

**IMPERIAL COLLEGE LONDON
DISTANCE LEARNING PROGRAMME
(formerly Wye External Programme)**

DARWIN INITIATIVE FINAL REPORT

**Genetic Resource Management Training
162/5/196**

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Structure of Report

This report adheres as closely as possible to the Format and Guidelines as supplied, although it necessarily differs in certain ways as the following contents' summary indicates, due to the nature of the project.

1	Darwin Project Information	page 3
2	Project Background/Rationale	
	(a) Location and Circumstances	page 3
	(b) The problem to be addressed	page 4
	(c) Identification of Need and Demand	page 4
3	Project Summary	
	(a) Project Purpose and Objectives	page 4-6
	(b) Modification of Objectives/Operational Plan	page 6-10
	(c) Relevant CBD Articles	page 10
	(d) Success in Meeting Objectives	page 10-11
4	Scientific Training and Technical Assessment	
	(a) Education and Training Activities	page 11-12
	(b) Capacity Building	page 12-13
5	Project Impacts	
	(a) Achievement of Objectives	page 13
	(b) Education and Training	page 13-14
	(c) Capacity building and Collaboration	page 14-15
	(d) Contribution to CBD Articles	page 15-16
6	Project Outputs	
	(a) Published Materials	page 16-17
	(b) Learning Outputs	page 17-18
7	Project Expenditure	page 18-20
8	Project Operation and Partnerships	page 20
9	Monitoring and Evaluation	
	(a) Learning Outcomes	page 21
	(b) External Evaluation	page 21-22
10	Darwin Identity	page 22
11	Leverage	page 22-23
12	Sustainability and Legacy	page 23
13	Value for Money	page 23
	Annex 1	
	Table A – original Project expenditure spreadsheet	
	Annex 1	
	EP Evaluation Research summary	
	Annex 2	
	Examples of publicity materials	

1 Darwin Project Information

Title: Genetic Resource Management Training

Country: United Kingdom

Contractor: Wye College External Programme, University of London

Project Reference Number: 162/5/196

Grant Value: £103,095

Starting/Finishing Dates: April 1996 to March 2001

2 Project Background/Rationale

(a) Location and Circumstances

The project was located at the offices of the External Programme at Wye College, University of London. These provided the administrative centre for the development of a curriculum for the educational and training materials, for the commissioning of specific courses at Masters' level in relation to these, for all editorial work in relation to these courses and for the production and despatch of course materials to students wishing to pursue specific studies in the field of genetic resource conservation and management, and in the broader field of biodiversity conservation generally.

The project was conducted in collaboration with the School of Biological Sciences at the University of Birmingham and there were some occasions when meetings were held at the Birmingham Campus. Indeed, the initial ideas for the project stemmed from an individual link between Dr Jane Bryson, the former Deputy Director of the External Programme, and Dr Nigel Maxted, a Senior Lecturer at the University of Birmingham and a researcher with an international reputation in the field of plant genetic resource conservation and management.

The initial proposal to approach the Darwin Initiative in 1996 derived in large part from Dr Maxted's support for distance learning training materials that were strong on scientific content, and also from the ideas and enthusiasm of Dr Helen Case, a former researcher at Wye and at Brogdale. Academic support on the animal genetic resource management side came, in particular, from Dr Simon Anderson, the current Degree Tutor for the MSc in Biodiversity Conservation.

The success of the External Programme in delivering cross-disciplinary MSc programmes by distance learning in the fields of Agricultural Development and Environmental Management to professional learners through out the world, and particularly the developing world, provided the catalyst for the final application for grant funding.

(b) The Problem to be addressed

The problem, although I would prefer to call it a challenge, was to develop a set of high quality educational and training materials in plant and animal genetic resource conservation that could be delivered effectively to a predominantly professional audience worldwide, thus meeting a perceived need for developing knowledge and awareness in a vital field, as made explicit in the Convention on Biological Diversity, and also enabling progression to a full postgraduate qualification, either MSc or Postgraduate Diploma of the University of London. The mission of the External Programme has been to “enhance access to continuing professional education globally” with its underlying philosophy of educating the educators and training the trainers. The challenge in this instance was to do this with materials that would need to have a strong science basis and to deliver this wholly by distance learning.

(c) Identification of Need and Demand

This has already been partly addressed in (a) above. Within the Convention on Biological Diversity there are specific articles (see under 3 (c) following) that refer to the need for research and training, and for public education and awareness to promote understanding of the importance of measures to conserve biological diversity. The External Programme at Wye had been running successful postgraduate programmes for continuing professional development, delivered wholly by distance learning to a global audience, since 1988 in the fields of Agricultural Development and Environmental Management.

By 1996 there was considerable experience and expertise built up on the preparation, delivery and management of distance learning courses, supported by a committed team of academics who provided high quality research-led teaching. The EP had been awarded an inaugural Queen’s Award for Higher and Further Education in 1994 for its pioneering work in promoting distance education for professionals.

The link with Birmingham University, with its international reputation in the field of plant genetic resource conservation, allied to Wye College’s own expertise in both plant and animal genetics, provided a sound academic basis upon which to develop a new set of distance learning materials, specifically designed to meet the needs specified in the CBD, since they would be deliverable to professional working in the field worldwide. The approach was thus made to the Darwin Initiative on the basis of providing essential knowledge in critical aspects of biological diversity, to those who were doing practical work on the ground already and to those who wished to equip themselves to be able to contribute in some meaningful way to help fulfil the aims of the CBD.

3 Project Summary

(a) Project Purpose and Objectives

The application to the Darwin Initiative for funding stated the purpose as follows: “The project on Genetic Resource Management Training seeks to provide a broad education in plant and animal genetic resource management and conservation for

students throughout the world. Courses in each of these specialist areas, together with a combined course, will be produced with the aim of providing effective and innovative in situ education in biodiversity. Access to training for a wide group of professionals will be developed through distance learning and, in the process, a useful library resource for both individuals and organisations will be established.”

The proposal was based upon course outlines that had already been drawn up by academics at Wye College, notably Dr Helen Case and Dr Simon Anderson. Once the grant had been awarded the objectives of producing three distance learning courses at Masters’ level were activated by assigning the task of course writing and preparation to key individuals. It was at this stage that Dr Nigel Maxted offered to supervise the preparation of a course in the Conservation of Plant Genetic Resources, and agreement was subsequently reached with the Head of the School of Biological Sciences, Professor Nigel Brown to enable this, with Antonia Eastwood, a Research Associate at the School, as principal writer. The preparation of the animal genetic resources course was undertaken principally by Dr Simon Anderson. It was agreed that the third course would be derived primarily from editing and adapting the two main theme courses.

Thus, in summary, the objectives of the Project were to produce three *courses** in distance learning mode with the following titles:

- Conservation of Plant Genetic Resources (Dr Nigel Maxted)
- Conservation of Animal Genetic Resources (Dr Simon Anderson)
- Conservation of Plant and Animal Genetic Resources (Drs Maxted & Anderson)

It was planned that these would be offered as optional courses in a new MSc programme in Sustainable Agriculture and Rural Development (SARD), to be launched in 1998, that had already received financial support from the University of London through its External System Lead Colleges Committee (ESLCC). They would also be available as “stand alone” courses, accessible via the University of London’s Affiliate student (now termed Occasional student) route. This enables professionals to update in a specific area without studying for a full Postgraduate Diploma or MSc, requiring them to for the course(s) only and not for the degree registration fee. However, the courses would be examinable and a pass would secure a Certificate from the University of London. Alternatively, students could offer a pass as a credit towards a postgraduate degree, since all courses are examined at Masters’ level, regardless of entry point.

*A course was defined at that time as comprising:

- A purpose written study guide of 10 or more units that built upon
- Volumes of selected readings, copyright cleared, and
- Selected recommended text books

Each course would require approximately seven to eight hours of study per week over a period of thirty-one weeks, commencing in mid-February, with an unseen examination of three hours in the thirty-sixth week. Each course would have three tutor-marked assignments (TMA) that would be used for educational diagnostic purposes, to assess progress and understanding, but not for the purposes of assessment.

Each course would go through a similar, rigorous process of draft preparation and editorial modification:

First draft with full references → distance learning edit → second amended draft → further edit → critical read/peer review → handover draft → first format → copy edit & proof read → final amendments from author → final format and check → print

The requirements for a consistently high standard mean that some schedule slippage needs to be built in to the timetable. The ramifications are explained in (b) following.

(b) Modification of Objectives/Operational Plan

As the previous paragraph has implied, the process of preparing new distance learning courses of high quality and standard at Masters' level is necessarily a protracted affair. Ambitiously, there were initial plans to launch at least one of the new courses for the 1998 session, to coincide with the first presentation of the new SARD MSc programme. In the event, we were able to offer the two principal courses in plant and animal genetic resource conservation for 1999. This in itself was a considerable achievement: to produce a new course from scratch in less than two years is good. The Darwin Initiative Secretariat were made aware of the situation, since there were some budgetary implications, as noted below in section 7, and gave approval to the operational modifications for the 1998/1999 academic year. One copy of each course was forwarded to the DIS in 1999, in accordance with the undertaking in the initial agreement.

A series of significant developments at Wye College at this time were to have an even greater impact on the proposal objectives, ultimately to most beneficial effect, although schedules were necessarily affected once more. I had seen the potential for mounting a full MSc programme in Biodiversity Conservation, once the preparation of the genetic resource courses was under way. During 1998 it became apparent that the wise management of the Darwin budget by Dr Bryson, added to the fact that the third course would cost less to produce than originally estimated, would "free" some funds from the grant to enable further courses to be started that would be "core" for the proposed MSc, if the DIS were agreeable.

Approval was sought and gained in the 1998/1999 session to transfer a portion of the funding to support the development of an introductory course "Introduction to Biodiversity Conservation", along with three further core courses: Assessing and Understanding Biological Diversity, Conservation of Biodiversity within Ecosystems, and Conservation and Humankind. Together with the genetic resource conservation courses, these four courses would provide a set of core modules for the new MSc programme. Their full development would be funded from External Programme core funds, derived principally from fee income, supplemented by the transferred Darwin funds.

It should be stressed that the MSc in Biodiversity Conservation would not have been proposed had it not been for the Darwin Initiative grant. The flexibility of the DIS in allowing Wye External Programme to transfer a portion of the funding to the new, but allied venture was much appreciated.

The development of the new MSc proposal coincided with a more fundamental set of changes through 1999 and 2000. On August 1 2000 Wye College merged with Imperial College of Science, Technology and Medicine to become Imperial College at Wye. Running up to the merger the External Programme had already set in motion a radical restructuring of its entire suite of programmes, with the objective of providing an Integrated Learning System (ILS) for postgraduate teaching at Wye. This would see the eventual total integration of internal and external postgraduate courses into a single set of programmes, whose principal difference would only be mode of learning experience: full time face to face, distance or mixed mode.

The impact on the traditional MSc programmes was to shorten individual courses by one third, to increase the number to be studied from seven to nine and to introduce a compulsory research report, where previously this had been optional. Courses were standardised to ten units, requiring five to six hours of study over a period of thirty weeks. The mode of assessment continued to be an unseen examination for all courses.

The impact on the "Darwin" courses was to retain the plant and animal genetic resource conservation courses in traditional mode, to be offered as options in the SARD programme, as continues currently for students registered in the traditional programme, and to produce new shortened ten unit versions for inclusion in the proposed MSc in Biodiversity Conservation that would follow the new ILS model. The combined course would also be in new, ten unit mode, and materials edited out of the plant and animal courses would be revised and "re-used" in the new courses to be prepared.

The proposal for the MSc in Biodiversity Conservation was finally approved by Imperial College and the University of London in the summer of 2000, and there was a special "launch" of the programme in October 2000 at the main South Kensington campus, with invited guests and a keynote speech from the current Director of the Darwin Initiative, Professor David Ingram. The programme was offered for the first time in 2001, with Professor Ingram as the inaugural External Examiner. Following is the current web page for the Degree, to which reference will be made in subsequent sections:

MSc and Postgraduate Diploma in Biodiversity Conservation

This new programme is a timely response to the increasing demand from international organisations like FAO for innovative distance learning materials that seek to meet the educational challenges set by the Convention on Biological Diversity, signed at the Earth Summit in 1992.

The survival of the Earth's biological diversity is under continuous threat from habitat loss and the overexploitation of natural resources. It has been estimated that approximately 15-20% of all species could become extinct within the next decade. This alarming rate of loss has led to a universal consensus on the urgent need to conserve global biodiversity for the benefit of humankind and future generations.

Part of the funding for this new programme has been provided by the UK Department of the Environment Darwin Initiative for the survival of species. It has been developed in collaboration with staff from the School of Biological Sciences at the University of Birmingham.

This programme gives students the opportunity to develop:

- a broad understanding of biological diversity at species, genetic and ecosystem levels
- the ability and confidence to formulate effective management policies and conservation strategies
- the skills required to manage in situ and ex situ animal and plant conservation projects
- a basic understanding of breeding and biotechnology and the ways in which genetic resources are utilised
- an awareness of the ethical and moral issues involved in the conservation and utilisation of biological resources
- a range of transferable skills: written, analytical, communication and IT skills

Graduates of this programme will typically find work as biodiversity or agrobiodiversity specialists in the following fields:

- NGO organisations dealing with diversity loss in areas designated as conservation priorities
- government ministries implementing CBD agreements
- international organisations concerned with biodiversity issues, sustainable agriculture and rural development
- consultancy work within the arena of biodiversity and agrobiodiversity
- applied research and teaching in institutions of research and higher education



Compulsory courses -
Six for MSc and five for PG Diploma

- introduction to biodiversity conservation (C90)
- assessing and understanding biological diversity (C91)
- conservation of biodiversity within ecosystems (C92)
- conservation and humankind (C93)
- data and management skills for conservation (C99)

(MSc only; linked to research report)

Plus **one** from

- plant genetic resource conservation (C95)
- animal genetic resource conservation (C96)
- plant and animal genetic resource conservation (C94)

Optional courses -

MSc and PG Diploma students take three of these

Either

- plant genetic resource conservation (C95)

Or*

- animal genetic resource conservation (C96)
- critical issues in sustaining biodiversity (C97)
- biodiversity utilisation (C98)
- environmental ethics (C63)
- international environmental law (C25)
- land resource conservation (C68)
- sustainable forest management (C85)
- one other from another programme

* whichever is not taken as a compulsory course

For more details of these courses see [Course Information](#)

Research Report - MSc students only

Examples of research report topics

- Assessment of the biodiversity of an ecosystem by identifying the main components and their interactions within an ecosystem
- Comparison of two ecosystems in terms of the sustainability of their biodiversity
- Evaluation of the risks of genetic erosion in a given ecosystem

- Appraisal of the genetic impact of the introduction of an exotic genotype into an agroecosystem
- Review of biodiversity conservation policies pertaining to a particular region or country
- Evaluation of the relative importance of different genetic resources to different types of farmers
- Comparison of different conservation strategies for a genetic resource threatened with extinction

[How to apply](#)
[Apply online](#)



(c) Relevant CBD Articles

The two most apposite Articles of the Convention on Biological Diversity for describing the project are Articles 13 and 12, although it may be argued that all the themes of the Articles listed in Appendix 14 of the Final report guidelines are covered, to a greater or lesser extent, within the courses of the MSc programme.

Article 13 refers to “Public Education and Awareness”: the project as amended and broadened has promoted understanding of measures to conserve biological diversity and has propagated these measures through the media, most especially through the medium of print. An additional outcome has been cooperating with other states and organisations in developing awareness programmes, as explained in sections 5 and 8 below.

Article 12 refers to “Research and Training”: the project has clearly sought to establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components, and it seeks to promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries.

(d) Success in Meeting Objectives

As should already be apparent from the foregoing the project has been entirely successful in meeting its original objectives, to produce quality courses by distance learning in the fields of plant and animal genetic resource conservation and management, and to make these available for study to a professional audience throughout the world and, in particular, the developing world given Wye College’s strong research and teaching links in developing countries, most notably in Africa, southern Asia and Latin America.

The careful management of the Darwin funding enabled Wye External Programme to propose a strong case for a full MSc programme in Biodiversity Conservation, and this was realised with its successful launch in 2001. The publicity for this programme continues to recognise the Darwin Initiative contribution and to carry the Darwin logo (see section 3c page 10). Further details are contained in Project Impacts and Project Outputs, sections 4 and 5 in particular.

4 Scientific, Training and Technical Assessment

(a) Education and Training Activities

As detailed above the project was entirely concerned with the provision of educational and training materials, delivered by distance learning through the University of London External System. Learners would have the opportunity to take individual courses in plant and animal genetic resource conservation, either as free-standing courses or as options in a taught Masters' programme in Sustainable Agriculture and Rural Development (since 1998). Subsequently, learners have been able to take either an MSc or a Postgraduate Diploma in Biodiversity Conservation (since 2001). All are by part-time study at distance.

The different routes for study, selection criteria, assessment and accreditation outcomes are as follows:

- MSc in Sustainable Agriculture and Rural Development (SARD) with options including plant and animal genetic resource conservation – four core courses and three option courses for an MSc – maximum study period 5 years – dissertation optional – entry requirements a good Honours Degree or equivalent (2.2 or better) in a relevant subject – assessment by unseen examinations for each course – offered in the traditional form since 1998
- MSc in Biodiversity Conservation – six core courses, three optional courses and a Research Report (25% of total assessment) for an MSc – maximum study period five years – entry requirements a good Honours Degree or equivalent (2.2 or better) in a relevant subject (either the natural or the social sciences) – course assessment by unseen examination, except for Data and Management Skills for Conservation which is assessed by two tutor marked assignments – offered in the new ILS form since 2001
- Postgraduate Diploma in Biodiversity Conservation – five core courses and three optional courses for a PG Diploma – maximum study period five years – entry requirements a good Degree or equivalent in a relevant subject – assessment by unseen examination for each course – offered in the new ILS form since 2001
- MSc in SARD with options including plant and animal genetic resource conservation – six core courses, three optional courses and a Research Report (25% of total assessment) for an MSc – maximum study period five years - entry

requirements a good Honours degree or equivalent in a relevant subject – course assessment by unseen examination – offered in the new ILS form since 2002

- Postgraduate Diploma in SARD with options including plant and animal genetic resource conservation – five core course and three optional courses for a PG Diploma – maximum study period five years – entry requirements a good degree or equivalent in a relevant subject – assessment by unseen examination for each course – offered in the new ILS form since 2002
- Affiliate/Occasional (since 2001) Student Certificate – professionals with relevant experience but not necessarily possessing HE qualifications are able to take courses individually – courses are examined at Masters level – a pass leads to the award of a Certificate of the University of London (External) – can be offered as a credit towards a full postgraduate qualification at MSc or PG Diploma level – courses offered in plant and animal genetic resource conservation since 1999 – additional courses in biodiversity conservation offered since 2001 – courses last 36 weeks

(b) Capacity Building

The initial development of the plant and animal genetic resource conservation courses, and the subsequent development of the Masters' programme in Biodiversity Conservation have led to some significant capacity building initiatives. These are summarised here and elaborated upon in section 5.

- University of Malaya, Postgraduate School of Biological Sciences – 1999 on – a British Council grant enabled successive reciprocal visits in 1999, 2000 and 2001, involving principally Professor Helen Nair and Paul Smith – objective to develop capacity in postgraduate provision of distance learning materials in the field of tropical plant genetic resource management – MoU between Imperial College and University of Malaya signed May 2001 - workshops were organised and run by Paul Smith in Kuala Lumpur in February 2000 and September 2001, focusing on the development of distance learning materials generally and specific course outlines with a regional emphasis in the *management of tropical plant genetic resources and sustainable forest management* – potential for further collaboration.
- International Plant Genetic Resource Institute (IPGRI) – early IPGRI involvement in reviewing the plant genetic resource course (Kevin Painting, Lyndsey Withers) – subsequent discussions in 2001 on how the plant genetic resource materials might be accessed for training purposes with Elizabeth Goldberg (Rome) and Professor Issiaka Zoungrana (Sub-Saharan Africa) led to participation in a three day academic network meeting, concerned with the management of plant genetic resources, organised by the APO (Asia, Pacific and Oceania) region in Serdang, Malaysia, in September 2001 – workshop and presentation by Paul Smith on sharing of distance learning materials prepared on the basis of the Darwin Initiative – follow-up still in progress, with as yet indeterminate outcomes.

- Instituto de Pesquisas Ecologicas (IPE), Brazil – exploratory discussions from 1999 on have led to a three-year DFID funded, British Council managed project (2002 – 2005) with this leading Brazilian NGO to develop capacity in biodiversity conservation and management distance learning training materials, for local educational purposes – good science linked to strong community support in Brazil’s Mata Atlantica for the development of “green corridors” based upon practical agroforestry schemes – aim is to develop a partnership link with the Catholic University of Rio de Janeiro (PUC) which has a strong distance learning unit and academic expertise in the environment and biodiversity field, and to attract significant funding to enable materials developed to be translated into Portuguese – reciprocal visits in 2002, further exchanges planned for 2003 – ongoing.

5 Project Impacts

(a) Achievement of Objectives

As noted in 3(a) above: “The project on Genetic Resource Management Training seeks to provide a broad education in plant and animal genetic resource management and conservation for students throughout the world. Courses in each of these specialist areas, together with a combined course, will be produced with the aim of providing effective and innovative in situ education in biodiversity. Access to training for a wide group of professionals will be developed through distance learning and, in the process, a useful library resource for both individuals and organisations will be established.”

It has already been explained that the project has exceeded its primary objective in that further course development has been supported by the Darwin funding, to the extent that a full MSc programme in Biodiversity Conservation is now offered. The original plant and animal genetic resource conservation courses continue to be offered in the MSc in Sustainable Agriculture and Rural Development programme, and in amended form in the more recent Biodiversity Conservation MSc. They have also been taken, exceptionally, in the MSc in Environmental Management programme, since students can opt to take one option from another programme. In addition the Darwin funding helped to support the development of an introductory course in biodiversity conservation, and courses in the assessment of biological diversity and the management of ecosystems (see 3(c) above).

The first Darwin courses were offered by the External Programme in 1999. Since then several dozen students have studied them, either on as Occasional students or as part of a Postgraduate Diploma or full MSc degree programme. Details are provided in the following section.

(b) Education and Training

The principal impact of the project has been in terms of courses studied by mainly professional students in several countries worldwide. To March 2003 almost one hundred individuals have taken one or more course in the field of biodiversity

conservation. The modal group has been 31-40 year-olds and 60% have been female. The detailed figures are as follows:

- 17 learners have so far studied the traditional course in Plant Genetic Resource Conservation (including 4 in 2003), 12 through the SARD programme and 5 through the Environmental Management programme. There have been 9 passes to date, all MSc level, and no fails.
- 8 learners have studied the traditional Plant Genetic Resource Conservation course (including 2 in 2003), 4 through the SARD programme and 4 through Environmental Management. There have been 2 passes to date, both at MSc level, and one fail.
- Since the MSc in Biodiversity Conservation was launched in 2001 there have been a total of 74 registered students, 41 for the MSc, 15 for the Postgraduate Diploma and 18 Occasional students. These currently account for over 200 courses sold (see also Outputs in section 6).
- Students from over 30 countries are currently taking courses from the Biodiversity Conservation programme. Some 20 % are from the UK and a further 15% from the USA. The other countries are, in alphabetical order: Australia, Botswana, Congo, Cyprus, Denmark, Ecuador, Ethiopia, Germany, Hong Kong, Ireland, Italy, Japan, Lebanon, Malaysia, Mauritius, Mozambique, Namibia, Nigeria, Norway, Singapore, South Africa, Spain, Surinam, Tanzania, Turkey, Vietnam, West Indies and Zimbabwe.
- To date there have been 40 courses passed in the MSc in Biodiversity Conservation programme, and a further 40 in the Postgraduate Diploma. No-one has yet graduated but the first MSc graduates and Diplomates are expected in 2003. Students have up to five years to complete their studies. Not every person takes the examination. Occasional students are often seeking professional update and are not seeking further qualification or certification.
- In 2001 and 2002 there have been 24 passes in the Introduction to Biodiversity Conservation (C90), 19 passes in Assessing and Understanding Biological Diversity (C91), and 15 passes in Conservation of Biodiversity within Ecosystems (C92), courses that were supported in some measure by the Darwin funding. There have been 7 passes in the combined Plant and Animal Genetic Resource Conservation course (C94), 1 pass in Plant Genetic Resource Conservation (C95), and 2 passes in Animal Genetic Resource Conservation (C96). It should be noted that most students taking the programme study C90 to C93 first, as compulsory core elements. (See also Outputs in section 6).
- Of all the courses passed to date in Biodiversity Conservation 15 have been at distinction level (that is 70% or above), or 20% of the total, which is exceptional.

(c) Capacity Building and Collaboration

Section 4 (b) has identified the principal areas where we have been involved in developing collaborative ventures with institutions in other countries, with a view to

developing capacity and capability in the provision of learning materials in biodiversity conservation for an audience that is broader than just postgraduate. This is particularly the case in the association with IPE, the Brazilian NGO, where the three-year DFID funded project aims to provide training materials in key areas of biodiversity conservation and management, related to IPE's work in the Mata Atlantica (the Atlantic Rain Forest) in the south and east of Brazil.

The project has already met the following objectives in the first year of operation:

- ❖ An investigation of the potential to develop joint training and educational materials on the links between the development of sustainable livelihoods, community participation and the conservation and management of biodiversity in the Mata Atlantica;
- ❖ The development of a proposal for a pilot project that brings together DLP materials from the biodiversity programme and IPE current research projects, to be translated into Portuguese and tested with a target audience of field workers and teachers, to be identified by IPE.

In this endeavour we will be joined by the Catholic University of Rio Janeiro, which has a well developed distance learning unit and also academics with expertise in relevant fields.

IPE has an impressive commitment to work with local people, in particular the “landless” in the Pontal region of Sao Paulo State, and is undertaking ground-breaking research, firmly rooted in the scientific tradition, on the conservation of flora and fauna with the forest – threatened species include the Black Lion Tamarin and the Jaguar. It is this essential multidisciplinary approach that ties in so well with the DLP's own approach to course and programme development. This is exemplified in the Biodiversity Conservation MSc, which combines academic rigour with practical relevance and draws on both the natural and the social sciences.

There is a strong complementarity of approaches between an academic institution that recognises the importance of providing applied materials that meet needs, focusing on emerging issues in sustainable development, and practically-oriented NGO doing excellent scientific research work and, at the same time, fully involving local people. Currently, we are concentrating on the Morro do Diabo State Park in the Pontal de Paranapanema region. The park is a 36,000 hectare remnant of the Mata Atlantica: only 1.8% of the forest remains from what existed in the 16th Century.

IPE's vision is to link together the forest remnants with a network of “green corridors” and “ecological stepping stones”, largely comprising agroforestry schemes, initiated by the new land owners in conjunction with IPE and State support. As the project enters its second year the partners are optimistic about producing a highly relevant pilot project as the forerunner to something more substantial in the longer term.

(d) Contribution to CBD Articles

Section 3 (c) noted that the key relevant CBD articles for this project were 12 and 13. However, all articles listed in table 14 of the final report guidelines are covered to a greater or lesser extent in the distance learning materials that are the courses for the

Biodiversity Conservation programme. It is not practically possible to allocate a percentage against each category, however, as requested and for this reason the table is not included here.

6 Project Outputs

(a) Published Materials

The principal output from the project has been in the form of comprehensive, high quality MSc standard distance learning materials. These have been produced in the form of detailed, individual courses for inclusion as both compulsory and optional areas of study in MSc and Postgraduate Diploma degrees offered formerly by Wye College, University of London, and currently by Imperial College London, Wye Campus, University of London.

The format of courses supplied to learners has been standard:

- ❖ A purpose written study guide comprising a number of units (standardised to ten in 2001) which act as the interactive teaching and learning guide, fully supported by
- ❖ A series of reading volumes of relevant, up-to-date reading materials that have been copyright cleared for educational purposes, and
- ❖ Two or three texts books that may be either background reading or closely linked to some of the text in the study guide;

All courses now offered by the DLP have on-line learning support through the OLE – the On-line learning Environment. This enables asynchronous discussions to take place between learners and specialists on a weekly basis throughout the study period of thirty weeks.

The distance learning courses fully supported by the Darwin grant are as follows:

- **Conservation of Plant Genetic Resources S05** (1999, traditional, offered as an option in the MSc SARD programme, and exceptionally in the MSc in Environmental Management)
- **Conservation of Animal Genetic Resources S06** (1999, traditional, offered as an option in the MSc SARD programme, and exceptionally in the MSc in Environmental Management)
- **Plant and Animal Genetic Resource Conservation C94** (2001, offered in the new MSc/PG Diploma in Biodiversity Conservation)
- **Plant Genetic Resource Conservation C95** (2001, amended version of S05 and offered in the MSc/PG Diploma in Biodiversity Conservation)
- **Animal Genetic Resource Conservation C96** (2001, amended version of S06 and offered in the MSc/PG Diploma in Biodiversity Conservation)

Distance learning courses that have been further supported by the Darwin funding, following agreement with Secretariat:

- **Introduction to Biodiversity Conservation C90** (2001, offered in the new MSc/PG Diploma in Biodiversity Conservation as compulsory, and as an option in the MSc in SARD and the MSc in Environmental Management)

Distance learning courses that have been developed as a direct result of the Darwin funding:

- **Assessing and Understanding Biological Diversity C91** (2001, offered in the MSc/PG Diploma in Biodiversity Conservation as compulsory, and as an option in the MSc SARD)
- **Conservation of Biodiversity within Ecosystems C92** (2001, offered in the MSc/PG Diploma in Biodiversity Conservation as compulsory, and as an option in the MSc in Environmental Management)
- **Conservation and Humankind C93** (2001, offered in the MSc/PG Diploma in Biodiversity Conservation as compulsory, and as an option in the MSc in Environmental Management)

Three further courses have been developed subsequently that also owe their genesis to the Darwin Initiative:

- **Data and Management Skills for Conservation C99** (2002, offered as compulsory in the MSc in Biodiversity Conservation)
- **Critical Issues in Sustaining Biodiversity C97** (2003, offered as an option in the MSc/PG Diploma in Biodiversity Conservation)
- **Biodiversity Utilisation C98** (2003, offered as an option in the MSc/PG Diploma in Biodiversity Conservation)

From September 2003 the programme in Biodiversity Conservation will be offered as a full-time internal MSc at the Wye Campus, with the title change: *Biodiversity Conservation and Management*. This will be the same degree, offered in the Integrated learning System, and students will be provided with the Study Guides for the courses that they take. From 2004 the DLP MSc and PG Diploma will be retitled to *Biodiversity Conservation and Management*.

(b) Learning Outputs

The information provided below relates to that provided in 5 (b) above, but with additional detail, and tabulated along the lines proposed in 15 Appendix II of the final report guidelines.

Courses delivered and passed to 2003

Full details of the following table can be viewed at the DLP offices, but are not available in the public domain. The table summarises the total number of Darwin funded and related Darwin courses (as detailed in 6 (a) above) that have been delivered to learners and the number of passes to date. It also provides details of fails, courses deferred and withdrawals.

Course Title	Total delivered	Passes to date	Fails	Deferrals	W/D
S05	17	9	0	n/a	n/a
S06	8	2	1	n/a	n/a
C90	74	24	5	7	1
C91	53	19	1	6	0
C92	49	15	2	5	1
C93	33	12	0	7	1
C94	17	7	0	3	1
C95	2	1	0	0	0
C96	2	2	0	0	0

Courses in bold depict those courses funded directly by the Darwin grant. C91, C92 and C93 were also prepared as a direct result of the funding. The table indicate the importance of the full MSc programme development. It is worth reiterating that courses S05 and S06 have been offered as options only within the SARD degree programme. A few students have also studied them as part of another Degree programme.

The “C” courses listed above are all compulsory in the MSc/PG Diploma in Biodiversity Conservation programme. Students have a choice to take one from C94, C95 or C96. If C95 is taken as a core course C96 may be studied as an option and vice versa. Students taking C94, however, are excluded from then taking either C95 or C96.

The high number of learners taking C90, Introduction to Biodiversity Conservation, is indicative of (a) its importance as the “first” course in the programme and (b) that it is offered as an option in both the Environmental Management and SARD programmes, 15 out of the 74 individuals being in this second category. The seemingly low number of passes to date is explicable in several ways:

- Learners are taking the course in 2003 (31 are taking C90 for example this year)
- Some exam candidates have deferred taking the examination from 2002
- Some learners do not sit the examination at all, particularly Occasional students who may wish to use the materials for professional update and are not worried about qualifications.

The figures from the table clearly demonstrate the impact that the Darwin Initiative funding has had upon this specific sector of higher education, where enhancing access to continuing professional learning worldwide in the field of biodiversity conservation has been the stated mission.

7 Project Expenditure

This provides a summary of the budget and expenditure under originally agreed headings. On the total budgeted figure the Wye College financial records indicate the following:

Three payments were received from the Darwin fund:

- £30,890 for 1996/97, the first year of the award
- £43, 575 in 1997/98, and
- £28, 545 in 1998/99

These payments were credited to a central Wye College finance account, the Development Fund account code RLRD8A. This fund was analysed and distributed against areas of expense within the External Programme at the end of each financial year (31 July). In 1996/97 the whole of the [REDACTED] received was matched against expenditure in Agricultural Development (for which read the External Programme). In 1997/98, of the [REDACTED] received, [REDACTED] was applied to Agricultural Development and [REDACTED] was carried forward to expend in 1998/99. This was done with the agreement of the Darwin Secretariat (Maria Stevens). This was added to the [REDACTED] received in 1998/99, which means that a total of [REDACTED] was matched in that financial year to the Agricultural Development project.

The audit trail for the Darwin money is thus contained within a Development budget that had its own cost centre and produced a detailed account analysis on a monthly basis. However, the account classifications were different from the ones used in the Darwin budget submission and many of the budgeted account types appeared in the External Programme general account. Overall, these demonstrated that the Agricultural Development project had direct costs of [REDACTED] in 1996/97, [REDACTED] in 1997/98 and [REDACTED] in 1998/99.

Table A following details a breakdown of expected expenditure against the annual payments from Darwin. As can be seen there is a slight discrepancy in the figures for 1996/97 and 1997/98 shown here as compared with the actual figures and this is explained below. Overall the accounts record that we received a total of [REDACTED] as compared to the [REDACTED] budgeted for, a discrepancy of only [REDACTED]

The file indicates changes that were agreed at the time to the projected expenditure in table A (see Annex 1) as follows:

- In 1996/97 Dr Bryson requested a change in the actual salaries expenditure, to be revised downwards from [REDACTED] to [REDACTED]. This was to take account of a carry over of [REDACTED] due to be paid to Dr Helen Case, and an increase from [REDACTED] to be payable to Dr Maxted at Birmingham University. This was agreed by Valerie Richardson.
- This led to revised projections for 1997/98 for salaries, to increase from [REDACTED] [REDACTED] This was also approved.
- The Annual Monitoring Form for 1996/97 confirms an expenditure of [REDACTED] which represents the [REDACTED] less [REDACTED] the reduction in the salaries expenditure.
- The grant request for 1997/98 confirms the amount claimed at [REDACTED]
- The Monitoring Form for 1997/98 confirms an anticipated cumulated expected expenditure of [REDACTED] comprising [REDACTED] added to the grant for that year of [REDACTED] In fact, as the monitoring forms for 1998/99 explain, there was a

delay in allocating the budget, due to slippage in the preparation of the two principal courses. This is sometimes the case with distance learning course preparation, and the details were explained to Valerie Richardson at the Darwin Secretariat. A carry over of funds was thus agreed for the next financial year, as noted in the following paragraph.

- The Annual Monitoring Form for 1998/99 documents an underspend on the two courses produced for a 1999 launch by [REDACTED] the principal plant and animal genetic resource conservation courses coming in under budget. Permission was given to develop the third combined course with this "saving" and to use the final grant of \$ [REDACTED] for a fourth course, the Introduction to Biodiversity Conservation. It was agreed that this could be carried over into a fourth year of the project. Total expenditure to date was indicated at [REDACTED]. This means that there is a slight discrepancy with the projected expenditure shown on the 1997/98 form: \$ [REDACTED]
- The figure taken forward was [REDACTED] added to the final payment of [REDACTED] (receipt of which was confirmed in 1998/99), giving a total of [REDACTED] which it was agreed could be carried over into 1999/2000. This is documented in the Annual Monitoring form for that financial year, with the reasons fully explained. This was accepted by the Darwin Secretariat.
- The final Annual Monitoring form (1999/2000) indicates that the final two courses to be prepared, the joint plant and animal course and the introductory course would be ready for the start of 2001, the launch of the new MSc programme. This goal was achieved.

The principal expenditures were on salaries (paid to authors, academic supervisors, critical readers and peer reviewers) and overheads (including costs incurred in the production of the course materials). It is worth pointing out that, at the time of the award of the funding in 1996, the development of the MSc in Sustainable Development was underway, and this was launched in 1998, with four new purpose written core courses. The funding for this came wholly from the University of London, at a cost of [REDACTED] per course (the total grant award being for [REDACTED]). The Darwin funding was thus well used to also produce four courses.

8 Project Operation and Partnerships

This section is not strictly relevant to the present project. Details have already been provided in previous sections (notably sections 3 and 5) about collaborative ventures and capacity building exercises: in Malaysia, involving the University of Malaya and IPGRI (APO), and in Brazil, involving the Instituto de Pesquisas Ecologicas. These were not part of the original proposal, but have arisen as a direct result of the development of the genetic resource conservation courses and the subsequent development of the full MSc programme in Biodiversity Conservation. Thus, this report should give full recognition to the significance of the Darwin Initiative role here.

9 Monitoring and Evaluation

(a) Evaluation of Learning Outcomes

Individual courses within any programme offered by the Wye Distance Learning programme are subject to evaluation by the student, but this is not a statutory requirement. Each Study Guide contains an end of course questionnaire, and there is a progress questionnaire associated with every Tutor Marked Assignment. In practice rather less than 15% of all students fill in these questionnaires, meaning that evaluation is at best ad hoc and anecdotal.

Recognising that this was a shortcoming of all programmes offered by distance learning through Wye, we were successful in getting research funding in 2001 from the University of London to carry out a comprehensive evaluation of impact and learning outcomes since the inception of the External Programme in 1988. This had the twin objective of evaluating two major programmes, Agricultural Development and Environmental Management, and establishing a model or template for future programme evaluations, including Biodiversity Conservation.

The research was carried out in 2001 and 2002 and the final report produced in February 2003. A two page summary of the findings is provided in Annex 1. Although not directly relevant to this project it demonstrates the commitment of the DLP to undertake a rigorous monitoring and evaluation of all its programmes from now on. The Biodiversity Conservation will be fully evaluated using this model once there is a reasonable cohort of completions.

In the mean time the feedback on an individual basis from students will need to suffice. The development of the on-line learning environment (OLE) has greatly increased the interactivity between tutors and learners, and all courses in the Biodiversity Conservation programme have been on-line since its inception in 2001. Participation is not mandatory, however, and a number of students choose not to do, although all do have access to the technology. It should be emphasised that access to the new technology is NOT a prerequisite for registration or success on any DLP programme.

Feedback on the programme has been overwhelmingly positive, the major problems having been getting courses to students on time in 2002, when there was a major production crisis – for that year only the despatch of learning materials was contracted out. The breadth and depth of learning opportunities have been singled out for specific commendation, as has the general overall quality and presentation of the learning materials. The increasing importance of the OLE is acknowledged by the majority of those students who have participated in one or more of the on-line course discussion groups.

(b) External Evaluation

The single, most important source of evaluation for academic programmes of study comes from the Visiting or External Examiner. In the case of the MSc in Biodiversity Conservation the DLP is fortunate to have as its first External Examiner Professor David Ingram, Master of St Catharine's College, Cambridge. In his first year as

External in 2001 Professor Ingram provided a resounding endorsement for the programme. In his report to the Examination Board he made the following comments:

“The programme is well designed and well balanced. The course materials are extremely well written and produced, and it is clear that the students are exceptionally well taught. The examination process was very well run and the question papers were excellent. I was impressed by the quality of the marking and the fairness with which the candidates were considered. Overall I was very impressed with the programme.”

It is worth pointing out that internal examiners are all experienced academics and are used to examining candidates from a wide range of cultural backgrounds, where English may often not be the first language. This is particularly important when dealing with a programme that is taught and examined wholly at a distance, and where two-thirds (in the case of the MSc) or 100% (in the case of the PG Diploma) is examined by unseen written examination.

10 Darwin Identity

The Darwin identity has always been closely associated with this project. The publicity materials continue to emphasise the importance of the Darwin funding and the Darwin logo is still carried in our Programme Guide and on the dedicated DLP website (reference www.wye.ic.ac.uk/EP). The original Darwin funded courses also carried the Darwin logo. The Darwin identity also appeared prominently in dedicated advertising for the new MSc programme. A4 flyers were produced and widely distributed, and a smaller A5 version was produced in large numbers (5000) and inserted by Earthscan in the CBD Handbook that was published in 2002.

Examples of all publicity materials are contained in Annex 2 of this report. Also provided are two copies of the annual EP Newsletter that is sent out to all currently registered students and to alumni. The 2001 and 2002 editions both carry articles that are relevant here, more notably the former that carries an article about the launch of the programme at Imperial College in 2000, with the keynote address given by Professor Ingram provided in full.

Although the MSc programme developed from the Darwin Initiative funding it has always been regarded as “the Darwin Project”, because without the initial funding there would have been no MSc programme. It is no coincidence at all that we invited Professor Ingram to launch the programme in 2000 and to become its first External Examiner. We were of course delighted when he accepted on both counts.

11 Leverage

There is no question that the acquisition of the Darwin grant back in 1996 provided the impetus and leverage to gain further, eventual College support for the full MSc programme. The Darwin monies, as highlighted elsewhere in this report, supported the development of six full courses, if you take revisions and adaptations into account

(S05, S06, C94, C95, C96 and C90). It provided the support for the development of a further six courses, where the development monies came from income revenues generated from support and other MSc programmes. In the resource-constrained environment that is higher education in the UK at the present time, this was no mean feat.

Section 7 explained that distance learning course production is a resource heavy process. We have been fortunate in getting the necessary funding earmarked for the remaining suite of courses to make up the full MSc programme. Registrations for 2003 indicate that this has been money well spent.

12 Sustainability and Legacy

There is equally no question that the project is sustainable in the longer term. Indeed, we anticipate that developments in the area of biodiversity conservation and management within Imperial College will continue to be supported. This year (2003) sees the start of a full-time MSc in this field, as a direct result of the DLP development. Planned is a new MSc in Sustainable Development, in which one of the principal strands will be the management of biodiversity.

Abroad, we are hopeful about our collaborative ventures in Malaysia and Brazil bringing forth some real results in terms of capacity building, and there is a chance that our growing links in the SADC region will be fruitful in this area. There have already been expressions of interest.

13 Value for Money

The original grant from Darwin was for producing three distance-learning courses. In the event we succeeded in producing six, given the structural changes in the External Programme that took place in the late 1990s, explained elsewhere, and a further six that were directly related to these courses. To date we have delivered over 250 biodiversity courses to almost one hundred professional learners in over 30 countries worldwide. In 2003 we will have our first MSc graduates and our first Diplomates.

Seeing the benefits at this level is often quite a long drawn out process, but we are confident that already the benefits can be said to outweigh the costs. I know that we are almost seven years along the road from when we first received notification that we had been successful with our Darwin application. It was for three years! The Darwin Secretariat have been patient with us but I hope that they will agree that, on the basis of the foregoing analysis, this has represented real value for money.

Author: Paul Smith (with thanks to Dr Jane Bryson who managed the Darwin Project until 1999, when she had to retire on the grounds of ill health).