iwokrama field station)
1	Jul 06	Methods in scientific research, including monitoring, recording and	Six trainees	Dr Doreen Winstanley Entomologist from

		photography		CSBD/UG (Iwokrama, Georgetown)
1	Jul 06	IT skills/archiving/databases	Six trainees	CSBD/UG
1	Jul 06	Technical writing	Six trainees	Dr Doreen Winstanley (Iwokrama, Georgetown)
1	Feb 07	Plant and Butterfly farming	Six trainees	Neil Naish (Iwokrama)
2	July 07	Diseases of Lepidoptera and disease free production	Six trainees	Dr Doreen Winstanley Neil Naish (Iwokrama)
2	Jul 07	Promotion of project within community with workshops, demonstrations and visits	Local community members, NRDDB representatives and rangers	Dr Doreen Winstanley, Neil Naish, Dr Raquel Thomas and six trainees (Iwokrama field station)
2	Feb 08	Training course for trainers	trainees	Dr Raquel Thomas Member CSBD (Iwokrama field station)
2	Jun 08	Experiences and recommendations of trainees and interested parties	Six trainees NRDDB representatives and rangers	Dr Raquel Thomas Neil Naish Trainees (Iwokrama field station)
3	Jan 09	Methods of farming butterflies and potential markets	Local community members undertaking butterfly trial and interested parties	Neil Naish and the six trainees (Iwokrama field station)
3	Jul 08	Overview of project outputs	CSBD and UG staff and supervisors	Dr Doreen Winstanley Dr Raquel Thomas (Georgetown)
3	Jul 08	Project summary and strategy for sustainable farming discussed	Local community members undertaking butterfly trail	Neil Naish and the six trainees (Iwokrama field station)

It is envisaged that the 6 trainees will become the core in-country / region expertise on butterflies and farming techniques and will be able to assist in any queries and future training.

#### LOGICAL FRAMEWORK

**19. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note. This should not have substantially changed from the Logical Framework submitted with your Stage 1 application. Please highlight any changes.**

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<b>Goal:</b>			
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			
<ul style="list-style-type: none"> <li>• the conservation of biological diversity,</li> <li>• the sustainable use of its components, and</li> <li>• the fair and equitable sharing of benefits arising out of the utilisation of genetic resources</li> </ul>			



<p><b>Purpose</b> To increase knowledge of the butterfly diversity and to sustainably exploit these populations within the Iwokrama forest and surrounding community areas.</p>	<p>New knowledge of the butterfly and moth species including their host plant species of the Guyanese rainforest.</p> <p>A two year Biodiversity assessment completed.</p> <p>Trial butterfly farming system by local communities in place by end of year 3.</p>	<p>Field survey reports and publications by partner institutions, including newsletter articles.</p> <p>Handbook of butterfly species and their host plants completed and published on the internet.</p> <p>Trial butterfly farmers from local communities planted host plants in five different locations and started to breed pupae.</p>	<p>Ministry of Amerindian Affairs continues to support sustainable development within the North Rupununi region.</p> <p>The Government of Guyana continues to support Iwokrama.</p>
<p><b>Outputs</b> Biodiversity and monitoring programme established and functioning through collaboration of two institutions.</p> <p>Production and distribution of handbook about local butterfly species.</p> <p>Development of methods for farming butterflies.</p> <p>Trial of butterfly farming techniques by local farmers.</p> <p>Production and breeding pupae methods.</p> <p>Central species list established.</p>	<p>Two MSc students, two local Amerindians and pool of rangers from Iwokrama trained in biodiversity assessment techniques by the end of year 2, in collaboration with staff from Iwokrama and Warwick HRI.</p> <p>Manual peer reviewed and publication date established. 20 + copies to be distributed by midway through year 3.</p> <p>Manual produced on best farming methods in collaboration with local communities. 20 + copies to be distributed by midway through year 3.</p> <p>Allocation of trial farming areas.</p> <p>Netting of first egg batch for all pupae to develop. Production of first set of pupae.</p> <p>Collection of sample species from forest (male and female species and host plants) and preparation for deposit.</p>	<p>Database established on butterfly biodiversity data (written and illustrative data) including information on stages of development.</p> <p>Field survey reports.</p> <p>Comments received from peer review panel.</p> <p>2 copies sent to Darwin Initiative.</p> <p>Comments received from peer review panel.</p> <p>2 copies sent to Darwin Initiative.</p> <p>Records of all village meetings and workshops attended.</p> <p>Host plant species sown / transplanted onto plot.</p> <p>Production of first set of pupae.</p> <p>Deposition of specimens at the CSBD centre at the University of Guyana . Including host plant species deposited</p>	<p>Trained staff remain within the institution and / or University and train others to use the skills gained.</p> <p>N/A.</p> <p>Biodiversity data supports the viability of a sustainable butterfly farming business.</p> <p>Continued support, co-operation and participation from local populations.</p> <p>Continued Government support for sustainable development.</p> <p>Host butterfly species able to develop into pupae within determined plot area.</p> <p>No disease outbreaks.</p> <p>N/A</p>

		in the herbarium.	
<b>Activities</b>	<b>Activity Milestones (summary of project implementation timetable)</b>		<b>Assumptions</b>
<b>Workshops.</b>	Yr 1: Project planning workshop with project team to establish priorities, methodologies and procedures; Workshop for the 6 people undertaking the biodiversity study covering topics such as assessment techniques, data recording including photography, butterfly and host plant recognition and time management. Workshop on plant and butterfly farming . Year 2: Workshop on diseases of Lepidoptera and disease free production. Yr 3: Information sharing workshop on Biodiversity Surveys with communities and at the University of Guyana. Breeding of butterflies workshop for local Amerindians.		Trained staff remain within the institution and / or University and train others to use the skills gained.
<b>Field research programme.</b>	Protocols for all biodiversity studies established. Field plots for surveys determined.		Field plot representative of region.
Trial farming; plot allocation and planting of host species.	Determine number of local Amerindians who would like to trial butterfly breeding and train at workshop using handbook by Sept 2008. Butterfly host species planted by Jun 2007 and Feb 2008. Butterfly pupae produced on host plants by Feb 2009.		Continued support and participation from local communities.
Viability study to determine the potential for the formation of a butterfly farming co-operative.	Collation of results from the socioeconomic and biodiversity studies. Business plan produced; including market and financial assessments.		Continued Government support for co-operative formation.  Studies support the viability of a sustainable butterfly farming business including seasonality of butterfly production match that of market demand, markets are stable, transport links are adequate for butterfly pupae distribution and cash flow within Co-op will be viable.
<b>Handbook development. (Species handbook and best farming practices handbook).</b>	Collation of information from biodiversity surveys, workshop outputs, local village meeting minutes. Draft manual produced by August 2008. Handbook distributed to local Amerindians by September 2008.		No setbacks occur during biodiversity study.
<b>Publicity Material</b>	Minimum of 3 articles to to Iwokrama press room for publication. In newsletters. Press release following publication of handbook. Project information in local GO and NGO publications (various dates); University of Warwick magazine, radio broadcasts (wherever possible). Butterfly handbook will carry Darwin logo and will be distributed to NHM, Kew, Smithsonian.		No setbacks during study

**20. Provide a project implementation timetable that shows the key milestones in project activities.**

Project implementation timetable		
Date	Financial year	Key milestones
Apr 06	Apr-Mar 2006/7	Recruitment of six trainees (two MSc students, two rangers

Aug 06		and two Amerindians). Database established to record biodiversity data (written and illustrative data) including information on stages of development.
Sep 06		Field plots for surveys determined.
Jun 07 Jun 07 Jun 07	Apr-Mar 2007/8	Year one training complete for 6 trainees (see 18 above). Field survey report and socioeconomic report. Identification of farmable butterfly species and host plants
Jun 07 Jun 07 Jun 07 Feb 08		Establish centre/station for farming project Pupae produced on netted branches of forest plants <i>in situ</i> First year Report submitted Larger scale plots planted
Jun 08 Jun 08 Jun 08 Jun 08 Jun 08 Jun 08 Aug 08 Aug 08 Sep 08 Sep 08 Dec 08 Feb 09 Feb 09	Apr-Mar 2008/9	Collection of sample species from forest (male and female species and host plants) and preparation for deposit. Field survey reports and publications by partner institutions, including newsletter articles. Field survey report. Completion of 2 year biodiversity assessment. Completion of 2 year socioeconomic study. Second year final report submitted Handbook detailing butterfly species and their host plants completed. Handbook peer reviewed and publication date established. Production of handbook, publication on the internet. 20 + copies of handbook distributed (including 2 copies to the Darwin Initiative). Trial butterfly farming system by local communities in place. Butterfly pupae produced on host plants.
Mar 09 May 09	Apr-Mar 2009/2010	Collation of socioeconomic and biodiversity studies. Business model determined and business plan produced.
<b>Jun 09</b>	Apr-Mar 2010	<b>Final Report submitted with handbook</b>

**21. Set out the project's measurable outputs using the separate list of output measures.**

<b>PROJECT OUTPUTS</b>		
<b>Year/Month</b>	<b>Standard output number (see standard output list)</b>	<b>Description (include numbers of people involved, publications produced, days/weeks etc.)</b>

Jul 06 – Jun 08	2	Two students from Guyana will attain a Masters qualification following 2 years research.
Jul 06 – Jun 09	5	Six trainees will gain at least one year of training in biodiversity and socioeconomic studies and accreditation for completing Iwokrama Personnel Development Programme.
Jun 08 – May 09	6A	Five members of the local community in Guyana will be given training in planting host plants and the identification and breeding of butterflies.
Aug 06 – Jun 08	7	Database will be produced to record species. This can be updated and utilised by Iwokrama following project completion.
Sep 08	7	Handbook production will allow future identification.
Jul 06 – Jun 09	8	The four UK project staff will spend a total of 30 weeks in Guyana between them over 3 years.
Aug 08	9	A species management plan is to be produced for this region for butterfly species and host plants.
Sep 08	10	One handbook will be produced of butterfly and host plant species in the region and detailing methods of butterfly breeding. This will assist future work related to species identification, classification, recording and breeding of butterflies.
Jun 09	11B	A paper will be submitted to a peer reviewed journal if a new species is identified.
Aug 06 – Jun 09	12A	One database will be established to record butterfly species and host plants in the region. This database will consist of illustrative and written data. This database will be handed over to Iwokrama following project completion.
Jul 08	13A	Two collections will be deposited at the University of Guyana. The butterfly host plant species will be deposited in the in-country herbarium for future reference. Butterflies (male and female) specimens will be deposited at the CSBD for future reference. New species will also be deposited at the CSBD (and NHM and the Smithsonian Institute if available)
Jun 09	13B	The CSBD reference collection at the University of Guyana for butterflies and plants to be enhanced
Jun 08 and 09	14A	Four seminars will be organised (two per year in year 2 and 3) to disseminate finding of both surveys. Two seminars will be held at the Iwokrama field station for the local communities and two will be held at the Iwokrama head office, Georgetown/University of Guyana.

Oct 08	15B	One local press release will be made following the production of the handbook. This will be made in Guyana.
Jun 06, 07, 08 & 09	16A,B&C	A minimum of three articles will be submitted to the Iwokrama press room for publication in their quarterly newsletter.
Jun 09	20	The two laptops, digital cameras and printers will remain with Iwokrama following the completion of the project. Estimated value of £4000
	22	Number of field plots established and netted cages???
	23	Value of resources raised from other sources (i.e. in addition to Darwin funding) for project .

### PROJECT BASED MONITORING AND EVALUATION

**22. Describe, referring to the Indicators in the Logical Framework, how the progress of the project will be monitored and evaluated, including towards delivery of its outputs and in terms of achieving its overall purpose. This should be during the lifetime of the project and at its conclusion. Please include information on how host country partners will be included in the monitoring and evaluation.**

There will be regular visits to Guyana and on each occasion all trainees will be present at meetings. They will provide regular updates in the form of presentations, discussions and presentations. The participants will receive feedback and will be given encouragement , and discuss and agree targets with the project leader and Iwokrama and University supervisors for the next time period. The progress of the MSc students will also be monitored directly by the University of Guyana and Iwokrama. They will make presentations at seminars during their studentship.

Annual progress will be discussed with the trainees and interested participants and annual reports will be prepared for Defra and copied to Iwokrama, the CSBD and the University of Guyana. A final report will be submitted to Defra at the end of the project and copies sent to Iwokrama, CSBD and the University of Guyana libraries.

Progress will be evaluated in relation to the activity milestones and project implementation timetable.

NRDDB, Amerindians and rangers will be important in evaluating the reception and perception of the project by the local population. The trainees will be particularly important in feeding back information at the regular project meetings.

At the conclusion of the project the biodiversity and socioeconomic studies will be collated. Discussions will be held with the community, Iwokrama and the trainees and feedback will be sort relating to new species of butterflies, the potential value of the manual to the community and a measure their willingness and enthusiasm to develop butterfly farming. A business model will be developed and a business plan produced to accompany the manual, which will provide Iwokrama with the information to proceed with another initiative and can be used to support new funding applications.