

Darwin Initiative Annual Report

Darwin Project Information

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Project Title	Biodiversity and sustainable development of butterfly production (Lepidoptera) in Guyana
Country(ies)	Guyana
UK Contract Holder Institution	University of Warwick
UK Partner Institution(s)	Natural History Museum, Kew Gardens, Matthews Payne & Bond LLP
Host country Partner Institution(s)	Iwokrama International Centre for Rain Forest Conservation and Development, The University of Guyana.
Darwin Grant Value	£322993
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Project Leader Name	Dr Doreen Winstanley
Project website	Guyanabutterflies.com
Author(s), date	Dr Doreen Winstanley, April 2008

1. Project Background

The purpose of this project is 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.

Guyana is situated along the North Eastern Coast of South America 56°20'W and 61°23'W, and 1°10'N and 8°35'N. The characteristic vegetation is tropical rainforest interspersed by patches of savannah. In 2001, one million acres of pristine rainforest were zoned into Sustainable Utilization and Wilderness Preserve. This region has great potential as a source of butterfly biodiversity and sustainable butterfly farming. Tropical rainforests are renowned for their high diversity of fauna and flora and lowland evergreen rainforests such as the Iwokrama Forest Reserve are thought to be the most species rich out of all tropical rainforest. One main road runs from Georgetown, the capital, to Lethem where the ferry crosses to Brazil. This unpaved road is the main route for timber and commercial and private vehicles travelling from Georgetown to Brazil and passes through the Iwokrama forest. A bridge is under construction which will connect Guyana and Brazil and will have a great impact on the local communities as the area becomes more accessible. The road passes close to Fairview, the community within close proximity to the Iwokrama Research Field station, the latter acts as a training, research and ecotourism centre. Also there are two small airstrips, one at Annai and one at Fairview, the latter being constructed after the start of this project. In addition, other developments in this area are resulting in rapid changes e.g. Fairview has received the title to their land allowing them to benefit from sustainable logging, as a result of a tripartite agreement between Iwokrama International, a logging company and Fairview, and currently there is a "gold shout" close to Fairview.



This project was inspired by the Kipepeo project (<http://www.kipepeo.org/>) near Malindi in Kenya (which the UK team had previously visited), where since 1993, over 700 butterfly farmers have earned more than US\$447,000 in revenues from butterfly exports. The model and methodology for local sustainable exploitation of butterfly species has been highly successful in Kenya and monitoring has shown that butterfly farming does not deplete the natural populations of butterflies. There are close parallels between the Kipepeo project and the proposed Guyana butterfly project. Kipepeo (Swahili for butterfly) is a community based enterprise that supports the livelihoods of people living around Arabuko Sokoke forest in coastal Kenya, East Africa. This provides an incentive for their participation in the conservation of a forest with high biodiversity and endemism. Kipepeo seeks to demonstrate the tangible link between conservation and livelihood. Kipepeo currently sells butterfly and moth pupae and other live insects as well as honey and silk cloth produced by the community. The pupae are exported and the live insects emerge as adults and are displayed in butterfly houses worldwide. Kipepeo coordinates production and sales, and ensures thorough training and monitoring so that the insects are bred and raised on-farm in a sustainable manner from wild parent stock. The butterfly display house at Kipepeo enhances ecotourism and is ideally situated close to the Gede Ruins National Monument and near the world famous Watamu beach. Over 100,000 people live in 50 villages adjacent to the Arabuko Sokoke forest. Most are small-scale subsistence farmers who utilize the forest for some of their livelihood requirements. The Kipepeo project has been evolving and consolidating for 15 years and the success of Kipepeo would not have been possible without the support of numerous donors and partners who have been involved with the project at various stages from its inception right through to the present e.g. National Museums of Kenya, The East African Natural History Society, GEF, USAID, EU, USAID-FORREMS, UCN (Netherlands) and ICPE. The challenge of our project will be to inform/initiate such an enterprise starting with a butterfly biodiversity study of the target areas, selecting economically important butterflies for farming, developing farming protocols, creating a butterfly farming and distribution centre, training community members in on-farm production of butterfly pupae, developing a business plan and ensuring that the necessary paperwork is in place for their export and finally targeting the US, UK and European butterfly markets. In addition, a new comprehensive butterfly collection will be established at the CSBD at the University of Guyana and survey data analysed for publication. This will provide a biodiversity baseline that will inform on the potential impact of sustainable enterprises e.g. a handbook of butterfly diversity and farming protocols will be produced for training and ecotourism.

This project will involve the collaboration of up to sixteen indigenous communities within the reserve and the surrounding North Rupununi. The intention is to engage and involve the communities directly at an early stage and to share knowledge and training with the widest group of Amerindians as possible by cascade learning, demonstration plots and training to ensure a strong legacy of know-how and interest in butterflies.

At Kipepeo producer associations are mainly butterfly farmers and beekeepers and they participate in the management of nature-based enterprises at Kipepeo through the Market Place Committee that acts as its Board. The groups are also actively involved in forest protection, advocacy and awareness creation of the benefits of the nature based enterprises.

The business management structure of a potential community based butterfly business at Fairview has yet to be determined.

The butterfly centre being developed at Fairview is located close to Iwokrama Field Station, an important training and ecotourism centre and close to transport links. Already tourism companies have made enquiries about the opening date of the butterfly house to add an additional venue to their ecotourism itinerary. Iwokrama and the North Rupununi have a rich diversity of butterflies and moths and is already becoming popular as a birding venue.

2. Project Partnerships

The Iwokrama International Centre for Rain Forest Conservation and Development is important in delivering the project aims and objectives in the host country. They receive quarterly payments from the University of Warwick, which they use to pay stipends for the two MSc students and the two Iwokrama rangers that have been seconded to this project. They also manage the budget for the in-country costs relating to food, accommodation and transport, as well consumables and equipment necessary for the project. Iwokrama also manage the budget for the associated costs relating to the two community members on the project, however they transfer their salaries directly to NRDDDB for payment to the individuals. We have developed a good working relationship with Mr Dane Gobin who administers the in-country part of the Darwin funding. The Warwick HRI accountant Mr James Argyle, Mr Dane Gobin and I are in regular contact to ensure that the finances run smoothly and to discuss any problems. Dr David Singh, who was the Chief Executive of Iwokrama, has moved now to head Conservation International in Guyana and his position at Iwokrama has been filled temporarily by Mr Dane Gobin until another CE is appointed. We will remain in contact with Dr Singh who is interested in helping biodiversity and conservation projects in the region.

Dr Raquel Thomas is our project manager at Iwokrama but Mr Hemchandranauth Sambhu (Sambhu) is responsible for the project on a day to day basis. Sambhu, one of the MSc students, is on study leave from Iwokrama. He was a member of the Darwin Wetland project team in Guyana prior to the butterfly project and has experience of working in our target area, namely the Iwokrama forest and North Rupununi district. Sambhu and Ms Gyanpriya Maharaj (Priya) are important in organising and co-ordinating our visits to Guyana. We plan to visit Guyana three times a year but in this financial year we visited Guyana in July and October. Our third visit was postponed until April 1st 2008 because the Guyanese MSc students attended the post-graduate symposium in Warwick in March. These regular visits to Guyana have enabled us to develop good working relationships within the project team and other interested parties in Guyana. We have meetings with Dane and Raquel when we visit and keep in regular contact by e-mail.

A vehicle (called the "B team" and bearing a Darwin logo) was purchased from the Darwin project budget to allow the team to conduct the monthly butterfly surveys, community visits and to develop the butterfly farming. The vehicle has been a valuable resource, however carrying out modifications to the vehicle has been protracted e.g. a canopy and seat to the rear of the vehicle have only recently been fitted and a radio has still to be installed. Iwokrama employed a driver for the vehicle; sadly the driver (in another vehicle) was involved in an accident in which his arm was amputated. Another driver has been appointed. A question relating to adequate insurance was revisited.

Recently, Iwokrama has increased its emphasis on ecotourism to bring in income. This has had a knock on effect, since there is less accommodation for research and training and new accommodation for trainees is on hold. The butterfly centre is located close to the field station and members of the team will be working there throughout the year and I am concerned that safe mosquito proof accommodation may not be available.

Miss Samantha James, the outreach officer from Iwokrama has been very valuable in promoting the butterfly project in the community by educating the young people (8 to 17 years old) from the Wildlife clubs about butterflies.

This year one of the MSc students (Ms Kaslyn Holden) resigned from the project. Kaslyn was replaced by Ms Gyanpriya Maharaj (Priya), an assistant lecturer from the University of Guyana.

She will be responsible for the butterfly survey and carries out her butterfly processing activities at the CSBD (Centre for studies on Biological Diversity). Mr Calvin Barnard who is the Head of the CSBD has regular contact with Priya. We meet with Calvin to discuss progress.

This project is building capacity to meet their CBD commitments through documenting butterfly biodiversity and identifying their host plants; and developing the potential for sustainable livelihoods in the target areas of the Iwokrama rainforest and surrounding North Rupununi District. The butterfly project will benefit both Iwokrama and the University. Iwokrama has an interest to promoting sustainable non-forest timber initiatives in the designated area and is very supportive. This will support and strengthen their effort. The socioeconomic aspects of the project are important in encouraging direct involvement in conservation and sustainable exploitation of their resources. Knowledge of local butterflies and their seasonality and phenology will inform ecotourism, one of the priority areas for the Iwokrama and the region. The establishment of the "Kawi Butterfly Centre" at Fairview will provide a butterfly training and production centre as well as an ecotourism opportunity.

Partnerships with other UK or Regional partners

Mr Neil Naish moved from the University of Warwick to join Oxitec in Oxford, in October 2007. Subsequently, he has been appointed as a consultant on the project so that he can continue to instruct and advise the team on butterfly identification and farming. He has first-hand knowledge on the tropical butterfly and moth market and in butterfly production. His expertise will help to ensure the success of the butterfly production initiative and marketing. In March the two MSc students visited the UK, which provided an opportunity to visit Gwilym Lewis, an expert in tropical *Leguminosae*, at the **Herbarium at Kew**. High value butterflies present in Guyana e.g. Morpho species are known to have leguminous host plants. He was very enthusiastic about the project and offered to identify free of charge any the leguminous host plants of butterflies of interest. His only condition was that the plant specimens were prepared correctly and had fruits and flowers. He demonstrated specimen preparation technique. Gwilym presented both MSc students with a book entitled "Legumes of the World" by Gwilym Lewis, Brian Schrire, Barbara Mackinder and Mike Lock, to be added to the libraries of Iwokrama and CSDB, respectively. There are also resident experts on the Passiflora, which are common host plants for other butterflies of interest e.g. Heliconids.

The students also visited **the Entomological Library of the Natural History Museum** at Wandsworth. They met Ms Blanca Huertas who is currently involved in the Tropical Andean Butterfly Diversity Project (www.andeanbutterflies.org) another South American butterfly survey in which Darwin has some involvement. She showed us some of the Neotropical butterflies and invited Priya to come to the NHM to learn more about butterflies. She is very keen to visit Guyana and assist in butterfly identification. Several staff have retired from the NHM and our new contacts are extremely enthusiastic and willing to offer their services. Her knowledge of collecting and preserving specimens for modern DNA analysis as well as more traditional methods could provide a useful resource to the legacy component of this Darwin initiative.

The MSc students visited **the Stratford upon Avon Butterfly Farm** where they met Mr Richard Lamb and had first hand discussions with a UK importer of butterfly pupae and other live insects, as well as the opportunity to see the type of establishment in which Guyanese pupae may be displayed in UK, Europe or USA. The Stratford Farm has a butterfly display house but more importantly is a centre for the distribution of imported pupae to the UK and Europe. Useful information on the care of pupae, egg laying and butterfly maintenance within a captive environment was obtained. They already trade butterflies from South America and have given advice on species of interest to them. They have been supportive of the project and have allowed BBC TV to use the centre as a backdrop for a report on the Darwin project. They have also agreed to allow the University of Warwick to film for an iCast on the Darwin project in May 2008.

The University of Warwick also has expertise in insect pathology and will provide advice and training on pests and diseases of caterpillars.

During the last year, scientists at Warwick HRI, a department of the University of Warwick have been working on a number of projects associated with biodiversity and the environment, most of which have been funded by Defra. Project titles include 'Climate change impacts on the delivery of biodiversity through agri-environment schemes', 'Ecosystem services for climate change adaptation in agricultural land management', 'Environmental footprint and sustainability of horticulture - a comparison with other agricultural sectors', 'Impacts of increasing biomass production on biodiversity and landscape' and a 'Review of the scientific literature to determine the extent of knowledge on the impact of crop management strategies on soil microbial populations'. These projects are building capacity at Warwick making them more effective partners.

Two members of the butterfly team were trained in biodiversity monitoring in a previous Darwin Initiative project on wetland management in the North Rupununi. This year they were able to share resources with the **Wetland team** involved in an additional one year follow on project. For example, the Wetland team were able to share the Darwin funded vehicle and the butterfly team were able to submit butterfly project highlights in the Wetland Bulletin.

Other Stakeholders

The North Rupununi District Development Board (NRDDB) is a community based organisation composed of village leaders (Tousho) and community representatives and is currently chaired by William Andries. An update of the butterfly project is presented by Sambhu at the quarterly meetings. The UK partners were present at the December meeting held at Bina Hill Institute, Annai and were introduced to the current membership. The board are supportive but are waiting to see how the project develops. The NRDDB will be heavily involved in the community based business if it is adopted and it is important to keep them informed. The project was also presented directly to the communities at the Heritage month celebrations at Annai via the "Darwin Booth" displaying both Darwin projects. We are fortunate that Delano Davis one of the community members on the project team is on the NRDDB council. In December 2007 Sambhu met with Minister Rodrigues, the Minister of Amerindian Affairs in Georgetown. Although she could not offer any immediate support she recommended that we contact GMTCS, a farmer's co-operative in the NW region (which collapsed due to infiltration) and other NFTP (non-forest timber product) initiatives to learn from past experiences. As a result we have been in contact with Mr Rodney Davies (an ex Director of NRDDB) who was a member of the team involved in the original community based ornamental fish business. He went through the history, development and subsequent discontinuation of the ornamental fish business which had benefited from DIFID and IUCN (World Conservation Society funding from the Netherlands give small grants to develop community tourism businesses) funding. He described the technical difficulties encountered in shipping the fish overseas and blamed the change in weather pattern for the failure of the business due to four years of exceptionally high floods. In addition, the fish export business was seasonal from November to April, the dry season. In spite of this Rodney is re-starting the fish export business as a private enterprise using the expertise he acquired from the community based project.

We visit the **British High Commission (BHC)** on each visit to Guyana to update them on the progress of the project. The Deputy High Commissioner Malcolm Kirk has taken an interest in the project and supported our application for financial assistance to complete the butterfly house at Fairview. The butterfly house is bigger than we had originally planned and required additional funding to be able to cover it with transparent roofing panels. The BHC awarded the project just over 2 million Guyanese dollars, over £5000. This was publicised in two national newspapers (<http://www.stabroeknews.com/?p=571>).

Environmental Protection Agency (EPA) To keep EPA abreast of our progress we send six monthly and annual reports and we visit EPA on our visits to Guyana. In addition, Sambhu and Priya have delivered a power point presentation to EPA this year,

The Wildlife Division We visit the Wild Life Division on every visit to Guyana so that Ms Alorna Sankar (CEO) can guide us through the steps necessary to be able to export butterflies to the UK and Europe. To date we have taken steps to obtain a licences for Fairview so that the

butterfly centre can act as a holding station (licence \$GY 50,000) and for commercial exploitation (licence \$GY50,000). Ms Sankar will be able to issue these licences subject to satisfactory inspection of the completed butterfly house. These licences have to be renewed annually. An export permit will be required for each shipment of butterflies which will cost 20% of the value of the shipment plus a 1.5% customs and excise fee. This is payable in advance. On our last visit in April 2008 we delivered a list of fifteen butterflies that we plan to export in the trial period together with the value for each species to determine the fee to be paid for the permits. The butterflies will be shipped at the pupal stage and must be inspected by the Wild life Division prior to export. An update meeting was organised on our last visit to discuss the details of shipping pupae from Guyana and to obtain fee information etc.

Customs and Excise Services: Sambhu has been in contact by phone with various members of customs and excise on several occasions but as yet he has not had a meeting with them. It is important that we meet to discuss the inspection procedure for the pupae.

Narcotics Unit (CANU): We have not made contact with narcotics to date but it is important that they are aware of the fragility of the pupal shipments. This will be addressed.

Fairview: Fairview village donated about one acre of land for the construction of a butterfly centre. A Memorandum of Understanding was signed with Fairview allowing the use of the land for butterfly production. Sambhu has regular meetings with the Touseho of Fairview to update him on the progress of the butterfly farm. Fairview will be involved in the butterfly business if it becomes established, at least as licence holders. To date Fairview is adopting a wait and see policy, since the completion of the butterfly house was delayed. Also, the village has become involved in sustainable logging and a recent gold rush. As a result it has been difficult to obtain and retain paid gardeners from Fairview.

Other Collaborations

Darwin Initiative Wetland Project: In Guyana we made contact with Dr Andrea Beradi and his family from the Wetland project covering the North Rupununi District. The outputs of the butterfly project will support the ecotourism aspect of their project and both projects have been able to gain mutual benefit e.g. by sharing information and resources

Society for Sustainable Operational Strategies (S-SOS). As a result of a public presentation on the butterfly project in Guyana we made contact with S-SOS, an organisation of ex-NGOs and of business men led by Jerry La Gra, whose aim is to offer their expertise and services to ensure the sustainability of local businesses. They have experience in supporting and improving the local peanut and cassava project that supplies local schools with traditional meals. This organisation may be valuable in offering business training and support to the Amerindian members of the team who will develop the business.

The CBD focal point: The CBD focal point in Guyana is Dr Roger Luncheon, Head of Presidential Secretariat based in Georgetown and Mr Doorga Persaud, Executive Director of EPA. So far we have not made contact with Dr Luncheon but we visit EPA each time we visit Guyana to update them on our project. The project also has regular contact with Mr Calvin Bernard from the CSBD at the University of Guyana. Priya is based at the CSBD and has daily contact with Mr Bernard. The new butterfly collection will be housed in the CSBD and the existing butterfly collections reviewed. An electronic database of the collection will be made available to CSBD. Iwokrama and via the internet

3. Project progress

3.1 Progress in carrying out project activities

The butterfly team

Before describing progress in our activities I will briefly describe the “butterfly team”. It consists of 9 members (including Raquel Thomas from Iwokrama (in country collaborator), Neil Naish (UK consultant) and Doreen Winstanley (UK project leader). Dr Katherine Payne was a consultant at the start of the project with in-country experience. There are two MSc students Mr Hemchandranauth Sambhu (Sambhu) and Ms Gyanpriya Maharaj (Priya) who are registered at the University of Warwick for an MSc in Plant and Environmental Studies. Priya is responsible for the butterfly knowledge output of the project and her thesis will focus around butterfly biodiversity. Sambhu’s focus will be mainly on the socioeconomic aspects of butterfly farming and research aspects and practicalities of butterfly farming. There are two community representatives, Delano Davis and Verly Jacobus and two rangers, Ryan Roberts and Arnold Jacobus who are involved in all activities and will play an important role in developing the butterfly business. All the team have been involved in the butterfly and socioeconomic surveys in the area from November 2006 until December 2007. This has often consumed two whole weeks out of every month, leaving only one week for farming related activities. The team are given one weeks leave at home (e.g. rangers and community members) or return to Georgetown to continue work. This has been problematic since no members of the team have been available for almost three out of four weeks to maintain and develop the butterfly farm or to look after experiments. Local members from Fairview were hired to look after the farm but so far three sets of helpers have resigned and this had an adverse effect on plant propagation and weed control. However, since December the activities of the team have been divided with Sambhu and Delano taking more responsibility for the farm. They have organised a rota system for leave has been organised so that at least one team member is always working at the butterfly farm. This means that experiments and plant maintenance can be conducted in an efficient manner, either on the farm or the nearby Iwokrama field station.

Butterfly Biodiversity Knowledge.

Butterfly surveys are conducted along six 1 km transects in locations representative of the diversity of vegetation in Guyana, which consists of tropical rainforest interspersed with patches of Savannah to provide a true picture of species diversity. Three selected sites are as follows:-

A forest site (transects include; Turtle Mountain, Canopy Walkway & Fair-View).

An intermediate (savannah-forest) site (transects include; Surama Access Road & Burro-Burro Trail).

A savannah site (transects include; Kwatamang School, Kwatamang Landing & Clarence Mountain Aranaputa).

The Monthly butterfly surveys began in November 2006 at the pre-selected locations using sweep nets to capture butterflies; baited traps were not available at this time. The catch was limited by the collection method and hanging baited traps, made locally, complemented the netting method for the butterfly surveys. The baited traps could only be incorporated into the surveys in July 2007 and it was agreed to restart the annual survey so that we would achieve a more comprehensive survey using both trapping and netting techniques. This will be completed in June 2008. The preparation of the butterfly specimens and the recording of the survey data were delayed due to the resignation of the MSc student (Kaslyn Holden), who was responsible for the preparing and recording the monthly butterfly collections. The surveys were continued by the team during July, August and September but the butterflies were not processed. In October, a replacement MSc student (Priya) was appointed who took part in the surveys from October onwards. However, she was presented with a backlog of butterflies dating back from

July 2007. I am happy to say that Priya has processed (set, dried and photographed) all the butterflies collected from October onwards and they have been entered onto the database. Priya needs help in processing the large backlog of butterflies but so far no undergraduate students have been available or interested. We will try to help resolve this. The survey is now a well organised procedure and traps, netting and recording are all routine procedures. The butterfly collecting for the biodiversity survey should be completed by June 2008. The monthly collections will allow studies on the seasonality and phenology of different species of butterflies to be recorded for the first time in Iwokrama forest and the North Rupununi district.

A collection of set butterflies with their identification (where known) is being assembled but because of the deleterious conditions at the CSBD a duplicate collection should be archived at the NHM. Some of the butterfly collections at the NHM are over 100 years old and still in excellent condition. Collation and detailed analysis of the information from the biodiversity surveys can proceed after all the butterfly specimens have been processed. Preliminary analysis on some of the monthly collections has been carried out. Trees and plants in the collection areas have been photographed to inform on potential host plants for the butterflies collected at those transects. Specimens of host plants have yet to be prepared for dispatch to Kew Herbarium. An Inga species has been identified as a host plant for *Morpho achilles* and a specimen will be sent in the near future when it is bearing flowers and fruits. Preliminary analysis of the butterfly surveys shows that for the period October 2007 to March 2008 (mostly dry season) the most abundant family of butterflies was the Satyridae followed by the Nymphalidae, Pieridae, Heliconiidae, Morphidae, Hesperidae, Riodinidae, Lycaenidae, Brassolidae, Danaidae, Papilionidae and the Ithomiidae being the least prevalent family in the selected transects (see table 1). The most prolific transect is the one located at Fair View which is in a forested area. This is followed by Aranaputa, a savannah area and then by very closely by Surama which is an intermediate savannah/forest area (see Table 2).

Table 1 showing: The Total number of Butterflies collected from October, 07 to March 08 and their respective Families.

Families	Number of butterflies
Brassolidae	58
Danaidae	15
Heliconiidae	268
Hesperidae	156
Ithomiidae	20
Lycaenidae	104
Morphidae	117
Nymphalidae	369
Papilionidae	13
Pieridae	282
Riodinidae	128
Satyridae	1200
Moth/Unidentified Damaged specimens	270
Total	3000

Table 2 showing: The Total number of Specimens collected from October, 07 to March 08 and the transects in which they are found.

Transects	Number of Specimens
Turtle Mountain	218
Canopy	400
Fair View	614
Surama	539
Burro Burro	449
Kwatamang Landing	132
Kwatamang School	76
Aranaputa	572

Two main factors have delayed the completion of the butterfly survey; restarting the butterfly survey to include baited traps and the resignation of the first MSc student. This has also impacted on the completion time for production of the training manual on butterfly diversity and butterfly farming and the workshop on biodiversity surveys targeted at the communities and the University of Guyana. I am pleased to say that Priya is working extremely hard to catch up with this aspect of the project and is learning very quickly. Protocols for the biodiversity studies are being prepared.

Neil Naish goes through the latest butterfly collection on each visit at the CSBD with Priya and the team have also helped to sort the butterflies into families and where possible into genus and species. A comprehensive collection of valuable butterfly books has been purchased to aid and confirm identification of unfamiliar species. These will be left in the CSBD in Guyana when the project is completed. Any unknown specimens will be identified with the help of the NHM., held with the team and a protocol for individual storage was agreed.

Data handling and storage

Large amounts of information are now being accumulated within the project and so steps were needed to centralise reports, presentations, data and images. Initially we had hoped that the web space available to the domain www.guyanabutterflies.com would be a central space to which team members could send data. However, upload speeds in- country and general reliability meant that this was impractical. Discussions were held with the team and protocols for individual storage agreed. Two 500 GB external hard drives were purchased one to be held in the UK and the other in Guyana. All members of the team were provided with folders in which their content could be stored. This in turn will be backed up to the University of Warwick M drive for security. The drives will be updated each time we travel to Guyana.

Butterfly farming scientific

Workshops were carried out in December to reinforce previous workshops on plant and butterfly farming and to help Priya who had missed the previous workshops. There was a session on photography which was particularly useful for Priya, who is photographing each specimen for the electronic database. This training has also improved the quality of photography for the rest of the team. Digital images of each butterfly specimen are being recorded using a single lens reflex digital camera. Images of different butterfly life cycle stages and their host plants are being recorded by all members of the team. Each team member has a snapshot digital camera and there are four laptop computers and two 50 gigabyte external hard drives in use to store all the data. These resources were provided by the project. The recent training session on data handling and storage has been valuable. This material will be exploited

for the compilation of the handbook on butterfly biodiversity and butterfly farming. Protocols are being prepared on farming methods and on the methodology for butterfly biodiversity and will be completed by December 2008. These will be incorporated into the butterfly handbook.

Methods are being developed for the production of a range of butterfly species in the target area. The priority has been in identifying local butterflies of economic value as well as their host plants. Careful observation of the behaviour of the butterflies searching for suitable host plants for oviposition has led to success in identifying host plants and sites where eggs have been deposited. The branches containing the leaves with eggs have been netted and larvae reared to the pupal stage. The team have received GIS training this year and this is valuable in fixing a location on the plant. In some cases the detached branch has been brought to the field station where the larvae have been allowed to develop in a more protected environment. Once the pupae emerge as adults the male and female adults are allowed to mate and large numbers of eggs are laid on the appropriate host plants. As a result of careful observation a *Morpho achilles* was shown to oviposit on a leaf of an *Inga* tree. The resulting single larva is being reared on the *Inga* species (the identity is still to be confirmed by Kew). The larva has been reared for 78 days and is near pupation. Other methods have been less successful such as forced oviposition by butterflies in closed plastic bags/containers containing leaves selected from different species of potential host plant (informed from scientific literature). A *Passiflora* species has been determined for the complete development of *Heliconius sara* but further experiments are necessary to determine the host plant for other Heliconids e.g. *H. catherinae*.

Butterfly farming economic

The butterfly farm is now making excellent progress and we are impressed by the team's ability to identify host plants and to observe and nurture their new livestock. All the team members are extremely active in this area and each brings something different to the team. It has been extremely worthwhile for us to see members of the team learning butterfly names, asking informed questions about host plants, wanting insight into lifecycles and actively just observing and hunting down immature (and consequently very tiny) insects with a view to rearing. This is fundamentally a farming activity and DD, RR, AJ and VJ are all instinctive at this activity. Part of Sambhu's MSc research will be devoted to the scientific aspects of butterfly farming. Sambhu has been responsible for organising the building of the butterfly house and liaising with the Toutho of Fairview regarding the land donation. The frame structure of the house has been in place for some time and we now have enough money to finally fit a transparent roof (donated by the BHC) and fit the netting. Netted walk-in cages will be used within the butterfly house after its completion. These will be used for expanding the rearing of high value species. The well on the farm is almost complete thanks to the hard work of the team and is now ready for the final stage i.e. lining with bricks. Seedling beds have to be established in earnest to replace lost host plants as larval feeding escalates. More Citrus, Soursop is required and *Inga* species seedlings need transferring to the farm area.

The gardens at the butterfly farm are very impressive and many local potential host plants are represented. It is hard to remember that this site was reclaimed from the rainforest when we started. Host plants e.g. *Passiflora* species, banana, citrus and *Inga* as well as pollen and nectar plants e.g. *Lantana* attract gravid female butterflies to the site. There is evidence of extensive egg laying on host plants; however this is not reflected in the numbers of larvae in the gardens which are outside the butterfly house. Creative thinking has to be employed to win the battle with the ants, spiders and birds and other predators. In addition to predators there are problems with general plant pests and diseases. Trouble shooting will be an ongoing process however, the team are observant and creative and seek solutions. A visit to a known butterfly farm in neighbouring Suriname may help to speed up progress on production.

We are ahead of schedule on planting host plant species. Since the plants take time to become established we decided that this would be a rate limiting step if this was started after the completion of the butterfly house. The butterfly farm now consists of multiple rows of each potential host plant. The selection of the host plants was based on butterfly knowledge but most importantly on careful local observation of butterflies seeking host plants for oviposition. We have five rows of *Passiflora coccinea* (host plant for many *Heliconius* species in Guyana); five rows of Batwing passifloras (host plant for *Dryadula phaetusa* and other species such as

Heliconius erato and some Tiger heliconiids (not identified) and larvae similar to *H. melpomene*). In addition, there is a large area of *Passiflora foetida* for *Heliconius*. This *Passiflora* does not climb and is an excellent host for *Agraulis vanillae* in the area. There are five rows of unidentified legumes now established for Pierids and some *Phoebis* species which have been reared through successfully. Plantings of large leaved *Passiflora* have been planted (possibly *P. laurifolia*) and are growing well. Six rows of small well spaced plants are supporting many larvae and ova of *Agraulis vanillae* and *Dryas julia*. Five rows of *P. cirrhifolia* are established and are supporting large numbers of larvae of *Heliconius sara* and another species. This again was established in response to a team member watching butterflies ovipositing. Also established are 2 rows of *Piper sp.* since *Papilio thoas* was seen to oviposit on this and larvae were found, and 3 rows of peanuts for possible *Morpho* farming in the future. In addition, around the farm, there are Soursop plants supporting *Eurytides* species that are easily farmed and citrus plants that are supporting *Papilio androgeus* and *Papilio anchisiades*. These species are all marketable and will form the central component of the export business. The local Inga species identified as the host plant for the high value *Morpho achilles* will be propagated at the farm.

Continual scouting for pests and diseases will be vital to maintain the eggs and caterpillars on their host plants. A workshop on insect pest and diseases has raised awareness of these problems. The development times for each stage in the lifecycle are being determined for the farmable species to be incorporated into the handbook.

Gradual progress has been made since the start of the project in relation to addressing the legislation and costs and the transport route for the butterfly export. There are two airfields close to Fairview, one actually in Fairview village and one at Annai. A MOU was signed by Fairview which gave permission to use one acre of land for the purpose of butterfly farming. As described earlier we have contacted the Wild Life Division on several occasions regarding necessary permits. They are ready to inspect the butterfly centre when the roofing and netting are complete to issue licences to hold and produce butterflies. A fee of GY\$100,000 is payable upfront per annum to the Wildlife Division for the licences. Export permits for each shipment and customs & excise tax will total 21.5% of the value of each shipment. A price list for 15 local butterfly pupae with export potential has been handed to the Wild Life Division to help to determine the export permit charge.

In a recent workshop a skeletal business plan was developed for the butterfly business. The costs have to be entered onto the plan by the team. Dane Gobin at Iwokrama has been awarded funding from the World Bank in conjunction with the Peace Core to deliver an International Development bank (IDB) course on business training to one member from each of the communities and we hope that someone from our team will be selected. Two members from Global Canopy Programmes (Hylton Phillipson and Andrew Mitchell) are developing the scheme for payments for ecosystem services and are more than willing to consider funding the butterfly centre subject to a good business plan. This is a priority.

Soon tourists will be able to have a paid tour of the emerging butterfly house and this money will be invested in the centre. A gift shop selling local crafts and butterfly related products is proposed later to provide added value for the communities. This model is used by the Kipepeo butterfly project in Kenya. The butterfly centre has attracted a lot of interest from in-country tourism students, as well as a group of overseas tour operators on a familiarisation visit to Guyana. The Prime Minister of Guyana with other high ranking Government agency officers visited the butterfly house in April this year. This has raised the profile of the butterfly farming aspect of the project **but** the expectations have been increased

The farm is a credit to the hard work of a relatively small team and their efforts are to be commended.

Training and support will be given to communities (local farmers) interested in taking part in a trial of butterfly farming techniques.

It is clear that Fairview, NRDDDB and Iwokrama have an interest in the butterfly centre. However, how the business will be set up has not been decided. This is an export business and money is required to buy export permits and customs taxes. The business will require accurate accounts, tight management and investment. However, the success of the business will depend on the skills and expertise of the staff at the butterfly centre that have to produce designated numbers of specific healthy butterfly pupae for specific dates. This requires a lot of skill and planning. They will also have to deal with the logistics of collecting pupae in a timely fashion from various satellite producers and have all the paperwork and transport organised for the pupae to reach the customer in the UK and Europe in just a few days. These people are the backbone of the business and will need some incentive. It is important that more community members are trained up to a high standard at the butterfly centre.

The team has been given their first challenge to produce an order of 300 pupae of orange butterflies of mixed species for a UK importer with a July deadline. This is the rainy season and it will be a challenge but it will be an exercise in time management and demonstrate proof of concept.

Business/community development

Sixteen dispersed communities have been introduced to the Darwin Initiative funded butterfly project during team visits and their initial interest has been determined via two surveys one for adults and one for children. The results of these surveys are being analysed by Sambhu in collaboration with a biometrician Mr Andrew Mead from Warwick HRI. This information will form part of the socioeconomic aspect of his MSc research. A second survey will be conducted following the community training programme to determine whether there is increased awareness, acceptance and interest in butterfly farming, as well as their concerns. Minutes are prepared for all village meetings principally by Sambhu, particularly with Fairview. These should be distributed and are archived by Iwokrama, since they are of great importance. The wildlife clubs have been carrying out butterfly based activities which have raised awareness of butterflies in the environment. This year the butterfly team organised the annual Wild Life Festival where many children wore butterfly costumes. The team are well known to the younger members of the communities. They also represented the project at the Heritage Month celebrations held at Annai in September 2007, using posters to disseminate the project. A basic butterfly business plan was presented to the team as a learning tool in a recent training course. Sambhu will be elaborating this as part of his studies but Neil Naish will advise since he has direct experience in running a butterfly business. However, a business plan has to be discussed and agreed with the interested parties. Additional business support for the local team will be sort from the S-SOS organisation.

The NRDDDB is important to the success of this project, since it represents the communities and has an important part to play in ensuring sustainability of the business. A team member presents a progress report on behalf of the butterfly team at the quarterly meetings of the NRDDDB.

The team had a presence at this year's Amerindian Heritage celebrations at Annai in September 2007 and played an active role in organising the Wild life festival in March 2008. Many children wore butterfly costumes.

Presentations were made to members of the communities by the two rangers Ryan Roberts and Arnold Jacobus and the two community representatives Verly Jacobus and Delano Davis at the field station in July 2007.

After completion of the butterfly house in the next month (May 2008) we will start training courses for interested members of the communities at the butterfly centre. They will be able to see what can be achieved. All members of the team will be involved in the training courses, in particular the local Amerindians on the team. The dissemination of know-how will be accompanied by training material. We will be able to inform communities close to the survey sites e.g. Aranaputa and Surama what butterflies they should target in their area based on the results of the biodiversity survey. It is anticipated that butterflies produced by other communities will be transported/collected to the butterfly centre for packing and distribution but the logistics

have to be worked out. Also this will be an opportunity to make local tour guides more familiar with the local butterflies to broaden their knowledge of the local fauna.

Community interest in trialling butterfly farming will be determined from the analysis of the socioeconomic surveys and from feedback following training and visits to the centre and after distribution of the manual. The local members of the team will also produce a CD/DVD of butterfly farming methods which they can show to increase interest.

Capacity Building

Training courses for the six members of the team have provided an excellent background in butterfly and plant production, as well as essential knowledge on butterfly collecting, setting and identification, insect pathology, photography, data handling and storage, GIS and radio broadcasting. All members are IT literate and the team maintain communications via the internet. The MSc students are progressing in their studies and have visited Warwick University to present at their post-graduate symposium and to meet their post-graduate committee. They are receiving support from the biometrician at Warwick and from the NHM and Kew Herbarium. Regular meetings with their supervisor and Neil Naish take place during in-country visits.

As mentioned previously the butterfly house is near completion and host plant gardens are established.

The new butterfly collection with photographs, electronic database and prepared specimens is in progress and is the responsibility of Priya, an MSc student on the project.

Further training for the team and community members will be ongoing and it is important that adequate business training is delivered to the team and to all interested parties.

Dissemination

The dissemination activities to the communities are slower than originally anticipated but the handbook and protocols should be completed by December 2008. Training at the butterfly centre will accelerate the dissemination of farming techniques since the processes can be viewed directly. The handbook will be used to promote further training in the communities. There has been good exposure for the Darwin project in Guyana this year via visitors to the butterfly house, radio broadcasts and presentations by the team, TV interviews and newspaper articles. The team has been extremely proactive in promoting the project and are always positive and enthusiastic.

3.2 Progress towards project outputs

Significant progress has been made towards achieving the project outputs. Measurable indicators are achievable if the team can maintain the heavy work load and we retain all members of the team.

Butterfly diversity knowledge: A one year butterfly survey of six transects, using sweep nets and baited traps will be completed in June 2008. However, there was a legacy of a large backlog of unprepared butterfly species when Priya joined the team. She is working hard to deal with this. I feel sure she will try her best to prepare, photograph and identify all the necessary specimens from the survey. Help in this activity would be invaluable. However, I feel that production of a butterfly collection and database originating from this one year survey is achievable, if Priya can maintain the heavy work load. Boxes of set butterflies she has prepared from the survey are stored at the CSBD. Both Dr Gwilym Lewis from Kew and Blanca Huertas at the NHM have offered help in identifying plant materials and butterflies, respectively. So far no plant specimens have been sent to Kew for identification and this activity has to be addressed since we have found local host plants that support farmable species of butterflies. However, the team have the knowledge and the equipment to prepare plant specimens and I feel this will be done. The output level assumptions hold true. Since conditions at the CSBD are not suitable for the long term storage of butterflies due to high humidity and variable temperatures a duplicate collection will have to be prepared to send to the NHM for archiving, time permitting. The baited traps were compromised by animal activity, particularly in the canopy walkway transect.

Butterfly farming Scientific: Recently excellent progress has been made regarding all the measurable indicators for this output and progress is likely to increase now that the butterfly farming activity is receiving continual input. Butterflies have been reared on netted branches and the stages of their life cycle determined e.g. *Morpho achilles*. The life cycle of several species has been recorded to date and pupae have been produced.

The manual is still in progress since the surveys are ongoing. It is anticipated that they will be available in December for use in training and dissemination.

The team are becoming competent in observing sites of butterfly oviposition as a route to host plant determination. Rearing of batches of caterpillars in netted cages within the netted butterfly house will be helpful. The output level assumptions are valid. We have found suitable host plants for some species and as anticipated are exposed to pests and diseases and adverse weather. No diseased larvae have been observed but there are problems with spiders and ants. A visit to a butterfly farm in nearby Suriname may help to address problems associated with predators e.g. spiders and ants.

Butterfly farming economic: Methods for farming local butterflies are being developed. The major production centre is at Fairview and in the laboratory at Iwokrama. Netted branch production is in progress in the transect areas. Training of the community in farming methods will take place in the near future and then the potential farmers will be helped to set up their own trial production. The completion of house will mark the start of a training and dissemination phase for butterfly farming. The output level assumptions are valid. Over fifteen species of valuable farmable butterflies have been identified. Pupae have been produced in netted branches and in cages. Fairview was very active in clearing the site for the butterfly farm and local builders constructed the butterfly house frame. The Toutho of Fairview has encouraged villagers to volunteer for labour on the farm and become involved in its activities. So far they are waiting to see how the farm develops.

Business/community development: All sixteen communities have been visited and made aware of the project. They were invited to complete questionnaires to determine the degree of their interest. Butterflies have a raised profile in the communities via the local media, the wild life clubs and events such as the annual Heritage Festival. The butterfly team organised the Wild Life Festival this year and are well known to the younger members of the community. Communities near to the butterfly transects have been more exposed to the project and Aranaputa and Surama are showing interest in this project.

A basic business plan for a butterfly farm was introduced to the team but a polished plan will require an understanding of a proposed business organisation and the requirements of interested parties, particularly Fairview and the NRDDB who have been very supportive. This will be done in year 3.

Community training at the butterfly farm will start in the near future when the butterfly house is completed and it will be possible to see how many communities participate and become involved. The output level assumptions are valid. I predict that the business plan development and business organisation will be the most challenging aspect of the business development.

Capacity Building: A great deal of capacity building has taken place. All members of the team have access to a laptop, cameras and memory sticks. They maintain communications via the internet. They have been given equipment necessary to prepare and house a butterfly collection and specialist butterfly books worth over £1000 for their identification. In addition, Darwin has funded the construction of the butterfly house, apart from the roof. The MSc students are making good progress and have met their MSc postgraduate committee at the University of Warwick who have offered help and support. Both students should submit their thesis at the same time, since Priya will do her research in one year and not two. The students will have up one year after completion of their research to submit their thesis for examination. Warwick will support the students to ensure that they are able to submit their thesis on time. The handbook will be prepared by December 2008 but this will be a tight schedule since the butterfly surveys are still in progress. The assumptions still hold true

3.3 Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	Total to date	Total planned from application
2	Two students from Guyana will attain a Masters qualification from the University of Warwick following two years research in Guyana	0	0				2
5	Six trainees will gain at least one year of training in biodiversity and socioeconomic studies and accreditation for completing Iwokrama Personnel Development Programme.	0	6				6
6A	Five members of the local community in Guyana will be given training in planting host plants and the identification and breeding of butterflies.	0	0				5
7	Database will be produced to record species. This can be updated and utilised by Iwokrama following project completion.	0	0				1
7	Handbook production will allow future identification	0	0				1
8	The four UK project staff will spend a total of 30 weeks in Guyana between them in 3 years	0	0				4
9	A species management plan is to be produced for this region for butterfly species and host plants.	0	0				1
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.	0	0				1 plus copies

11B	A paper will be submitted to a peer reviewed journal if a new species is identified.	0	0				1 to 2
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.	0	1				1
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)	0					2
	The CSBD reference collection at the University of Guyana for butterflies and plants to be enhanced.						
13B	The CSBD reference collection at the University of Guyana for butterflies and plants to be enhanced.	0	1				1
14A	Four seminars will be organised (two per year in year 2 and 3) to disseminate findings 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.	0	2				4

15B	One local press release will be made following the production of the handbook.	0	0				1
16A,B&C	A minimum of three articles will be submitted to the Iwokrama press room for publication in their quarterly newsletter.	0	0				3
20	The four laptops, four digital cameras and SLR digital camera will remain with Iwokrama/UG following the completion of the project. Estimated value of £4000.	0	0				
22	Number of field plots established and netted cages	1	1 main plus several netted				5
23	Value of resources raised from other sources (i.e. in addition to Darwin funding) for project.	0	£5400				
New - Project specific measures							

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

Table 2 Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
TV interview (Guyana)	NN, KH and HS (July 2007)	National Communication Network – Georgetown, Guyana. SA	NCN	
TV (NCN) Breakfast TV Interview on “Good Morning Guyana”	GM (April 2008)	National Communication Network – Georgetown, Guyana. SA	NCN	
Guyana National Newspapers “Staboek and Kaiteur News”	“Butterfly Industry to take flight”	Stabroek News paper and Kaiteur New paper. Both papers are located in Georgetown, Guyana	Archives of Newspapers http://www.stabroeknews.com/?p=571	
Department seminar at	GM and HS (March 2008)		University of Warwick (DW)	

Warwick HRI UK				
Two poster presentations at Warwick HRI Post-graduate Symposium	NN and HS (March 2008)		University of Warwick	
Powerpoint presentation to EPA	HS and KH	Butterfly project	Available from DW and HS	
Powerpoint presentation to "Friends of Iwokrama"	NN (December 2007)	Butterfly project	Available from DW and HS	
Broadcasts on Radio Paiwomak	Three sessions prepared and it is repeated.	Radio Paiwomak – North Rupununi, Guyana SA.	CD available DW and HS	
Icast University of Warwick arranged for May 2008	DW and NN	University of Warwick	To be made May 2008	
Project website	NN	University of Warwick	www.guyanabutterflies.com	

3.4 Progress towards the project purpose and outcomes

Considerable progress has been made towards achieving the outcomes for the project purpose. Nine out of twelve monthly surveys have been carried out using both netting and baited traps to sample butterflies in six locations in the Iwokrama Forest Reserve and the North Rupununi area. There is a different distribution of butterfly families in the different habitat zones. The surveys have identified butterflies with potential commercial value in the different transects and fifteen of these have been selected for further investigation in regard to their host plants and development times and will form the basis of a pilot butterfly farming business. Sixteen communities have been introduced to the project and their level of butterfly knowledge and interest surveyed. A butterfly centre has been established which will be used for production, training and ecotourism. Host plants for the fifteen butterflies of interest are being investigated and gardens of potential host plants established. Methodologies for rearing pupae and studying life cycle stages are being carried out and will be used in the development of protocols for the training manual. Communities will be invited to attend training courses at the centre lead by community members of the team with Sambhu's help and support. A second socioeconomic survey post-training will be used to determine the viability of community involvement. The team will support interested communities in setting up butterfly production trials. The butterfly surveys will provide a valuable baseline for butterfly biodiversity in these areas, where sustainable logging is in progress. The identification of host plants will inform logging activities as to which trees are valuable in maintaining butterfly biodiversity. The purpose level assumptions still hold true. The extensive butterfly biodiversity in the target areas indicates that there is great potential to set up a sustainable butterfly business. Species of butterflies found in this region will be highly desirable to the industry. A business plan has yet to be negotiated with interested parties. The purpose level assumptions hold true.

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

Butterflies have not been exploited previously in this area. All caterpillars were viewed in the same light as caterpillar pests on food crops such as cassava and were frequently destroyed if encountered. The communities are beginning to appreciate that not all caterpillars are crop pests and that some have high value as pupae for export to butterfly display houses. They are also beginning to appreciate that the forest trees and smaller plants are important host plants

for butterflies and moths and should be conserved. An appreciation of their rich diversity of butterflies is becoming apparent, especially to communities near to where the surveys are conducted and to the young people of the wild life clubs. In the past collectors from overseas have collected butterflies for their personal collections and displays of dead butterflies are commercially available in Guyana. It is hoped that by training communities to farm butterflies sustainably, rather than deplete the environment there will be a positive impact on conservation. An increase in butterfly biodiversity was reported for Kipepeo in the area where butterfly farming was conducted and it is hoped that this will be the case in this instance. However, one concern is the impact of insecticide fogging on butterfly production in malaria endemic areas such as Fairview.

4. Monitoring, evaluation and lessons

It is clear that all the outputs in this project are important steps towards delivering the project purpose. This multifaceted project started from an almost a zero baseline, since there was little appreciation of butterfly biodiversity in the communities and only small or incomplete butterfly collections, legacies of various transient enthusiasts, were available at the CSBD and these were in a relatively poor condition. No comprehensive seasonal survey had been conducted in this region. It is evident from this report that significant progress has been made towards the outputs in the areas of butterfly biodiversity knowledge, business/community development, capacity building and dissemination. This can be attributed to the dedication and sheer hard work of a relatively small team of people in Guyana. It must be stressed that fulfilment of these outputs is in progress. The final outputs of this project will be self evident if the project is successful, namely a butterfly collection at CSBD and electronic database, a handbook for butterfly biodiversity and farming, a successful butterfly centre capable of producing pupae for export, evidence for the successful export of butterfly pupae, and finally communities engaged in butterfly production using the handbook and being trained at the centre. An added bonus will be an ecotourism centre and local guides conducting butterfly surveys. Information on butterfly host plants will be valuable information for sustainable logging.

Lessons- Developing a new area of interest in country takes time, longer than anticipated. Team building, negotiating with relevant authorities, developing a mutual understanding with the collaborative Institution, organising transport, accommodation and conducting surveys throughout the dry and rainy seasons and dealing with all aspects of the project is very time consuming and a lot of work for a relatively small team. In retrospect we realise we could not have made such progress on such an ambitious project without the help of a very energetic and driven team. Sambhu has been the in country project manager and has organised the practical aspects of the surveys and has been responsible for the budget on a day to day basis. The local team have been enthusiastic, hard working on all aspects on the project and are extremely keen to progress and be involved in the butterfly farming business development.

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

We have responded to issues raised in the last annual review and submitted a modified logframe and Gantt chart. The actions taken as a result of the recommendations were described in the six monthly report.

6. Other comments on progress not covered elsewhere

There are several risks to this business apart from caterpillar predators and weather, principally the loss of trained staff from the project at the end of the project e.g. loss of the rangers and other local team members and the feasibility of giving the satellite farmers sufficient training in year three to make them productive. A risk to the sustainability of the business will be in establishing a good business model that will satisfy all the interested parties. Enough money must flow back into the business to develop the farm and for research and development and to keep and retain key workers at the butterfly centre and to reward the local producers. Money will be required for upfront payment for export permits and customs tax before each shipment of butterflies can be processed. This business has the potential to earn satisfactory revenue if it is handled in a realistic way. A lot of effort and money has been put into this project and

somehow it has to be left at a stage for sustainable growth. Additional funding to reinforce the business, butterfly production and legacy may be required at the end of the project but it is too soon to determine how productive the final year will be in terms of sustainable business development, community adoption and technical expertise.

7. Sustainability

The butterfly project has been presented to the Guyanese people via TV and radio interviews (National and local). Articles have appeared in the National press and in the Iwokrama and Wetland Bulletins. Presentations have been given to EPA, NRDDDB and Iwokrama friend's night. The butterfly project was promoted at the Amerindian Festival at Annai and to the Wildlife Clubs via Ms Samantha James who heads the community outreach programme. Recently there have been several groups of curious visitors to the butterfly house, the Prime Minister and other officials, a group of Guyanese tourism students and a group of tour operators. There is so much interest in the butterfly house that guided tours are being organised for ecotourists. Increase in capacity is very obvious as a result of the butterfly house structure, the trained and competent butterfly team and the growing butterfly collection. This butterfly farming part of the project was designed as a feasibility study but if the butterfly farming is initiated successfully and pupae are exported to customers in good condition, it is important that a sound exit strategy is developed to ensure sustainability and legacy. The important question that has not been addressed to date is how the proposed butterfly production business will be structured and how will the producers, managers and workers at the butterfly centre be rewarded financially. Should entrepreneurs be rewarded according to their input or will the business function as a co-operative, a friendly society or be managed by a group consisting of NRDDDB, Fairview and Iwokrama who may have no direct involvement in farm, research and development or day to day running of the butterfly centre? It is vital that all interested parties meet in the near future to discuss this issue. It may be useful to look more closely at the business model adopted by the Kipepeo project. Neil Naish has first hand knowledge of the butterfly industry and will be a great help in facilitating the marketing of the butterfly pupae. In addition, the NHM and the Smithsonian are developing butterfly displays and are interested in receiving butterflies.

There is evidence for increasing interest and capacity for biodiversity resulting from the project. Iwokrama have been very proactive in attracting money from various agencies e.g. for biodiversity monitoring and Conservation International play an important role in this activity. The MSc student (Priya) has been awarded a Darwin Scholarship to celebrate the Darwin's Bicentenary study biodiversity monitoring in the UK, however she has to raise the airfare and an additional £750 for the course fees. In addition she is being considered for participation in a new Darwin initiative on biodiversity in education which will add capacity to Guyana. As discussed a before there is no exit strategy in place at this time, which may be a mistake. However, getting to know local partners and interested parties takes time and superficial involvement in local politics requires some background knowledge. The first two years have focused on the surveys, raising awareness and capacity building. This was a feasibility study but as time has progressed there is pressure to create a viable and sustainable business before exit and this may require more time. Development of an exit strategy will involve several meetings with all interested parties at one time and this will be initiated on our next visit to Guyana. These may be difficult to schedule. A draft business plan has been produced which will be refined subject to other interested parties. This will determine whether the business will be sustainable.

8. Dissemination

Dissemination activities have been described in earlier sections. The major dissemination activities have been through, community visits, the media (TV and radio), the Iwokrama Bulletin and Wetland Bulletin, National newspapers (in country) and butterfly project information on the project website www.guyanabutterflies.com and the Iwokrama website. The two Guyanese students visited the UK in March 2007 funded by the Darwin Project. They attended the post-graduate symposium at Warwick HRI and presented posters on the Darwin project. In addition the two students presented their work to the department. It was well received and there was a

great deal of interest in the Darwin Initiative programme. The local members of the team are developing a training CD lead by Delano Davis and Sambhu and Priya will produce a butterfly biodiversity and butterfly training manual as an aid to butterfly farming and ecotourism. Iwokrama will continue to promote the Butterfly Centre since their main driver is in promoting sustainable business development in the area and in maintaining biodiversity. The centre will be an important component of their ecotourism package. After the termination of the project we expect the team to maintain their interest in dissemination since they have received media training and DD is a member of the NRDDDB council. The wild life clubs will maintain their interest and appreciation of butterflies.

9. Project Expenditure

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

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

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

10. OPTIONAL: Outstanding achievements of your project during the reporting period

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

A community butterfly centre has been established at Fairview village in the Iwokrama rainforest of Guyana. The centre has been developed on a one acre of plot of land donated by Fairview for the purpose of developing a community based sustainable butterfly export business, subject to terms laid out in a Memorandum of Understanding. This will be a multifunctional facility and will be used for sustainable butterfly production; as a focus for the export of locally produced butterfly pupae; for the dissemination of community training on butterfly production and butterfly and as an ecotourism venue. A licence to produce and hold butterflies will be granted subject to a satisfactory inspection. This project has been a communal effort between many parties: the Fairview community, the Iwokrama International Centre for Rain Forest Conservation and Development, NRDDDB, local builders, EPA, the Wildlife Division and the energetic Darwin funded butterfly project team. Fairview members helped the team to clear the land and provided local materials for the wooden framework of the house. A local builder constructed the house and will roof and net the structure this month. The cost of the butterfly house and local materials was covered in the Darwin budget and the British High Commission funded the roofing material. The butterfly

centre will be ready to deliver community training courses June 2008. A garden consisting of a wide range of butterfly host plants is now established and host plants have been identified for a selection of local high value butterflies. Fifteen species of local butterflies have been identified on which to base the butterfly business and the host plant for *Morpho Achilles*, a high value butterfly has been identified. The butterfly house is a large and impressive structure and has already attracted a lot of interest from the communities, visitors, potential funding organisations and government officials, including the Prime Minister of Guyana.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2007/08

Project summary	Measurable Indicators	Progress and Achievements April 2007 - March 2008	Actions required/planned for next period
<p>Goal: <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>		<p><i>The biodiversity survey on butterflies is almost complete but there is a backlog of specimens to process. It is clear that different habitats support different families of butterflies. Butterflies from the Satyridae are common in all areas and the Ithomiidae are least common. Fairview (forest) has the highest number of butterflies, followed by Aranaputa (savannah) and Surama (forest/savannah) This study will provide information on butterflies and their specific host plants and will act as indicator species for the evaluation of the environmental impact of human activities e.g. logging and global warming. It is envisioned that butterflies will be conserved by butterfly farming and provide a sustainable income for the indigenous communities.</i></p>	<p><i>(do not fill not applicable)</i></p>
<p>Purpose Develop (a system for) sustainable use of butterfly biodiversity in Iwokrama and North Rupununi, in Guyana, to enhance the livelihoods of local communities</p>	<p>Measurable indicators</p> <ol style="list-style-type: none"> 1. New knowledge of the butterfly and moth species including their host plant species of the Guyanese rainforest. 2. A two year Biodiversity assessment completed. 3. Trial butterfly farming system by local communities in place by end of year 3. 	<p>The butterfly surveys, and preparation and databasing of the butterflies are progressing well with the replacement MSc student and will inform on biodiversity. A backlog of butterflies has yet to be processed. The butterfly house is almost completed and a garden of potential host plants established. Focus on the primary production and training facility has affected the early dissemination of</p>	<ol style="list-style-type: none"> 1. Initiate training for interested communities at the butterfly centre 2. Complete the butterfly survey 3. Workshop on community surveys 4. Joint meetings with NRDDDB, Fairview and Iwokrama to discuss business structure 5. Pupae produced in large numbers

		<p>farming techniques, however, the team have been on a learning curve to this point and time was required to identify host plants and develop farming techniques. Fifteen farmable butterflies have been identified and pupae are being produced on a small scale and protocols developed. The local host plant for <i>Morpho achilles</i> has been identified. Communities have been visited to determine their interest in butterfly farming and there has been dissemination via the wild life clubs. All authorities involved in exporting pupae have been consulted.</p>	
<p>Output 1. Butterfly biodiversity knowledge</p>	<p>Monthly butterfly surveys for a complete year conducted in six locations. Specimens collected.</p> <p>Collection of sample species from forest (male and female species and host plants) and preparation for deposit.</p> <p>New collection of butterflies established at CSBD</p>	<p>The monthly butterfly surveys are in progress and should be completed in June 2008. There was a large backlog of unprepared butterfly species when the MSc student (Kaslyn Holden) resigned in July 2007. She was involved with the biodiversity aspect. In October 2007 Gyanpriya Maharaj (Priya) replaced Kaslyn and has made excellent progress, setting, photographing and entering the specimens on the electronic database. The two MSc students visited the Herbarium at Kew where Dr Gwilym Lewis delivered training on plant preparation for identification. They offered their services free of charge, on receipt of good quality specimens. They also visited the Neotropical butterfly specialist Blanca Huertas at the NHM who has offered help. The students will receive training from Kew and the NHM if desired. So far no plant specimens have been sent to Kew for identification. We need to prepare specimens of the unknown host plants with fruits and flowers when they reach that stage. The conditions at the CSBD are not suitable for the long term storage of butterflies due to high humidity and variable temperatures. A duplicate collection will be sent to the NHM for archiving, time permitting. The indicators are achievable if the team can maintain the heavy work load and we retain all members of the team.</p>	
<p>Activity 1.1 Workshops 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.</p>		<p>Additional workshops and training were delivered to the team in year 2. These included Photography; Insect Pathology and predators; Business plan development; Data handling and storage; GIS training, using ArcView and Radio Paiwomak training. Practical training and experimentation on plant propagation, butterfly rearing and butterfly identification is a continuous process. In year 3 we propose carrying out an information sharing workshop on Biodiversity Surveys with communities and at the University of Guyana. In addition, we will recruit business support for the local members from S-SAS, an organisation that supports local sustainable businesses.</p>	

Activity 1.2 Field plots for surveys determined.		Year one activity completed.
Activity 1.3 Protocols for all biodiversity studies established.		These are in preparation (Priya and Sambhu).
Activity 1.4 Collation of information from biodiversity surveys		These are in progress. Andrew Mead a biometrician from Warwick HRI will assist Sambhu with the analysis and the design of a second survey.
Activity 1.5 Information sharing workshop on Biodiversity Surveys with communities and at the University of Guyana		This will be conducted on our next visit to Guyana.
Output 2. Butterfly farming –scientific	<ol style="list-style-type: none"> 1. Netting of first egg batch for all pupae to develop. Production of first set of pupae. 2. Production and breeding pupae methods. 3. Understanding of butterfly species life cycles and host plant requirements. 4. Manual produced on best farming methods in collaboration with local communities. 20 + copies to be distributed by midway through year 3. 	<p>Progress has been made to all measurable indicators. Butterflies have been reared on netted branches and the stages of their life cycle determined e.g. <i>Morpho achilles</i>. The life cycle of several species has been recorded to date. The team are becoming competent in observing sites of butterfly oviposition as a route to host plant determination. A large garden of a wide variety of butterfly host plants has been established at the butterfly centre. Development of farming techniques is a continual process and problems with predators of life cycle stages of the butterflies e.g. ants and spiders have to be resolved. Diseases and phytophagous pests of host plants are also a problem. Rearing of batches of caterpillars in netted cages within the netted butterfly house will be helpful. A visit to a butterfly farm in nearby Suriname may help to address these problems and provide ideas.</p> <p>The manual is still in progress since the surveys are ongoing. It is anticipated that they will be available in December for use in training and dissemination. The assumptions are valid.</p>
Activity 2.1 Workshop on plant and butterfly farming.		Completed but training ongoing.
Activity 2.2. Year 2: Workshop on diseases of Lepidoptera and disease free production		Completed. To be put into practice.
Activity 2.3 Draft manual produced by December 2008		In progress
Activity 2.4 Handbook distributed to local Amerindians by December 2008.		
Activity 2.5 publicity material		Ongoing. A series of visitors have already had guided tours around the butterfly house e.g. Prime Minister and officials, tourism organisations, students and tourists
Output 3. . Butterfly farming – economic	<ol style="list-style-type: none"> 1. Development of methods for farming butterflies 2. Allocation of trial farming areas. 3. Trial of butterfly farming techniques by local farmers. 	<p>Methods for farming local butterflies are being developed. The major production centre is at Fairview and in the laboratory at Iwokrama. Netted branch production is in progress in the transect areas.</p> <p>Training of the community in farming methods will take place in the near future and then the potential farmers will be helped to set up their own production.</p>
Activity 3.1 Workshop on diseases of Lepidoptera and disease free production.		Completed. Continual observation will be required to maintain disease free insects.

Activity 3.2 Breeding of butterflies workshop for local Amerindians		In year three
Activity 3.3 Butterfly host species planted by Jun 2007 and Feb 2008		Host plants are well established at the farm. A continual supply of seedlings and plants propagated from cutting will be required to feed large numbers of caterpillars. Communities will be encouraged to nurture or plant chosen host plants at an early stage
Activity 3.4 Butterfly pupae produced on host plants by Feb 2009.		
Output 4. Business/community development	<ol style="list-style-type: none"> 1. Engage communities and establish interest in butterfly farming. 2. Train interested communities using demonstration farm and direct help in the community. 3. Develop a business plan for a butterfly export business with NRDDB 	<p>All sixteen communities have been visited and made aware of the project. They were invited to complete questionnaires to determine the degree of their interest. Butterflies have a raised profile in the communities via the local media, the Wild Life clubs and events such as the annual Heritage Festival. The butterfly team organised the Wild Life Festival this year and are well known to the younger members of the community. Communities near to the butterfly transects have been more exposed to the project and Aranaputa and Surama have shown interest in this project.</p> <p>Training will be delivered to the community when the butterfly house is completed.</p> <p>A basic business plan for a butterfly farm was introduced to the team but a polished plan will require an understanding of the proposed business organisation and the requirements of interested parties. This will be done in year 3.</p>
4.1 Collation of local village meeting minutes		Responsibility of Sambhu
4.2 Collation of results from the community surveys		Responsibility of Sambhu
4.3 Business plan produced; including market and financial assessments.		
4.4 Determine number of local Amerindians who would like to trial butterfly breeding and train at workshop using handbook by Dec 2008.		Determined from the results of the survey and training courses.
Output 5. Capacity Building	<ol style="list-style-type: none"> 1. A team of six trained in butterfly collection, identification, and setting. IT, communications, butterfly production, plant propagation, insect pathology and GIS, photography, data handling and radio broadcasting. 2. Two MSc students trained 3. Central Butterfly house built at Fairview for production and training 	<p>A great deal of capacity building has taken place. All members of the team have access to a laptop, cameras and memory sticks. They maintain communications via the internet. The MSc students are making good progress and have met their MSc committee at Warwick who have offered help and support. Both students should submit their thesis at the same time.</p> <p>The training courses have been delivered.</p> <p>The butterfly house will be completed in May 2008.</p>

5.1 Breeding of butterflies workshop for local Amerindians.		
5.2 Butterfly centre established		
5.3 MSc students submit interim report to Warwick University by November 2008		
5.4 Local team members receive a certificate from Warwick on completion of training		
5.5 Local team members receive adequate business training		
Output 6. . Dissemination	<ul style="list-style-type: none"> 1. Community visits and demonstrations using handbooks and netted trees. 2. Production and distribution of handbook about local butterfly species. 3. Butterfly farming manual produced 4. Publicity for project and transfer of knowledge 	
Activity 6.1 Minimum of 3 articles 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.		

Annex 2 Project's full current logframe

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: Conservation of (butterfly) biodiversity and its sustainable use			
Sub-Goal: Enhance the biodiversity-based contribution to sustainable livelihoods in Rupununi, Guyana			
Purpose Develop (a system for) sustainable use of butterfly biodiversity in Iwokrama and North Rupununi butterfly biodiversity in Iwokrama and North Rupununi, in Guyana, to enhance the livelihoods of local communities.	1. New knowledge of the butterfly and moth species including their host plant species of the Guyanese rainforest. 2. A two year Biodiversity assessment completed. 3. Trial butterfly farming system by local communities in place by end of year 3.	Field survey reports and publications by partner institutions, including newsletter articles. Handbook of butterfly species and their host plants completed and published on the internet. Trial butterfly farmers from local communities planted host plants in five different locations and started to breed pupae.	Ministry of Amerindian Affairs continues to support sustainable development within the North Rupununi region. The Government of Guyana continues to support Iwokrama. Healthy butterfly host plants are maintained for production. Pests, diseases and adverse weather can affect both the plant and insect.
Outputs 1. Butterfly biodiversity knowledge	1. Monthly butterfly surveys for a complete year conducted in six locations. Specimens collected. 2. Collection of sample species from forest (male and female species and host plants) and preparation for deposit. 3. New collection of butterflies established at CSBD	Central species list established Field survey reports Database established based on butterfly biodiversity data (written and illustrative data) including information on stages of development. Deposition of specimens at the CSBD centre at the University of Guyana . Including host plant species deposited in the herbarium. Pupae produced	All specimens recorded Reports produced Surveys from bait traps may be compromised by other animals or access to trials may be affected during flooding. Conditions at CSBD e.g. controlled humidity, suitable storage cabinets and adequate control of microorganisms and pests that attack set butterflies and dried plants in place to conserve specimens in good condition.

<p>2. Butterfly farming –scientific</p>	<p>1. Netting of first egg batch for all pupae to develop. Production of first set of pupae.</p> <p>2. Production and breeding pupae methods.</p> <p>3. Understanding of butterfly species life cycles and host plant requirements.</p> <p>4. Manual produced on best farming methods in collaboration with local communities. 20 + copies to be distributed by midway through year 3.</p>	<p>Viable pupae produced</p> <p>Life cycles and host plants determined</p> <p>Comments received from peer review panel. 2 copies sent to Darwin Initiative.</p> <p>Comments received from peer review panel. 2 copies sent to Darwin Initiative.</p>	<p>Suitable host plants and no problems with pests, diseases or weather.</p> <p>No diseases</p> <p>Host plants identified</p> <p>Manual produced on time</p>
<p>3. Butterfly farming –economic</p>	<p>1. Development of methods for farming butterflies</p> <p>2. Allocation of trial farming areas.</p> <p>3. Trial of butterfly farming techniques by local farmers.</p>	<p>Production of first set of pupae</p> <p>Host plant species sown / transplanted onto plot.</p> <p>Pupae produced</p>	<p>Biodiversity data supports the viability of a sustainable butterfly farming business.</p> <p>No disease outbreaks.</p> <p>Host butterfly species able to develop into pupae within determined plot area.</p> <p>Continued support, co-operation and participation from local populations</p>
<p>4. Business/ community development</p>	<p>4. Engage communities and establish interest in butterfly farming.</p> <p>5. Train interested communities using demonstration farm and direct help in the community.</p>	<p>Records of all village meetings and workshops attended.</p> <p>Pupae produced in different communities.</p>	<p>Continued Government support for sustainable development. Continued support and management from NRDDDB for a community based business.</p> <p>Community interest.</p>
<p>5. Capacity Building</p>	<p>1. Develop a business plan for a</p>	<p>Business plan available</p>	<p>Business plan acceptable and practicable</p>

<p>6. Dissemination</p>	<p>butterfly export business with NRDDDB</p> <p>1. A team of six trained in butterfly collection, identification, and setting. IT, communications, butterfly production, plant propagation, insect pathology and GPS .</p> <p>2. Two MSc students trained</p> <p>3. Central Butterfly house built at Fairview for production and training</p> <p>4. Community visits and demonstrations using handbooks and netted trees.</p> <p>5. Production and distribution of handbook about local butterfly species.</p> <p>6. Butterfly farming manual produced</p> <p>7. Publicity for project and transfer of knowledge</p>	<p>Courses completed and participants able to train others.</p> <p>Students obtain MSc</p> <p>Butterfly house completed</p> <p>Record of visits and survey results</p> <p>Butterfly handbook published</p> <p>Handbook produced via: articles published in local magazines and journals; website: podcasts, scientific papers, TV and radio. Media trained team.</p>	<p>Team members remain on the project</p> <p>Trained staff remain within the institution and / or University and train others to use the skills gained. Students complete the course</p> <p>The building will be retained for butterfly production and training after completion of the project.</p> <p>Communities interested</p> <p>Handbook produced in time.</p> <p>Handbook produced in time</p> <p>Media or recipients interested in publishing information</p>
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Activities	Activity Milestones (summary of project implementation timetable)	Assumptions
Workshops.	<p>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 .</p> <p>Year 2: Workshop on diseases of Lepidoptera and disease free production.</p> <p>Yr 3: Information sharing workshop on Biodiversity Surveys with communities and at the University of Guyana. Breeding of butterflies workshop for local Amerindians.</p> <p>Protocols for all biodiversity studies established. Field plots for surveys determined.</p>	Trained staff remain within the institution and / or University and train others to use the skills gained.
Field research programme.	Determine number of local Amerindians who would like to trial butterfly breeding and train at workshop using handbook by Sept 2008.	Field plot representative of region.
Trial farming; plot allocation and planting of host species.	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.
Handbook development. (Species handbook and best farming practices handbook).	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.	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.
Publicity Material	Minimum of 3 articles 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 occur during biodiversity study. No setbacks during study

Annex 3 onwards – supplementary material (optional)

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ectf-ed.org.uk putting the project number in the Subject line.	
Is your report more than 5MB? If so, please advise Darwin-Projects@ectf-ed.org.uk that the report will be send by post on CD, putting the project number in the Subject line.	
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you completed the Project Expenditure table?	
Do not include claim forms or communications for Defra with this report.	