BUILDING CAPACITY FOR PLANT BIODIVERSITY, INVENTORY AND CONSERVATION IN NEPAL

2003 ~ 2006

DARWIN INITIATIVE FOR THE SURVIVAL OF SPECIES
PROJECT NUMBER **162/12/030**

FINAL REPORT

CONTENTS

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1. Darwin Project Information

Project Reference No.	**162/12/030**
Project title	**Building Capacity for Plant Biodiversity, Inventory and Conservation in Nepal**
Country	Nepal
UK Contractor	Royal Botanic Garden Edinburgh
Partner Organisation (s)	Nepal Academy of Science and Technology, Kathmandu, Nepal (NAST), formerly Royal Nepal Academy of Science and Technology (RONAST) Government of Nepal, Ministry of Forests and Soil Conservation, Department of Plant Resources, Kathmandu, Nepal (DPR). Tribhuvan University, Central Department of Botany, Kathmandu, Nepal (TU-CDB).
Darwin Grant Value	£112,150
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Project website	www.floraofnepal.org/darwin
Author(s), date	Dr Mark F. Watson, Prof. Stephen Blackmore and Prof. Dayananda Bajracharya, 31st January 2007

2. Project Background/Rationale

The Kingdom of Nepal and its Biodiversity

The project was located in the Kingdom of Nepal at the heart of the Himalayan Biodiversity Hotspot. For its area Nepal is one of the most biologically diverse countries in the world, with 118 distinct ecosystems and an enormous altitudinal range within very short distances. In just 50 km as the crow flies you can travel from the hot southern plains at 60 m elevation to the icy peak of Mount Everest at 8848 m, the highest point on Earth. In this highly dissected landscape over 6500 species of flowering plants have so far been documented, and more await discovery. However, many habitats are under threat and the long term security of the environment is in jeopardy.

Human activity has had well-documented major impact on these ecosystems, such as large areas of natural vegetation lost to cultivation and grazing, urban encroachment, alterations to water catchments and the effects of increasing numbers of tourists. Of growing concern is the effect of climate change on fragile mountain ecosystems with alarming melting of major glaciers and the already reported upward displacement of climatic belts. The Government of Nepal has responded by, amongst other initiative, establishing a major network of protected areas across Nepal. But conservation initiatives such as these are hindered by the lack of accurate information on what plants occur where in Nepal and the tools to identify them. The threats to Nepal's plants and ecosystems are well-documented, but the plants themselves are not.

Documenting the Plants of Nepal

Information on the plants of an area is contained within a Flora: a comprehensive reference with the names and descriptions of each plant and keys to aid identification. Floras also contain a wealth of other information on ecology, flowering time, distribution, uses, conservation status and comments on difficult or unresolved taxonomy. They are a key resource providing base-line data for biological studies and are especially useful in conservation initiatives. But, unlike neighbouring countries such as Bhutan, India and China, Nepal has no published Flora, just a basic checklist of plant names and general distribution. An earlier Darwin Initiative project (1997-1999 between The Natural History Museum, London and TU-CDB) established an important taxonomic database: Nepal Plant Information System. This built on and mobilised earlier checklists and provided a basis for establishing conservation priorities and action plans and, ultimately, the preparation of a Flora of Nepal.

However, trained taxonomists in Nepal who would be able to participate in the production of the Flora of Nepal are few in number. Furthermore the plant reference collections in Nepal (e.g. the national herbarium KATH and university herbarium TUCH) are incomplete, facilities are poor and key publications are not available. The project aimed to address the long term need for increased in-country botanical expertise in Nepal to undertake botanical inventory and collection as a basis for the production of the Flora of Nepal. This was achieved primarily by intensive human and institutional capacity building in Nepal. Through the training activities undertaken significant new reference materials were also collected, new plant data generated, and draft accounts written for the Flora of Nepal.

The Government of Nepal's 10th Five-Year Plan (2002) and the National Biodiversity Strategy (2002) prioritised institutional strengthening and human resource development as key areas needed for the management of the biodiversity of Nepal. In the light of this, NAST (formerly RONAST) approached RBGE on behalf of the participating institutes requesting assistance through the Darwin Initiative. The capacity building Darwin Initiative project was developed from this collaboration and addressed the needs identified in these two government policy documents.

3. Project Summary

Purpose of the Project

The purpose of the project was to strengthen the institutional base for plant taxonomy in Nepal (in particular the herbarium collections and staff at DPR [KATH herbarium] and TU-CDB [TUCH herbarium]), so that Nepal has in-country reference collections of its rich flora and the necessary taxonomic expertise to meet its needs in responding to the CBD. Eighteen Nepalese scientists received training in field techniques of data recording and plant specimen collection, and the assessment of conservation status (according to new IUCN categories). Training was also provided on modern herbarium techniques for collection management, documentation and utilisation. The aim was to provide the fundamental skills to enable Nepalese scientists to generate taxonomic information and to undertake conservation status assessments, including plant species and habitat action plans. All 18 participants attended the three training workshops in Nepal and then, in groups, took part in field research training on expeditions in Nepal and attended UK study visits. Additionally, this training programme developed the human resources needed for Nepal to contribute to international collaborative efforts towards a Flora of Nepal (coordinated by RBGE and involving institutions in Japan, Nepal, UK and USA).

The revised project Logical Framework is included in Appendix V, and Appendix VI gives a summary of the project reporting against this Logical Framework. There was only one change to the Logical Framework in 2005 following the reviewer's suggestion after the first annual report.

During the timeframe of the project Nepal was going through a difficult period of political instability, and it became increasingly problematic to travel to areas outside the Kathmandu Valley other than to regions under tight army control. Because of these safety concerns modifications were made to the location of fieldwork training events, and these were moved to National Park areas where the safety of participants was more assured. Approval was not specifically sought for this from the Darwin Secretariat, but this decision was not questioned when reported in our Annual Reports. The final in-country event of the project was a high profile one-day symposium showcasing the results and achievements of the project to decision makers in the biodiversity and government sectors and media in Nepal. This was originally timed for mid March 2006, but due to major political unrest in Nepal at that time we were forced to postpone it. Darwin Secretariat was approached and approved the carry over of £2,800 to finance this last event in financial year 2006-7. This symposium was successfully undertaken in October 2007 (see report in Appendix VIII).

The only negative impact of the change in field location on the outputs of the project was that it would not be possible to achieve the anticipated wide coverage (75%) of plant species as we could not get to under-collected remote areas. Even so, over 830 different plant species were collected including significant numbers of additions to the Nepalese flora and extensions to ranges. In compensation Preliminary Global and Regional Conservation Assessments were undertaken for all 833 species identified rather than just Global Assessments for 50% (this was suggested by the reviewer of the second year report). The recent dramatic improvements to the short and long term political situation in Nepal are very encouraging. The insurgency by the Maoist movement in Nepal has now ended and the Maoist party has renounced its military activities and joined a new united government of Nepal under a new constitution. Past restrictions on travel outside the Kathmandu valley are now removed and it will now be possible for us and our counterparts in Nepal to work freely in areas that need field research.

Contribution of the Project to National and Global Strategies

The Darwin Initiative project has contributed to both national and global strategies for plant biodiversity and conservation. Nationally the project directly addressed needs identified in The Government of Nepal's 10th Five-Year Plan (2002) and the National Biodiversity Strategy (2002) (see above in section 2). Globally the project as contributed to the aims of the Global Taxonomy Initiative (GTI) and the Global Strategy for Plant Conservation (GSPC) established under the CBD. Specifically the project has contributed to:

(a) enhancing national coordination (CBD Article 10), capacity building through human resources (Article 12a), research (12b), and international cooperation (Article 12c)
(b) reflecting the state of knowledge about biodiversity through identification and monitoring (Article 7)
(c) strengthening national biodiversity database network and facilitate exchange of information and scientific cooperation to the needs of developing countries (Articles 17 & 18)
(d) endorsing indigenous people's knowledge and innovations through *sui generis* IPRs (Article 8j)
(e) increasing support for biodiversity research (Article 20) and by operating within a democratic and transparent system of Governance (Article 21)

Achievements of the Project

As can be seen in the summary of achievements against the Logistical Framework (Appendix VI), the project has been very successful in meeting almost all of its objectives and exceeding them in some cases. The main thrust of the project was capacity building through extensive training so the only objective that was not wholly achieved, the ambitious increase to 75% coverage of the Nepalese herbaria for plants recorded in Nepal, was therefore not viewed as a major problem. Indeed this meant that more emphasis was put on quality of collections rather than on quantity of collections which also enhanced the training elements of the expeditions. We were also able to extended the coverage of conservation assessments (see below).

New Reference Collections and Conservation Assessment

In total over 1,800 plant specimen collections were made in sets of five or six (representing over 8,000 individual herbarium specimens). These have been distributed to the two Nepalese herbaria (KATH and TUCH), the Department of National Parks and Wildlife Conservation (Government of Nepal), Edinburgh (E) and Tokyo (TI). Specimens of difficult plant groups have been sent to world taxonomic experts for accurate identification. The main bulk of the identifications have been completed and the final specimen labels printed and distributed with the specimens. Data for the collections, including Google Earth KML files for the collecting localities, is available via the project website. 833 species have so far been identified including 32 that are new to Nepal and two that are new to science. These totals will certainly rise when the remaining taxonomically difficult groups are studied. It is surprising to note that even though the expeditions were limited to often visited areas of Nepal (Solukhumbu and Chitwan) the specimens collected during the project have contributed significantly to extending the knowledge of the plants of Nepal: 40 species new to Nepal, 106 species with extended known geographical range into a major regional division, and 93 species with extended altitudinal range. This highlights the urgent need for continued fieldwork in Nepal.

During the fieldwork training events emphasis was placed on recording data that can feed into conservation assessments and management plans. As an output of the project, Global and Regional Preliminary Conservation Assessments were undertaken on all the 833 species identified from the collections: significantly more than the 50% original objective. The report of the conservation assessment exercise is attached as Appendix VII. Of the 833 species those which were categorised as Likely Data Deficient (LDD) or Likely Threatened (LT) should now be prioritised for further study. On a Regional basis (considering all plants recorded to be endemic to Nepal) 80 species have been assessed as LDD or LT, on a Global basis 37 species have been assessed as or LT (see Appendix VII). These highlighted species should now be studied in more detail for full conservation assessments including a wider group of experts working across the Himalaya.

Human Capacity Building through Training and Experience

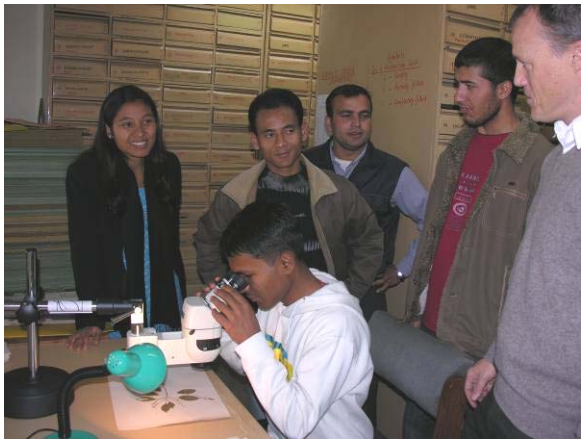
The formal training side of the project was highly successful with all 16 Darwin Scholars and two Nepalese co-ordinators actively participating in the three workshops, three fieldwork training expeditions and UK study visits. Reports of all of these (and other major activities of the project) have previously been submitted as attachments to the three Annual Reports and are also available on the project website. During the project many experts from the partner institutes and external organisations contributed with guest lectures and practical sessions during the workshops and study visits. Additional members of RBGE staff obtained external funding to join the expeditions and participate in the training. After the third training expedition we were able to run an additional one-day training programme at the Royal Botanical Garden of Nepal, Godawari, to introduce the main

topics of seed (germplasm) and voucher specimen collection to RBG staff not participating in the main Darwin project. Feedback from participants on the training events showed that the training was effective and productive. During the final workshop a one day fieldwork assessment showed that the Darwin Scholars had learnt a great deal and could operate independently.

All 16 Darwin Scholars successfully completed the training course and submitted their personal projects on time. The personal projects included first draft Flora of Nepal accounts of 33 plant genera that were judged suitable to send to foreign co-authors for comment. All Darwin Scholars are now actively involved in either passing on their knowledge to others and/or applying their skills to biodiversity research undertaking field or herbarium studies, publishing their work and taking on the co-authorship of further plant groups for Flora of Nepal. One Darwin Scholar (Bhaskar Adhikari) has been awarded funding to study for a PhD at RBGE on the systematics of Himalayan *Berberis*. Another Darwin Scholar (Sangeeta Rajbhandary) has registered for a Ph.D. degree at Tribhuvan University on the systematics of Himalayan *Begonia*, and another (Sheetal Vaidya) will register with TU within the next six months.

Institute and Infrastructure Capacity Building

During the lifetime of the project we have been able to contribute to improving the facilities and libraries at our partner institutes. Literature resources were targeted to cover the important taxonomic reference works, and some specialist books were supplied at the request of the partners. High quality dissection microscopes were given to the two herbaria alongside consumables for specimen preparation. All project partners were given computers (either laptops or desktops) and sets of field equipment (including handheld GPS receivers and plant collecting and pressing equipment). Darwin Scholars were given some personal equipment for collecting, dissecting and examining plant material. Small grants were given to the two herbaria to improve the curation and storage of the collections.



Network Building and Promotion

The one-day Final Symposium, held in October 2006, was a fitting climax to the project and an opportunity to showcase the activities and achievements (report attached as Appendix VIII) During the Final Symposium senior figures from partner organisations, Government of Nepal and the British Ambassador praised the achievements of the Darwin project and pledged continued institutional support for future work. Many good ideas for enhancing the legacy and future collaborative work were forthcoming from the discussions held during the final workshop. Subsequently letters of congratulations and support were received from TU and DPR (Appendices X and XI). The importance of this work is also demonstrated by the strong media uptake in both Nepal and the UK. Some of the articles have been taken up by international newspapers and reprinted round the world. Examples of the articles are provided in the three Annual Reports, in the Final Symposium Report and Appendix XII.

A significant but less measurable output of the project is the closer collaboration and understanding between project partners. Through the teamwork forged during the project activities and wider collaborations with people at all levels, there is much greater willingness to work together on biodiversity research which will be a lasting benefit of the project in Nepal. This is symbolised by the decision to establish a Flora of Nepal Office at the KATH herbarium which will provide a shared resource for research and training and act as a focus for those involved in biodiversity work in Nepal, especially those working on the Flora of Nepal. Initially this will be used mostly by those who have

been involved in the project, but this will expand to include those trained in the future and brought into the network.

4. Scientific, Training, and Technical Assessment

Introduction

Scientific training was at the heart of this project and a great deal of time and effort was put into designing the training elements and adapting them following feedback as the project developed. Although a ground plan was in place before the start of the project, a Planning Meeting of partner institutes was held in Edinburgh at the start of the project (September 2003) to establish the detail and set the timing of the training activities. These were recorded in a Gantt chart (see First and Second Annual Reports). The main training elements of the project were:

- Selection of Trainees (Darwin Scholars and Nepalese Co-ordinators)
- Three training workshops in Nepal
- Three fieldwork training expeditions in Nepal
- Two UK study visits
- Darwin Scholars Personal Project report that would be assessed
- Development of a project website

As a matter of course separate reports were produced for all the project activities. These have been submitted as attachments to the relevant Annual Reports and are available in multiple formats on the project website. Training materials were also distributed on CD-ROM and are available on the website.

Darwin Scholars and their selection

The procedure for selection of the eighteen Nepalese scientists to be trained during the project was established at the Edinburgh Planning Meeting and later approved by the wider Organising Committee. Prof. Shrestha (TU-CDB), and Dr Rajbhandari (DPR) were included in their capacity as Nepalese Co-ordinators, and sixteen Nepalese botanists formed the Darwin Scholars. Because an important aim of the project is capacity building for the three participating organisations, the institutional heads were invited to nominate ten Darwin Scholars as follows: DPR four; TU four; NAST two. The remaining six places were filled through open competition which was open to everyone, including members of the participating institutes not put forward as nominees. An advertisement was placed in Kantipur Daily (an English language newspaper with wide circulation in Nepal), sent to participating organisations, other environmental institutes, NGOs and INGOs, and posted on the project website. The application form was available from NAST and as a download on the website. Applicants were invited to submit a full *Curriculum Vitae*, application form, and up to two letters from referees supporting their application.

Forty five people applied for open competition places. The criteria for final selection were:

- M.Sc. (Botany) or equivalent experience; preference given to those specialising in the systematics of any plant group
- Candidates demonstrating commitment to plant biodiversity research in Nepal
- Candidates with computer literacy

A shortlist of 12 candidates was made by a selection committee constituted by NAST, and the applications for these sent to RBGE. Prof Blackmore and Dr Watson selected the six successful candidates and one reserve candidate. All sixteen selected Darwin Scholars accepted their place on the training programme and attended the first workshop. Soon after the first workshop Mr Naresh Thapa left Nepal and his open competition place was filled by the reserve candidate Ms Sajan Dahal. This combination of nominated places and open competition was successful in both enabling the partner institutes to put forward their priority staff members and also for the inclusion of the best botanists beyond this selection. The sixteen Darwin Scholars are:

Selection by Internal competition:
Mr Sunil Kumar Acharya, Assistant Scientific Officer, District Office, Banke (DPR)
Ms. Anjana Giri, Assistant Scientific Officer, RONAST, Khumaltar (RONAST)
Mr Umesh Koirala, Lecturer, PG Campus, Biratnagar (TU)
Ms Vidya Keshari Manandhar, Asstistant Research Officer, National Herbarium (DPR)
Mr Lalit Narayan Mandar, Lecturer, PN Campus, Pokhara (TU)
Ms. Nirmala Pandey, Assistant Scientific Officer, DPR Head Office,Thapathali (DPR)
Ms. Sangeeta Rajbhandary, Lecturer, CDB-TU, Kirtipur (TU)
Dr Sangita Shrestha, Scientific Officer, RONAST, Khumaltar (RONAST)
Mr Rajesh Kumar Uprety, Assistant Scientific Officer, DPR Head Office,Thapathali (DPR)
Ms Sheetal Vaidya, Lecturer, Patan Campus (TU)

Selection by Open competition:
Mr Bhaskar Adhikari, Freelance botanist, Kathmandu
Ms Sajan Dahal, Asstistant Research Officer, National Herbarium (DPR)
Mr Kamal Maden, Teaching Asstistant (part time), PG Campus, Biratnagar (TU)
Mr Ram Chandra Poudel, Freelance botanist, Kathmandu
Dr Lokesh Ratna Shakya, Lecturer, ASCOL, Kathmandu (TU)
Dr Mohan Siwakoti, Reader, Natural History Museum, Swayambhu (TU)

First Training Workshop, Kathmandu, March-April 2004

Three members of staff from Royal Botanic Garden Edinburgh (Prof. Stephen Blackmore, and Drs Crinan Alexander and Mark Watson) ran the first Training Workshop. The workshop was held over nine days spread across 21 days, with the NAST organised 4th National Conference for Science and Technology between the two main parts of the workshop. Workshop participants were invited to attend the conference, and many gave presentations. All 16 Darwin Scholars attended the workshop which included the following subjects:

- plant specimen collection in the field
- data recording methods
- specimen preparation and identification
- Convention on Biological Diversity
- conservation action plans in Nepal

Six Nepali experts were involved in the teaching as Co-ordinators and Resource Persons (Dr. UR Sharma, Dr. KD Yami, Prof. KK Shrestha, Dr. TB Shrestha, Dr. PR Shakya, Prof. RP Chaudhary), and two visiting foreign botanists (Prof. Hideaki Ohba, University of Tokyo, Japan and Prof. David Boufford, Harvard University Herbaria, USA) gave guest lectures. Two Practical sessions were run in the two main herbaria, and for half a day in the field (Phulchowki Hill, up to 2100 m). Darwin Scholars initiated their individual projects by consulting and recording data from the herbarium specimens in the two herbaria. Assessment was also carried out on the general holdings from the two herbaria.

As this was the first major in-country event, the opportunity was taken to hold a formal Inauguration Ceremony with distinguished invited guests and representatives of the national media. A closing ceremony was also held during which the Darwin Scholars were given certificates of Attendance.

Second Training Workshop, Kathmandu, November 2004

Three members of staff from RBGE (Drs Tony Miller, Colin Pendry and Martin Pullan) ran the second Training Workshop. The workshop was held over eight working days, and involved all 16 Darwin Scholars, five main trainers and five additional speakers representing WWF-Nepal, the King Mahendra Trust for Nature Conservation, Integrated Centre for Mountain Development, the United Nations Development Programme and Tribhuvan University. In addition four of the Scholars gave presentations. The teaching materials used were collected on a CD and each scholar was given a copy after the workshop and it is available on our website.

The aims of the Workshop were:

- develop the participants' abilities to write accounts for the Flora of Nepal
- to develop their identification skills
- to train them in modern methods of data management
- to improve their understanding of biodiversity and conservation issues in Nepal

The Workshop sessions were a mixture of lectures, practicals and discussions, and were grouped into seven themes:

- Flora Writing Skills
- Identification Skills
- Angiosperm Phylogeny
- Conservation Assessment
- Major Plant Families
- Biodiversity & Conservation in Nepal
- Electronic Data Storage, Management and Presentation.

Third Training Workshop, Kathmandu, November-December 2005

Three members of staff from RBGE (Drs Elspeth Haston, Colin Pendry and Mark Watson) ran the third Training Workshop. The workshop was held over eight days and involved all 16 Darwin Scholars and the two Coordinators. Ten guest lectures and practical sessions were presented by representatives of the Government of Nepal, NGOs and independent researchers. Six of the Scholars gave presentations on their Project work or on their involvement in the Project's activities. The aims of the Workshop were:

- To train the participants in Herbarium management techniques
- To review and reinforce fieldwork methods
- To develop the participants' research skills
- To give an overview of ethnobotanical activities in Nepal
- To give an overview of the resources available for botanical research
- To report on Project activities since the previous workshop

First Training Expedition, June 2004

Five Nepalese botanists accompanied three from RBGE (Drs Tony Miller, Mark Watson and Mr David Knott [externally funded]) on a 19-day trek-based expedition to Sagarmatha National Park (Everest region). 368 gatherings were made, including 228 herbarium collections (in sets of six, about 1,200 specimens). 500 field records were collected and 75 seed accessions. All the collections had full habitat and ecological notes, including threats to the habitats and condition of the vegetation, and abundance assessment. These data give added value to the collections and feed directly in to conservation assessments and action plans. Due to the switch to a higher altitude than planned (due to political problems discussed above), it was rather early in the flowering season for the area we visited and consequently the actual numbers of collections were lower than anticipated. Nevertheless, all the training objectives of the expedition were met, and the reduced volume of plant material enabled us to focus more on training and testing of collecting methods and data recording techniques. Two Darwin Scholars (Bhaskar Adhikari and Kamal Maden) went on to undertake fieldwork of their own, borrowing equipment supplied by the project.

Second Training Expedition, November-December 2004

The second training expedition lasted 14 days and visited sites in the Terai around Chitwan National Park and in the Siwalik Hills to the north of Hetauda. Six Darwin Scholars and Dr Krishna Shrestha accompanied the three RBGE staff (Drs Tony Miller, Colin Pendry and Martin Pullan), and because of the large size of the group it was split into two teams who collected in separate sites. A total of 494 collections were made (ca. 2,000 specimens) of flowering plants, the primary focus, with more limited collections made of ferns, fern allies and bryophytes. Specimens were gathered in sets of at least three, usually five. Training objectives were as for the first training expedition, and all were met. The group was unable to visit Parsa Wildlife Reserve because of a recent Maoist incident there and fears about land mines, and there was a ban on road travel for two days of the visit to Chitwan. Alternative localities were found, but there was a general nervousness about the security situation.

Third Training Expedition, September-October 2005

The Third Fieldwork Training Expedition involved a 22-day trek & camping-based expedition to Sagarmatha National Park between 10th September and 1st October 2005. Four RBGE staff members (Drs Colin Pendry, Mark Watson, Mr David Knott and Mr Neil McCheyne, the latter two externally funded) participated in the expedition and, along with the two Nepalese co-ordinators, provided training for six Darwin Scholars. As well as the vital training and experience-sharing outputs, 886 plant collections were made in sets of 4 or 5 (ca. 3600 individual specimens), with silica gel dried leaf material and digital photographs (habit and close up) for the majority of these collections, and approximately 1,000 field records. We were privileged that Dr Uday Sharma (then recently appointed as Director General of Department of Forests, Government of Nepal) was able to join the team for the first week and shared his experience from his time as the first Warden of this National Park in the mid 1970's. He also set up meetings with the current Park Administration and Buffer Zone Council. With nine Nepalese botanists in the team and four from the UK, this was the largest contingent of Nepalese botanists ever to participate in an international expedition in Nepal, and as such it was much acclaimed as a unique event. Work continued on return to Kathmandu where it took over three full days to process all the collections for distribution to the partner organisations.

An additional activity (not funded by the Darwin grant) was the running of a one-day workshop by RBGE staff at DPR headquarters and the National Botanical Garden in Godavari. This workshop addressing the basic techniques in seed collecting for seed storage and voucher collection was aimed at DPR staff (especially those of the Botanical Garden) that had not been able to participate in the Darwin Initiative project. It was aimed at establishing a biodiversity seed bank for Nepal. A refrigerator was purchased and donated to DPR for the storage of nearly 168 seed numbers collected in three sets as a start towards the seed bank. At the end of the trip Mark Watson gave a lecture on fieldwork and plant collecting in Nepal to the Association of British Alumni in Nepal at the British Council in Kathmandu (an additional event).

First UK Study Visits, January-February 2005

In January and February 2005 seven Darwin Scholars and Nepalese Coordinator Dr Keshab Rajbhandari visited the UK during two two-week Study Visits. Dr Rajbhandari led both groups and stayed in the UK for a further three weeks after the return of the second group. The aims of the UK Study Visit were to:

- Enable research on personal projects using herbarium and library resources at the three major UK botanical institutes: RBGE (E), The Natural History Museum, London (BM), and Royal Botanic Gardens, Kew (K). These institutions house valuable materials not available in Nepal (especially historic materials), but vital to a revision study.
- Participate in one-to-one tutorage of Darwin Scholars by RBGE staff on the personal projects.
- Develop identification skills by working on the specimens collected during the first two Training Expeditions.
- Provide general experience in the organisation and running of international herbaria in the UK (E, BM and K).
- Provide more detailed experience in the activities and research undertaken at RBGE, especially with regard to use of the living collections for education and research.
- Develop an understanding of British and Scottish culture and way of life, which helps when developing collaborative programmes.

The Darwin Scholars prepared a draft account of their project group in advance which they worked on during their visit. During their time in the UK the Scholars spent as much time as possible researching their project group and revising their manuscript (both alone and in collaboration with tutors). All the Scholars were able to consult vital specimens and literature which were not available to them in Nepal. All Scholars had some species for which they had not seen any material of at all, and for others only a few specimens. Identification skills were improved by the Darwin Scholars working singly with a tutor used the RBGE herbarium and literature from the library to identify specimens collected during the fieldwork events. Some 159 collections were named to species. This demonstrated the value of complete material in the gathering and accurate supporting data, and also the importance of good keys and descriptions for their own work.

Whilst in Edinburgh, tours provided experience of: public display/education living collections (under glass and outside) with interpretive materials; non-public research living collections (under glass and outside); plant propagation and Nursery facilities; Quarantine House; Herbarium office administration and database systems; Herbarium specimen mounting; and library. A weekend day trip was arranged to Dawyck Botanic Garden, and cultural activities were organised. Dr Rajbhandari planted a Nepalese tree to inaugurate the Nepalese plantings at Dawyck Botanic Garden. This attracted media attention and was featured in several local newspapers. During a short visit to London the Darwin Scholars were able to tour round and work with the collections of the two other major UK botanical collections relevant to Nepal: The Natural History Museum, London, and Royal Botanic Gardens, Kew.

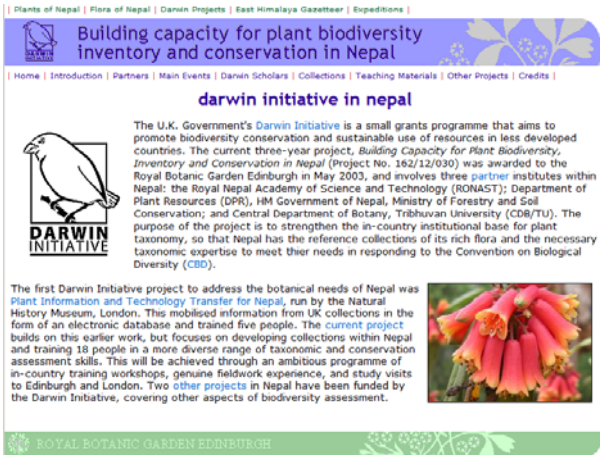
Second UK Study Visits, January-February 2006

In January and February 2006 the remaining nine Darwin Scholars and Nepalese Coordinator Prof Krishna Shrestha visited the UK during two two-week Study Visits. Prof Shrestha led both groups and he and Mr Ram C Poudel stayed in the UK for a further nine days after the return of the second group. This was a repeat of the first UK Study Visit with the aims and activities largely being the same. Prof Shrestha and Mr Poudel worked on analysing and restructuring the existing Nepalese Plant Information database.

Feedback after each Study Visit was very positive with many comments on this being an ‘unbelievable experience’ with facilities and access not conceivable in Nepal. This was also reiterated in the Final Symposium when Darwin Scholars reported on their work and experiences. It was strongly felt that high level decision makers in the Government of Nepal and partner institutes should undertake a study visit for themselves to experience first hand the facilities and organisation of the UK taxonomic institutes so that they can implement changes back in Nepal.

Flora of Nepal Website

The Flora of Nepal Website (www.floraofnepal.org) was launched in 2004. The Darwin project website forms part of this and is a valuable resource for documenting the project activities, disseminating information to project participants and interested readers. The main website also has a great deal of information on Nepal, the land and its plants. Specific information on the Flora of Nepal is currently limited to a link to the eFloras version of the Annotated Checklist (www.eFloras.org), but this will be expanded to include the main Flora accounts when they are produced.



Darwin Scholars Personal Project Reports

All Darwin Scholars (excepting Naresh Thapa who left the programme) successfully submitted reports on their personal project on time to the NAST office in mid February 2006. All submitted the whole or a large part of their report in electronic format suitable for distribution by email, so copies could easily be sent to all coordinators. It is noteworthy that through the revisions undertaken by the Darwin Scholars, the consultation of specimens and literature, 14 additions to the 2000 Annotated Checklist of Flowering Plants of Nepal have been recognised. In addition to the extra taxa, two species are now judged to not occur in Nepal and previous literature records from Nepal are considered erroneous.

The coordinators in Nepal and the UK independently assessed the project report on criteria spanning quality of presentation, factual content and accuracy. Additional relevant information beyond that expressly stipulated was taken into consideration as well as the base-level knowledge and experience each Darwin Scholar had when they started the training programme. A feedback report was prepared and sent to the Darwin Scholars.

Assessment and Accreditation

Direct evaluation of the performance of the Darwin Scholars through formal assessments after each training event was not considered appropriate given the range of seniority of the participants. Instead, monitoring the performance and understanding of Darwin Scholars was undertaken through a number of routes:

i) One-to-one sessions during the workshop practical classes and UK Study Visit. All Scholars visiting the UK were asked to complete the first draft for their specialist group, and feedback was given on these during one-to-one sessions. Tutors involved in the UK sessions were asked to indicate the achievements of their tutees.

ii) Quality of data recording and specimen collection during fieldwork was monitored continuously with the Scholars working closely with trainers. Inadequate material was not accepted and very quickly all the material collected was of high quality with complete collection data recorded.

iii) Performance of individuals during the one-day fieldwork as part of the final workshop. Here the Darwin Scholars were given equipment and the objectives (collect 10 specimens) and monitored whilst they organised themselves and carried out the fieldwork. Quality of data and collections was partially self-monitored when we asked each group the next day to work up the collections of another group. Trainers accompanied each group as observers.

iv) The Personal Project Reports were an excellent measure of achievement of the Darwin Scholars and these were assessed by the trainers in detail. Feedback on each report was given to each Scholar. Absolute grading of the Personal Project Reports was not considered appropriate, but instead the high achievers were acknowledged through the awarding of prizes (one top prize and 5 runners up prizes) which were presented during the final symposium.

Formal Certificates of Attendance were presented at the end of each Training Workshop and final framed Certificates of Completion were presented by the Government of Nepal's State Minister of Science and Technology during the final symposium.

5. Project Impacts

Human Capacity Building

All Darwin Scholars completed the training activities and wrote personal project reports demonstrating that they have understood and can utilise the data gathering and plant documentation skill they have learnt. All personal project reports contained draft accounts for the Flora of Nepal to a standard that they are considered Stage 3 first drafts for co-authors to work on. Some of the personal projects have subsequently been published in the DPR Fascicles of Flora of Nepal (see Publications below). All Darwin Scholars are now engaged in taking on co-authorship of additional plant groups for the Flora of Nepal. Plant inventory and exploration through field research was a major component of the project and its success is evident from both the extent and quality of the plant specimens collected (see above in 4), the number of field records taken and the increased ability for Darwin Scholars to undertake fieldwork of their own. The fieldwork exercise undertaken during final workshop demonstrated that the Darwin Scholars could operate independently without supervision. Many of the Darwin Scholars have since undertaken independent fieldwork of their own using equipment supplied during the project (see Darwin Scholar activities below), and Sunil Acharya is establishing a new reference Herbarium at Nepalgunj.

Several Darwin Scholars are now very keen to further their skills and experience through additional training, especially through academic qualifications in Nepal and abroad. One unexpected impact of the project was the awarding to one Darwin Scholar (Bhaskar Adhikari) a scholarship to undertake a PhD research project at University of Edinburgh and RBGE on the Systematics of Himalayan *Berberis*.

Nepal is now much better placed to study and document its flora, thus feeding into local and global conservation initiatives. Some Darwin Scholars and Darwin coordinators (Ram Poudel, Sangeeta Rajbhandari and Krishna Shrestha) are using their skills to undertake other biodiversity projects (such as the sustainable use of medicinal plants in the Rasuwa district, supported by Plantlife) and preparing further project applications to CEPF (e.g. an assessment of the threatened plants and habitats in Kangchenjunga Conservation Area). Project partners in DPR and TU-CDB are planning to continue training others in an annual series of workshops.

Institutional Capacity Building

The capacity for all three partner institutes for biodiversity research has been increased through the training of staff, provision of equipment and discussions with decision makers. The major key reference literatures are now available to researchers and basic tools such as high quality dissection microscopes are available at both the KATH and TUCH herbarium. Those at the KATH herbarium have found such great benefit that they have since bought another dissection microscope. Small curation grants provided to KATH and TUCH have meant that more specimens have been

incorporated into the herbaria and the organisation and infrastructure of the herbaria have been improved. It is now easier to find the specimens you need to work on.

Darwin Scholars and other staff and students associated with KATH and TUCH have used the fieldwork equipment to undertake fieldwork of their own and collect quality specimens. Some of the publications recorded below are the results of subsequent expeditions. The specimens collected on the project expeditions are now being mounted and incorporated into the collections at KATH and TUCH. Some are being used for further in-depth study by Darwin Scholars.

Enhanced Collaboration and Links

Although it was anticipated that the project would foster and develop closer ties and working relationships between partner institutes the success and developments in this area were beyond those expected. Following the final symposium there has been a drive from those in Nepal to set up a Flora of Nepal office that would act as a focus and shared resource for those working on the Flora of Nepal (see above). This will be a major achievement and strong evidence to the success of the project. Furthermore, there has been an agreement with the head of the KATH herbarium to improve access to MSc students undertaking systematic dissertation projects and other researchers working on the Flora of Nepal.

The project has had broad outreach and connectivity within Nepal, and representatives from many environmental organisations in Nepal have participated in the in-country activities (as guest speakers or attendees). At the start of the project RBGE started a 'Who's Who in Nepal' recording names, contact details and interests of the people that we met. This internal document now has entries of nearly 200 people currently in post (and several more who have moved on) spanning more than 20 organisations. There is a very good indication of the wide network that RBGE has now built up in Nepal with the help of our partner institutes.

Divisional Directors from RBGE (including Prof. Blackmore, the project Co-Project Leader) have had a series of meetings with Government of Nepal Ministry of Forest and Soil Conservation towards formulating an access and benefit sharing agreement for plant genetic resources for non-commercial research. This is in response to legislation currently awaiting to be enacted by parliament. Unfortunately, the disruption to the parliamentary process over the last two years have held up this bill becoming law and so have delayed the formulation of this agreement. However, there is an excellent understanding on the outline of the agreement and with the recent formulation of a new parliament it looks promising that an access and benefit sharing agreement can be signed in 2007.

Darwin Scholars: what they are doing are now

Mr Sunil Kumar **Acharya**, Asst. Scientific Officer, DPR District Office, Banke. Sunil is actively engaged in fieldwork in his district and is establishing a reference herbarium the DPR regional office. He is continuing his studies on Acanthaceae and is preparing a Flora of Nepal account of *Sibbaldia* (Rosaceae) in collaboration with Prof. Ikeda, Japan.

Mr Bhaskar **Adhikari**, Freelance botanist, Kathmandu. Before the project Bhaskar had been working on the plants of the Terai regions and during the project he completed an IUCN publication on invasive plants of Nepal. He continues his work on the Terai in collaboration with Prof Krishna Shrestha, preparing a Flora for this lowland region. Bhaskar received the top prize for this personal project and was also successful in getting a University of Edinburgh scholarship to come to Edinburgh for 3 years and undertake a PhD research program on the systematics of *Berberis* under the supervision of Colin Pendry and Richard Milne at the University . One of the outputs of this research will be a Flora of Nepal account of *Berberis*.

Ms Sajan **Dahal**, Asst. Research Officer, DPR, National Herbarium. Sajan has undertaken further field research with Vidya Manandhar resulting in the recording of one *Cuscuta* and two *Passiflora* species new to Nepal (see Publications). She is preparing a publication from her personal project. Sajan, Vidya and Rajesh Uprety are involved in preparing the KATH set of the specimens collected during the project for incorporation into the KATH herbarium. They are also looking into ways of improving the KATH herbarium and use of the collections from the experiences gained during the UK visits. Sajan is also preparing a Flora of Nepal account of Capparaceae in collaboration with Prof. Krishna Shrestha.

Ms. Anjana **Giri**, Asst. Scientific Officer, NAST, Khumaltar. Anjana continues her biodiversity research at NAST working on fungal taxonomy and ethnomycology centred around Solukhumbu. She has published articles describing the fungal diversity and use of fungi in Sagarmatha National Park. Anjana is also engaged in a ethobotanical survey of Sagarmatha National Park and is preparing a Flora of Nepal account of Droseraceae in collaboration with Mark Watson.

Mr Umesh **Koirala**, Lecturer, TU PG Campus, Biratnagar . Umesh is passing on his skills through teaching postgraduates at PG Campus. He is also preparing a Flora of Nepal account of *Argemone* and *Papaver* (Papaveraceae) in collaboration with Mark Watson.

Mr Kamal **Maden**, formerly Teaching Asst. (part time), TU PG Campus, Biratnagar. Kamal left teaching in 2005 to pursue a career dedicated to biodiversity research. In 2006 he was appointed a team leader in the ethnobiological project *Inventory of Indigenous Knowledge of Kirata Nataionalities of East Nepal*, researching bioresources and livelihoods. This is a research fellowship programme of SNV Nepal (www.socialinclusion.org.np), and fieldwork and identification skills learned have been key to its success. Kamal is associate editor of the biological journal 'Our Nature', and has written several articles on the Darwin Project for this

and the popular press. Kamal is preparing Flora of Nepal accounts of Myrsinaceae with Mark Watson and Tetracentraceae with Colin Pendry.

Ms Vidya Keshari **Manandhar**, Asst. Research Officer, DPR National Herbarium. Vidya has undertaken further field research in collaboration with Sajan Dahal (see above) and Dr Mahesh Adhikari. Vidya is also preparing a publication from her personal project and is working with Dr Mark Watson on describing a new taxon of *Acer* discovered during the project. She is part of the team making improvements to the KATH herbarium and working on incorporating the specimens collected during the project (see above under Sajan Dahal). Vidya is now preparing a Flora of Nepal account of *Sorbus* (Rosaceae) in collaboration with Mark Watson.

Mr Lalit Narayan **Mandar**, Lecturer, TU PN Campus, Pokhara. Lalit is currently involved in teaching botany at the PN Campus as well a research project on the medicinal plants and their indigenous medicinal practice by tribal people of Kankali Community Forest, Chitwan. Lalit is also managing the herbarium section housed in the Institute of Forestry, Pokhara Campus, and maintains research into socio-economic aspects of traditional medicinal practice of his native Tharu peoples. He is now preparing a Flora of Nepal account of Schisandraceae in collaboration with Chantel Davis (RBGE) and wishes to undertake a PhD research project.

Ms. Nirmala **Pandey**, Ass. Scientific Officer, DPR Head Office, Thapathali. Nirmala has been involved in fieldwork in Solukhumbu and extended the known inventory plant list for this National Park. Although based in the head office, Nirmala would like to spend more time back at the National Herbarium to work on taxonomic research. Nirmala has published her personal project work (see Publications) and is now preparing a Flora of Nepal account of *Rosa* (Rosaceae) in collaboration with Prof. Ohba, Japan.

Mr Ram Chandra **Poudel**, Freelance botanist, Kathmandu. Ram now has a keen interest in preparing of Flora accounts and researching threatened plants, and wishes to extend his skills and professional qualifications by undertaking an MSc in the UK. He has participated in several field research activities in Nepal and is currently employed on a project on the conservation and sustainable use of medicinal plants in Rasuwa District with the Ethnobotanical Society of Nepal, and the Important Medicinal Plant Areas (see comments below for Sangeeta Rajbhandary). Ram is also involved in a grant application to WWF for botanical inventory and research of threatened plants in E Nepal. Ram is preparing the account of Magnoliaceae for Flora of Nepal in collaboration with Yumiko Baba (RBGE).

Ms. Sangeeta **Rajbhandary**, Lecturer, CDB-TU, Kirtipur. Sangeeta is active in university teaching and research. During the project she enrolled for a PhD working on *Begonia* and has undertaken many field research trips to study and collect her plants. These trips have often been in collaboration with MSc taxonomy students and she has passed on her fieldwork skills to them. Sangeeta is a key person in both the Botanical Society of Nepal and Ethnobotanical Society of Nepal and participates in their projects (e.g. the Rasuwa project. see comments above under Ram Poudel). Sangeeta, Krishna Shrestha and Ram also organized an international meeting in Nepal (September 2006) on Important Medicinal Areas sponsored by Plantlife, and they are now finalizing the country report. Sangeeta has received training on GIS methods by ICIMOD and is also preparing a Flora of Nepal account of Spiraea (Rosaceae) in collaboration with Crinan Alexander (RBGE).

Dr Lokesh Ratna **Shakya**, Lecturer, TU Amrit Campus, Kathmandu. Lokesh continues his teaching at the Amrit Campus and he is keen to establish a teaching herbarium there for BSc students to learn specimen preparation and identification skills. He has an active research programme on Orchidaceae, regularly undertaking field research and has published his results in national and international journals. Lokesh is about to start a new internationally funded project on conserving threatened orchids of Shivapuri National Park and has developed a specialist orchid living collection at the Amrit Campus. He is continuing preparing Flora of Nepal accounts for several orchid genera, and has already completed *Platanthera*, *Peristylus* and *Pectilis*. Lokesh is also working on *Duchesnea* and *Fragaria* (Rosaceae) for volume 3 of the Flora of Nepal in collaboration with Prof. Ohba, Japan.

Dr Sangita **Shrestha**, Scientific Officer, NAST, Khumaltar. Sangita is currently heavily involved in biotechnology, including training in India, and is now member secretary for a recently formed Government of Nepal scientific subcommittee on biotechnology. She is keen to extend the capacity for DNA analysis at NAS and to build on her taxonomic training. She is involved in a proposed EV-K2 CNR project on high altitude medicinal plants, and is preparing an updated Flora of Nepal account of *Meconopsis* (Papaveraceae) with Dr Christopher Grey-Wilson incorporating several very recently described species.

Dr Mohan **Siwakoti**, Reader, TU Natural History Museum, Swayambhu. Mohan is active in field research and extending the reference collections at TU. He is currently undertaking a major project on the wetland areas of Nepal involving inventories and the use of new and existing collections. Mohan is preparing a Flora of Nepal account of *Rubus* in collaboration with Dr David Boufford, USA.

Mr Rajesh Kumar **Uprety**, Asst. Scientific Officer, DPR Head Office, Thapathali. Rajesh has published his personal project work on Geraniaceae (see Publications) and is part of the team making improvements to the KATH herbarium and working on incorporating the specimens collected during the project (see above under Sajan Dahal). Rajesh is using his knowledge and experience of working at the main offices of the Ministry of Forests and Soil Conservation to help in the process of formulating access and benefit sharing agreements between MoFSC and RBGE. Rajesh is now preparing a Flora of Nepal account of Pittosporaceae, Moringaceae and Hamamelidaceae in collaboration with Mark Watson.

Ms Sheetal **Vaidya**, Lecturer, TU Patan Campus. Sheetal is passing on her skills through teaching undergraduates and postgraduates at Patan Campus. In 2006 she took a group of 12 BSc students for fieldwork training at Langtang National Park. Sheetal is in the process of registering for a PhD research degree at TU and is also preparing a Flora of Nepal account of *Fumaria*, *Hypecoum* and *Dicranostigma* (Papaveraceae) in collaboration with Mark Watson.

Social Impact

The direct beneficiaries of the project are those that have been trained and the staff of institutes using the equipment and improved working conditions at the partner institutes. However, indirect beneficiaries will include students and others working in collaboration with Darwin Scholars and partner institutes, sharing their expertise and experience and receiving future formal training. Through the setting up of the Flora of Nepal Office it will be possible for freelance botanists to be officially engaged on Flora of Nepal activities and so allowed access to the research collections and facilities at KATH and TUCH.

6. Project Outputs

Project Outputs

The project outputs are quantified in Appendix II. All outputs have been achieved with the major difference being the reduction in coverage of the reference collections (discussed above) and the change in format of the training manual (see following paragraphs).An additional one-day training course on seed collection was run and additional field training was provided by the inclusion of both Nepalese coordinators and extra RBGE staff on the third fieldwork training expedition. Also in addition to the planned outputs was the re-structuring of the Plant Information for Nepal database during a nine-day extension to the last UK Study Visit by two Nepalese botanists working with Martin Pullan and Mark Watson.

Dissemination of Publications and other Outputs

Apart from some internal reports and press articles, all information related to the project outputs and outcomes is freely available on the project website or reference given to the printed publication (e.g. a journal article).

The target audience is primarily those scientifically informed, but most of the outputs are intended for a more general audience. The project website (and the main Flora of Nepal website itself) is designed for a general audience. The project website will be maintained on the RBGE's webserver and will be a permanent part of the Flora of Nepal website. Minor changes and corrections will be made by RBGE staff (funded by RBGE) to the project web pages (e.g. updates to the specimen identifications), but major changes and additions are not anticipated. Future development will concentrate on other parts of the Flora of Nepal website or linked sites funded by RBGE and external grants.

The training manual provided in electronic format has a great deal of information that would be generally useful to others undertaking similar training activities or those looking to train themselves. Discussions are underway to take the training materials for field research and use these to form the basis of an internet Wiki resource. The initial stages have been completed and an online FieldWiki established (elmer.rbge.org.uk/collwiki) but external funding is needed to write the main pages which will act as a core for future additions in the usual open Wiki model.

Nepalese Tree Is Planed At Dawyck

DAWYCK Botanic Garden near Peebles has opened for the 2005 season — with a little help from some Nepalese visitors.

Dawyck, which is a satellite of the Royal Botanic Garden Edinburgh, was officially opened for the new season on Tuesday, February 1, the first time that the garden has opened so early in the year.

And to mark the occasion, two Nepalese botanists who are currently carrying out research work in Scotland, were on hand to help with the planting of a Himalayan birch tree.

The tree, which was collected during an expedition to the Himalayas in 2001, was planted by David Knott, the curator at Dawyck, with help from Dr Mark Watson of the Royal Botanic Garden Edinburgh and the two Nepalese visitors — Dr Keshab Rajbhandari and Nirmala Pandey.

David Knott has previously taken part in expeditions to Nepal, while Dr Watson is a specialist in systematics evolution, who is currently part of a team compiling a Flora of Nepal.

Dr Rajbhandari is one of the editors of the Flora of Nepal, while Nirmala Pandey is one of a team of Darwin Scholars currently visiting the Royal Botanic Garden Edinburgh as part of their research work. Both are from the Department of Plant Resources in Nepal.

During their visit to Dawyck, they presented David Knott with a Nepalese flag — the only national flag in the world which isn't a rectangle.

Pictured above are David Knott and Dr Mark Watson planting the Himalayan birch tree at Dawyck, watched by Dr Keshab Rajbhandari and Nirmala Pandey. Another picture appears on page two.

Dawyck Botanic Garden will be open to the public right through until November 30 this year.

The decision to open the garden earlier than usual was taken as a result of demand from visitors, who can now enjoy the snowdrops carpeting Dawyck's magnificent grounds.

THE SUNDAY TIMES · JANUARY 8, 2006

Plant hunters

Plant-hunter: Dr Colin Pendry is preserving endangered species

Astride a lumbering elephant, Dr Colin Pendry ducked to avoid the branches of a towering dipterocarp tree as his party made slow progress along the banks of the River Rapti.

In the steamy lowland jungle of the Royal Chitwan National Park in Nepal, fending off mosquitoes, the Edinburgh botanist was hunting for rare and interesting specimens, including the sub-tropical Bischofia tree.

But Pendry and his party were not the only creatures on the prowl. "We certainly saw a rhino and there were tracks made by leopards and tigers," he says with no hint of anxiety in his voice now — whatever his emotions at the time.

Back in the relative safety of the Royal Botanic Garden Edinburgh (RBGE), recalling their adventures, Pendry and his colleague, Mark Watson, make modest heroes. The pair have just returned from the latest leg of a 15-year project, following in the footsteps of Victorian plant-hunters in an attempt to help preserve some of the world's most endangered species.

Dressed casually in sweaters and chinos, they scoff at any notion that they have achieved the status of some real life Indiana Jones. Yet, like the Jones of fiction, a fair chunk of their working lives is spent dodging landmines, carefully circumnavigating man-eating tigers and trekking at lung-bursting altitudes.

"It all seems pretty safe to us, and no, my girlfriend doesn't worry about me when I'm gone," insists 41-year-old Pendry.

Their latest three-week trip took the experts to Kathmandu, the heaving capital of Nepal in the heart of the Himalayas. With funding from the government's Darwin Initiative, the aim is to create an official record of the area's rich plant environment, which would prove an invaluable aid for conservationists.

Existing checklists for the region, recognised as one of the world's top 20 global biodiversity hot spots, record around 7,000 species of flowering plants and ferns. The UK, by comparison, has fewer than 2,000 species.

The need for such data grows ever more pressing because many of these species are on the verge of extinction. Their last field trip was to a forest in the Kathmandu valley, a bumpy 20-minute ride from the capital in a clapped-out coach. There, looking out into the snowy

THE SCOTSMAN Tuesday 1 February 2005 NEWS 13

Home from home for Nepal botanists

ANGIE BROWN

Dr Mark Watson, head of the Flora of Nepal project at the Royal Botanic Garden, studies one dried specimen Picture: David Moir

DRIED specimens of plants collected by Scottish botanists in 19th-century Nepal are to be used to help find lost species in the mountain kingdom.

A team of Nepalese botanists has travelled to Scotland to examine the specimens in a special herbarium at the Royal Botanic Garden in Edinburgh, which has the best collection of Nepalese plants outside the Himalayan country.

The plants were collected about 160 years ago at the time of the Raj, when Britain was colonising India. Nepal closed its borders in a bid to remain an independent kingdom and only political missions were allowed in. It was during treks through the border area that Scottish scientists were able to collect the specimens.

Several of Nepal's 7,000 plant species are believed to have been destroyed through over-development and tourism and. However, it is thought that there might be parts of the country's remote landscape where a few species still exist which could be used to cultivate more plants.

Nepal does not have a written flora library, so botanists have come to Scotland to learn more about how to identify and locate the country's rarest plants.

Dr Mark Watson, head of the Flora of Nepal project at the Royal Botanic Garden, said he believed the project could also uncover a further 500 unknown species in Nepal.

"We have detailed information where each plant has come from, so when they go back to Nepal they can look in these areas to see if they still exist," he said.

Dr Keshab Rajbhandari, Nepal's leading botanist, who is part of the research team visiting Scotland, said: "There is nowhere else in the world where we can see and learn about our flora. We are very grateful that Scottish scientists took some of our plants as specimens because without them we would not be able to learn now about our plants."

7. Project Expenditure

Comments for 2003-2004.
audit fees under the heading Others has been moved to the budget for 2006-2007 at the request of the Darwin Initiative. £195.82 has been moved from Others to Office costs to cover additional materials for workshops with permission of the Darwin Initiative secretariat.

Comments for 2004-2005.
Overspend of £793.73 under Capital budget heading and £25.93 in Office costs has been offset against Others with permission of the Darwin Initiative secretariat.

Comments for 2005-2006.
Overspend in Others is covered by approved virement of £3,000 from Printing to Others for books & equipment. Carry forward of £2,800 to 2006/2007 approved by the Darwin Initiative secretariat for the final symposium (£1,800 from conferences, £1,000 from T&S).

8. Project Operation and Partnerships

Local partners

The three main local partners identified at the start of the project (NAST, DPR and TU-CDB) remained active participants and collaborators throughout the project. As mentioned above, seven other organisations in Nepal were involved as guest speakers during the workshops. All three of the main local partners have been very active during the project. Project partners and their colleagues are closely involved in conservation planning in Nepal and so participate either directly or indirectly with this. They have written popular articles in the press and for magazines which disseminate information about the project and plant biodiversity issues to the general public. Although many staff of partner organisations in Nepal were involved in the project, in addition to the Darwin Scholars themselves, the main people involved in the project were:

Prof. Dayananda Bajracharya, NAST (Project Co-Leader)
Prof. Pramod K. Jha, CDB-TU (Organising Committee)
Prof. Krishna Manandhar, NAST (Organising Committee)
Mr Hari Krishna Sainju, DPR (Organising Committee)
Dr Uday Sharma, DPR (Organising Committee)
Dr Keshab Raj Rajbhandari, DPR (Co-ordinator and Resource Person)
Prof Krishna Kumar Shrestha CD-TU (Co-ordinator and Resource Person)
Dr Kayo Devi Yami, NAST (Co-ordinator)
Dr Mahesh Adhikari, DPR (Resource Person)

Project planning has involved the local partners at every stage of the project. At the start a Planning Meeting was held in Edinburgh attended by representatives of all local project partners. This established the detailed plan of the project activities, and did not need any major changes subsequently. Meetings were held with project partners in Nepal during the project and issues discussed. Outside these times issues were discussed via email. Decisions affecting the running of the project were always taken in consultation with and agreement of the project partners. All reports were prepared in collaboration with project partners.

International Partners

RBGE was the main international partner throughout the project, but significant help and input was also received from the British Embassy and The British Council in Nepal. Six international speakers contributed to the workshops (from Finland, Japan, UK, USA and Israel). The RBGE staff involved in training events in Nepal were:

Prof. Stephen Blackmore (project co-leader, one workshop and final symposium)
Dr Mark Watson (project co-ordinator, two workshops, two field expeditions, final symposium)
Dr Colin Pendry(two workshops, two field expeditions, final symposium)
Dr Anthony Miller (one workshop, two field expeditions)
Dr Martin Pullan (one workshop, one field expedition)
Dr Crinan Alexander (one workshop)
Dr Elspeth Haston (one workshop)
Mr David Knott (two field expeditions) - externally funded
Mr Neil McCheyne (one field expedition) - externally funded

Many other staff at RBGE, RBG Kew and the Natural History Museum, London, generously gave their time to be involved in the UK Study Visits.

Inter-project Collaboration

Within Nepal, contact was made with other Darwin Projects but no joint activities were undertaken. A presentation at a Darwin-run seminar in London resulted in very positive feedback with some people using the format of the training activities as a model for planning other projects. Discussion with holders of other Darwin grants at RBGE, the Natural History Museum, London and RBG Kew has led to the ideas behind the FieldWiki (see above).

National action on biodiversity issues in Nepal (including the CBD focal point) is undertaken by the Ministry of Forest and Soil Conservation and its constituent departments. For plants this is the Department of Plant Resources, one of our partners in Nepal. Consequently we have close consultation with the relevant conservation offices in Nepal.

Future work of Nepalese partners

Project partners in Nepal have continued their biodiversity work after the end of the project by undertaking their own research, applying for further project grants and working together to forward plant biodiversity research, especially directed to the Flora of Nepal. Further details are provided under section 5. Impact. Due to the difficulty of getting permanent jobs in Nepal, there is definitely a role that the private sector can fulfil in funding research by recently qualified botanists from TU-CDB. There are several talented, dedicated young botanists who are struggling to gain an income through part time jobs so that they can also work un-paid on plant biodiversity research in Nepal, especially the Flora of Nepal. If the private sector can sponsor some of these young botanists, then a dynamic team can be established centred at the new Flora of Nepal Office. Cost would not be high, £10,000 per year would pay for three to five young botanists.

The National Herbarium (KATH) and TU Herbarium (TUCH), in collaboration with RBGE, are planning to organize a week-long training workshop on "Herbarium techniques and Flora writing" on a regular basis. The training will be supplemented by two days of field research. About 20 trainees per workshop will be selected from internal nomination and open competition (as in Darwin Initiative project). Selective Darwin Scholars and experts from the academic, government and non-government organizations will be invited as trainers.

A separate public reference herbarium (at KATH) and student's reference herbarium (TUCH) will be established, with only one very good quality and correctly identified specimen per species. KATH will donate duplicate herbarium specimens to TUCH, in exchange, TUCH and RBGE will provide digital images of type specimens deposited at BM, E, K and TI. The photographs were taken in the first Darwin Initiative project during 1997-1999 and later visits by RBGE staff. The images will then be printed at herbarium specimen size, mounted on herbarium sheets and placed the red folders (as type material).

KATH and TUCH are also planning to organize a joint expedition (plant collection) trip to some remote areas of Nepal, especially in Western Nepal, in the near future. Application forms will be submitted to international organizations for the necessary funding.

9. Monitoring and Evaluation, Lesson learning

Monitoring and Evaluating

Monitoring of activities was achieved through the production of detailed reports, with reference to the stated deliverables and outputs, and the running of formal (written and round table) and informal (oral group and individual) feedback sessions after all the training events. Group verbal feedback sessions worked well in small groups (e.g. for the UK Study Visits) with everyone participating and felt able to speak their mind. However, the verbal group feedback session for the workshops worked less well as not everyone contributed and it was felt that some were inhibited in presenting all their views. For these instances it is recommended that questionnaire feedback forms are used. Feedback from participants was discussed by the project co-ordinators and used to alter and improve the remaining training events. It was pleasing to note that in the second half of the project almost of the main reported problems had been resolved and participants were very satisfied with the activities. The details of these have been discussed in the Annual Reports.

Feedback from the external reviewer was of particular use and suggestions for improvements were adopted in the following years (see below under 10).

Lessons Learned

One key lesson throughout the project was that flexibility to adapt schedules was of prime importance in maintaining successful outcomes. Other lessons worth reiterating are as follows:

Tutoring and deadlines: One-to-one training for the assessment of individual knowledge and levels of achievement was particularly useful and successful. Help and advice can be tailored to the needs of the individual. Staged project deadlines were requested and given.

UK Visas: The difficulty in getting a UK visa for one of the disadvantaged Scholars was very instructive. Through this special effort was made to understand and satisfy the specific requirements of the UK visa issuing authorities. Additional supporting documentation was provided for the potentially more difficult candidates and strong letters of support sent out. There were no problems with the subsequent visa applications.

Wilderness First Aid Training: During the third fieldwork training expedition there was a medical problem that highlighted the need for adequate health and safety provision in the field. Although according to RBGE guidelines the leaders had basic First Aid training and provided the necessary equipment and backup plans, it was felt that all senior participants should also have training in the application of First Aid, and other medical treatments, in wilderness conditions. RBGE staff will undertake this as soon as possible and Nepalese colleagues are encouraged to seek professional help within Nepal.

Direct evaluation of the performance of the Darwin Scholars through formal assessments was not considered appropriate given the range of seniority in the participants. Instead, monitoring the performance and understanding of Darwin Scholars was undertaken through a number of routes:

i) One-to-one sessions during the workshop practical classes and UK Study Visit. All Scholars visiting the UK were asked to complete the first draft for their specialist group, and feedback was given on these during one-to-one sessions.

ii) Quality of data recording and specimen collection during fieldwork was monitored continuously with the Scholars working closely with trainers. Inadequate material was not accepted and very quickly all the material collected was of high quality with complete collection data recorded. The quality of the collections, and the draft and final reports demonstrate the effectiveness of the project in meeting its objectives.

iii) Performance of individuals during the one-day fieldwork as part of the final workshop. Here the Darwin Scholars were given equipment and the objectives (collect 10 specimens) and monitored whilst they organised themselves and carried out the fieldwork. Quality of data and collections was partially self-monitored when we asked each group the next day to work up the collections of another group. Trainers accompanied each group as observers.

iv) The Personal Project Reports were an excellent measure of achievement of the Darwin Scholars and these were assessed by the trainers in detail. Feedback on each report was given to each Scholar (see the 3rd Annual Report).

Direct evidence of project output are the sets of 1800 high quality, data rich plant specimens that are now at the major herbaria in Nepal and RBGE.

10. Actions taken in response to annual report reviews (if applicable)

The issues raised and suggestions made in the reviews of our annual reports were useful in improving both the activities of the project and the way that we reported. All reviews were circulated to the collaborators on the project and discussed via email and meetings. We responded to all the issues raised and suggestions in our Half Year and Annual reports and the Annual Report Review - Response to Comments documents. The following is a brief summary of the actions taken during the lifetime of the project in response to these.

Reporting on feedback and monitoring of progress
From suggestions on the first annual report more detail has been provided on the results of feedback from participants. More emphasis was also placed on monitoring progress and providing more information on output progress using the Logistical Framework. Additional information was provided on the achievements and quantifiable outputs, which was useful in assessing the success of the elements of the projects and judging progress against the stated aims.

Improving the Logistical Framework
Following the reviewer's suggestion on the first annual report, an additional output was added to the Logistical Framework to reflect the significant emphasis on building human capacity for herbarium management, plant collection, biodiversity assessment and description. In the final year's report the reviewer suggested a much improved wording for the Purpose which was too fragmented and repetitive of the outputs. The original wording was due to our inexperience with the system and we now recognise the inadequacy of the original and adopted the alternative Purpose. Likewise, we also agree with the comments that the Purpose Level indicators could be improved, and we will use this advice in future project applications.

Adaptation of Training Activities
Lessons learned from the first two workshops were used to improve the final workshop. As well as the main theme, extra time was given to recap on subjects that people have said needed reinforcement, and we continued with the personal project helpdesk sessions that were previously successful. When planning the topics we asked all the Scholars to send suggestions by email on areas that they would like to see included, and these were incorporated. The trainers and trainees were happy with the running of the third workshop and we feel that we have got the balance about right.

Effects of political stability on achieving outputs
The reviewer rightly highlighted the need to consider the likely affects of political instability in Nepal on achieving some of the objectives and outputs. The problems mainly affected the ability to undertake the desired fieldwork and to complete the reference collection. The project team was certainly aware of this and kept a close eye on the political situation in Nepal, with advice from the British Embassy, Kathmandu, and HM Government of Nepal. Political instability affected almost all of our project work to some extent (see earlier discussions), and by retaining a flexible approach we were able to cope with the difficulties and still achieve our objectives.

Although the location of fieldwork was restricted this did not have any impact on other training areas apart from increasing the scope for training capacity during the expeditions themselves. This enabled more time to trial new collecting methods (such as data recording onto laptops, extensive digital photography in the field and routine silica gel dried leaf material sampling) and more time to reinforce high standards of plant and data gathering. Although the target coverage was not reached, analysis showed that these collections added significantly to the knowledge of the plants of Nepal (see above). In addition the scope of the conservation assessments was extended to cover all species recorded, not just 50%.

The political situation in Nepal is now dramatically different to that even four months ago. The Maoist insurgency has now disbanded its alternative government structure, locked up its arms and joined the mainstream political process. There is now a joint government operating under a new constitution. The partner institutes will now be able to work freely throughout Nepal and are planning fieldwork to target under-collected remote areas.

Darwin Scholar access to computers and the Internet in Nepal
Although the reviewer commented that computer access in Nepal might be a concern, in reality all Darwin Scholars were able to gain access to computers either at their place of work or in public access areas (there are many internet cafes in Nepal), and several have access to computers at home. In addition three computers were purchased in year 1 of the project: a laptop computer each for DPR and TUCH, and a desktop for NAST. Hence, all Darwin Scholars were able to utilise the CD-Roms distributed and access the resources on the project website. All Darwin Scholars produced their personal projects in electronic format. Even so, with the ever increasing reliance on computers, and fast internet connections for communication and research (there are many Internet sites giving free access to information needed for botanical research), it is important to build into future projects additional computing equipment and internet connect fees to enhance facilities and replace redundant equipment.

The training manual

Ideas on the format of the training manual changed significantly through the lifetime of the project. From the first workshop onwards it was clear that trainees preferred to receive training materials in electronic format (often MS Powerpoint presentations) which they could re-use and adapt for their training needs. Thus is was decided to not produce a printed manual but rather to use electronic means alone and use the money allocated to publishing the manual for further infrastructure building in the partner institutes. This decision was not taken in isolation, but also reflected discussions with other Darwin Initiative grant holders at RBGE, The Natural History Museum (London) and RBG Kew. We are planning to develop an Internet wiki site (discussed earlier) to improve access to these training materials and to enable others to contribute.

Links to other environmental organisations in Nepal

After the first annual report the reviewer suggested that the partners in Nepal should widen links with other environmental organisations in Nepal. Although it was not initially apparent our Partners are prominent, key members of the plant biodiversity community and many are personally involved with biodiversity organisations and in the running of the major botanical societies (such as the Botanical Society of Nepal, the Ethnobotanical Society of Nepal and the Mycological Society of Nepal). Furthermore, the Natural History Museum, Kathmandu, is part of Tribhuvan University, and one of our Darwin Scholars (Mohan Siwakoti) is a Reader at the Museum. During the workshops representatives from many of the environmental organisations and botanical societies in Nepal gave presentations and participated in discussions. The wide network established during the project is clear from the list of invitees to the Final Symposium (see Appendix VIII) and the extensive 'Who's Who' compiled by RBGE staff.

11. Darwin Identity

The profile of the project and the Darwin Initiative was raised by making extensive use of the logo whenever possible, placing a large advertisement in the National press inviting applicants for Darwin Scholars (this was also circulated for the notice boards of relevant organisations), placing the logo and project title on all the books bought and distributed (laptops and data projector), and the establishment of the project website. The Darwin Initiative promotional DVD was shown during the Inaugural Ceremony to a general audience. The importance of the Darwin Initiative was also emphasised by the British Ambassadors to Nepal during the opening ceremony and final symposium, and the Director of The British Council in Nepal at the workshops. Within the country the project was informally widely known in official and public circles as the Nepal Darwin Plant Project and it is felt that the Darwin Initiative now has a very high profile in Nepal. Status is important in Nepal and the trainees were honoured and very proud to be known as Darwin Scholars and used this title.

Throughout the project the partners regularly tried to engage with the media with press releases and articles. Special requests were made to specifically include a mention of the Darwin Initiative as supporting the project, but frequently this did not make it through to the final printed copy. However, we did have success in some cases with International and National newspapers (e.g. Sunday Times, 8th January 2006, news article included in the 3rd Annual Report). We have participated in various Darwin Initiative workshops or forums in the UK and contributed to the Darwin Initiative Eighth Annual Report: photographs and informative captions are used on pages 9 and 26 of this report.

The project is part of the larger Flora of Nepal project, and as such has an assured long term legacy of continued involvement of project participants in biodiversity research and

conservation. Never-the-less the project had its own clearly defined separate identity and was referred to as a major capacity building project in its own right. Work on the Flora of Nepal is now much enhanced through the project and one of the recommendations from the Final Symposium was to establish a Flora of Nepal Office at the national herbarium. All of the trainees are now using their skills in biodiversity research, including co-authorship of further accounts for Flora of Nepal.

12. Leverage

During the lifetime of the project additional funding was made by RBGE by the provision of additional staff time for four members of staff participating on in-country training events and the final symposium. Travel and subsistence expenses for these two of these participants was provided by external grants (ca. £5000) and the remainder (ca. £4000) by RBGE.

RBGE staff have helped several of those involved in the project in securing funding for other biodiversity work in Nepal through provision of references and advice on project applications. The kinds of activities supported can be seen above under 5. Project Impacts

RBGE was instrumental in securing funding for a PhD position for one Darwin Scholar (Bhaskar Adhikari to undertake a PhD at the University of Edinburgh. This is funded by the Royal Horticultural Society, RBGE and an award from the University of Edinburgh that was personally granted to Bhaskar. RBGE is keen to secure additional funding for Nepalese partners to study for MSc and PhD research degrees in the UK and so greatly increasing capacity for research and collaboration within Nepal.

RBGE is committed to continuing biodiversity research with project partners in Nepal and for this additional funding from international donors will be necessary. During the project an international oil company with interests in Nepal was approached and discussions were positive, and they funded the international travel of one of the Nepalese coordinators to attend the International Botanical Congress in Vienna, 2005. However, the deteriorating political climate in Nepal meant that they were unwilling to fund any in-country work at that time. RBGE has the support of the British Embassy in Nepal, and with renewed stability within Nepal there are now good possibilities for funding of this kind.

The proposed establishment of a Flora of Nepal Office will be a physical demonstration of the cooperation and collaboration by project partners and provide a strong signal to potential donors.

13. Sustainability and Legacy

The most enduring achievements of the project will be the 8000 plant herbarium specimens themselves. Given the right storage conditions they will last many hundreds of years. They also provide a lasting legacy for plant taxonomic research as experts will continue to work with these specimens, identifying the more difficult plant groups and describing new taxa. As material is shared between project partners and workers in Japan, new identifications can be shared and material readily available for study by those who need it, particularly for those working on Flora of Nepal accounts. Accurately named plant material is also valuable for identifying unknown collections and so these collections will help those engaged in inventory work in Nepal.

Flora of Nepal accounts of the 33 plant genera contributed as part of the Personal Project work will be used as first drafts for international co-authors to revise. These will result in the published Flora of Nepal and so have a lasting impact on plant biodiversity research in Nepal. The project has established an excellent basis for biodiversity research in Nepal and especially for the Flora of Nepal, and as such it will long be remembered.

The small grants given for infrastructure strengthening within the two herbaria have been well used to improve the storage conditions and curation. Furthermore the experiences gained during the UK study visits by the herbarium staff have been put into practice. However, there still is much to be done in securing the long-term safety and accessibility of the collections and future projects will target this area.

As can be seen in the Impacts section above, those involved with the project have continued and expanded their activity in biodiversity research. The resources given to the partner institutes are now available in their libraries and herbaria, and used by staff and visiting researchers. The proposed Flora of Nepal Office in the national herbarium will act as a shared resource (for example the project data projector), and focus for those involved in the project and others engaged in the Flora of Nepal. Future annual workshops on Flora writing are being planned involving those trained on the project and using project equipment. A newsletter which keeps Darwin Scholars in touch has also been proposed by those in Nepal, and it is certain that partners will continue working together directly and keeping in touch.

Additional funding will be required to continue some aspects of this project (e.g. fieldwork research and the continued input of freelance botanists), although some is achieved through partner institutes dedicating staff time. See above under 12 Leverage for further comments on additional funding.

14. Value for money

The project is considered to be excellent value for money given the wide benefits in capacity building and infrastructure strengthening at a modest cost. Extensive training was provided to a large group of Nepalese botanists in both Nepal and the UK, important reference collections were made, partner institutes saw improvements in equipment and facilities and there have been lasting benefits of enhanced understanding and collaboration between project partners.

Travel and subsistence costs formed a large part of the budget, but we consider that these were wisely spent. It is important to note that costs for staff time of administrators, trainers and trainees and were not included in the grant and were covered by partner institutes or as personal contributions from freelance botanist. The project was particularly costly on RBGE staff time with several staff spending many weeks in Nepal, and many more staff being involved in the UK Study Visits. If even part of these costs were factored into the grant application the project would have been much more expensive for the Darwin Initiative to support.

15. Appendix I: Project Contribution to Articles under the Convention on Biological Diversity (CBD)

Please complete the table below to show the extent of project contribution to the different measures for biodiversity conservation defined in the CBD Articles. This will enable us to tie Darwin projects more directly into CBD areas and to see if the underlying objective of the Darwin Initiative has been met. We have focused on CBD Articles that are most relevant to biodiversity conservation initiatives by small projects in developing countries. However, certain Articles have been omitted where they apply across the board. Where there is overlap between measures described by two different Articles, allocate the % to the most appropriate one.

Project Contribution to Articles under the Convention on Biological Diversity		
Article No./Title	**Project %**	**Article Description**
6. General Measures for Conservation & Sustainable Use	5	Develop national strategies that integrate conservation and sustainable use.
7. Identification and Monitoring	15	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	5	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation	0	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	0	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures	0	Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	50	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education	5	Promote understanding of the importance of measures to

and Awareness		conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing Adverse Impacts	0	Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources	5	Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
16. Access to and Transfer of Technology	5	Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information	10	Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol	0	Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Total %	**100%**	**Check % = total 100**

16. Appendix II Outputs

Please quantify and briefly describe all project outputs using the coding and format of the Darwin Initiative Standard Output Measures.

Code	Total to date (reduce box)	Detail (←expand box)
Training Outputs		
1a	Number of people to submit PhD thesis	
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	
3	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training	
4b	Number of training weeks provided to undergraduate students	
4c	Number of postgraduate students receiving training (not 1-3 above)	48 Darwin Scholars and Nepalese Coordinators and attendees of one day seed workshop
4d	Number of training weeks for postgraduate students	12+9+ (workshops, fieldwork, UK visits etc)
5	Number of people receiving other forms of **long-term** (>1yr) training not leading to formal qualification(i.e not categories 1-4 above)	
6a	Number of people receiving other forms of **short-term** education/training (i.e not categories 1-5 above)	
6b	Number of training weeks not leading to formal qualification	
7	Number of types of training materials produced for use by host country(s)	3 (workshop training materials produced as CD after each workshop)
Research Outputs		
8	Number of weeks spent by UK project staff on project work in host country(s)	33+31
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	
10	Number of formal documents produced to assist work related to species identification, classification and recording.	
11a	Number of papers published or accepted for publication in peer reviewed journals	1
11b	Number of papers published or accepted for publication elsewhere	10
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	2 (eFloras web version of Plant Information for Nepal database * PIN database re-structured)
13a	Number of species reference collections established and handed over to host country(s)	8 (2 X 4 fieldwork collections)
13b	Number of species reference collections enhanced and handed over to host country(s)	

Dissemination Outputs		
14a	Number of conferences/seminars/workshops organised to	5 (3+1 workshops and final

	present/disseminate findings from Darwin project work	symposium)
14b	Number of conferences/seminars/ workshops **attended** at which findings from Darwin project work will be presented/ disseminated.	3
15a	Number of national press releases or publicity articles in host country(s)	8
15b	Number of local press releases or publicity articles in host country(s)	2
15c	Number of national press releases or publicity articles in UK	9
15d	Number of local press releases or publicity articles in UK	7
16a	Number of issues of newsletters produced in the host country(s)	
16b	Estimated circulation of each newsletter in the host country(s)	
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established	1 Darwin Scholar network
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	1
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	
19b	Number of national radio interviews/features in the UK	1 (BBC Radio Scotland)
19c	Number of local radio interviews/features in host country (s)	
19d	Number of local radio interviews/features in the UK	
Physical Outputs		
20	Estimated value (£s) of physical assets handed over to host country(s)	£27,000
21	Number of permanent educational/training/research facilities or organisation established	
22	Number of permanent field plots established	
23	Value of additional resources raised for project	£19,000

17. Appendix III: Publications

* publications and other material included with this report
[2] included with the Second Annual Report
[3] included with the Third Annual Report

Type * (e.g. journals, manual, CDs)	**Detail** (title, author, year)	**Publishers** (name, city)	**Available from** (e.g. contact address, website)	**Cost £**
Bulletin of Department of Plant Resources No 25[2]	Botanical expedition in the Sagarmatha National Park, east Nepal in 2004. K.R. Rajbhandari, et al. (2004):63-67 & cover	DPR, Kathmandu	Dept. Plant Resources, PO Box 2270, Thapathali, Kathmandu, Nepal	?
Journal: Our Nature 2[2]	Plant Collection and Herbarium Techniques. K. Maden (2004): 53-57	Nature Conservation and Health Care Council	Nature Conservation and Health Care Council, Biratnagar, Nepal	?
CD-ROM[2]	Training material used in 2nd Workshop, anon (2004)	RBGE	www.floraofnepal.org	free
factsheet[2]	Expedition guidelines, anon (2004)	RBGE	www.floraofnepal.org	free
factsheet[2]	Project work guidelines, anon (2004)	RBGE	www.floraofnepal.org	free
manual[2]	Flora of Nepal guidelines for authors, anon (2004)	RBGE	www.floraofnepal.org	free
Booklet[3]	Rhododendrons of Nepal, K.R. Rajbhandari & M.F. Watson (2005). pp 46	DPR, Kathmandu	Dept. Plant Resources, PO Box 2270, Thapathali, Kathmandu, Nepal	?
Booklet[3]	A Report on the UK Visit by Darwin Scholars in 2005. K.R. Rajbhandari et al. (2005). pp 22.	Independent, Kathmandu	Dr Keshab Rajbhandari, c/o Mark Watson, RBGE	?
CD-ROM[3]	Training material used in 3rd Workshop, anon (2004)	RBGE	www.floraofnepal.org	free
Bulletin of Department of Plant Resources No 26*	Herbarium management in the Royal Botanic Garden Edinburgh (UK) K.R. Rajbhandari, et al. (2005): 54-57	DPR, Kathmandu	Dept. Plant Resources, PO Box 2270, Thapathali, Kathmandu, Nepal	?
Journal: Our Nature 3*	First Ever Large Scale Botanical Training. K. Maden (2005): 91-93	Nature Conservation and Health Care Council	Nature Conservation and Health Care Council, Biratnagar, Nepal	?
Booklet*	Amarathaceae, N. Pandey (2006). Fascicle of Flora of Nepal 2(3):1-39	DPR, Kathmandu	Dept. Plant Resources, PO Box 2270, Thapathali, Kathmandu, Nepal	?
Booklet*	Geraniaceae, R. Uprety	DPR, Kathmandu	Dept. Plant Resources, PO	?

	(2006). Fascicle of Flora of Nepal 4(2):41-58		Box 2270, Thapathali, Kathmandu, Nepal	
Magazine article: Shangri-La Oct-Dec 2006*	Lali-Gurans, Magnolias of the East. S. Rajbhandary. (2006) 34-37	Nepal Airlines, inflight magazine	Nepal Airlines PO Box 1932, Lazimpat, Kathmandu, Nepal	Free
Bulletin of Department of Plant Resources No 27*	Cuscuta chinensis Lamarck (Convolvulaceae). A New record of Flowering plants from Nepal. V. Manandhar & S. Dahal. (2006) 3-4	DPR, Kathmandu	Dept. Plant Resources, PO Box 2270, Thapathali, Kathmandu, Nepal	?
The Rising Nepal (English Daily Newspaper)*	Building Bridges Through Collaboration. 22 December 2006 (Friday Supplement)	Gorkhapatra Sansthan, Kathmandu Nepal	Dharmapath, Kathmandu, Nepal	?

18. Appendix IV: Darwin Contacts

Project Title	**Building Capacity for Plant Biodiversity, Inventory and Conservation in Nepal**
Ref. No.	**162/12/030**
UK Leader Details	
Name	**Prof. Stephen Blackmore**
Role within Darwin Project	Co-Principal Investigator
Address	Royal Botanic Garden Edinburgh, 20a Inverleith Row, Edinburgh. EH3 5LR
Phone	
Fax	
Email	
Other UK Contact	
Name	**Dr Mark F. Watson**
Role within Darwin Project	Project Coordinator
Address	Royal Botanic Garden Edinburgh, 20a Inverleith Row, Edinburgh. EH3 5LR
Phone	
Fax	
Email	
Partner 1	
Name	**Prof. Dayananda Bajracharya**
Organisation	Academician, Nepal Academy of Science and Technology
Role within Darwin Project	Co-Principal Investigator
Address	C/o NAST, Khumaltar, Lalitpur, PO Box 3323, Kathmandu, Nepal
Fax	
Email	

19 Appendix V: LOGICAL FRAMEWORK (REVISED 2005 & 2006)

Project summary	*Measurable indicators*	*Means of verification*	*Important assumptions*
Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • the conservation of biological diversity, • the sustainable use of its components, and • the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose To enhance the human and institutional capacity within Nepal for the collection, description, storage, research and analysis of plant data (including specimens) and making this available for national and international level research and conservation.	18 (maximum) Nepalese botanists from DPR, CDB and other institutions to be trained. Collection of 2000-3,500 sets of herbarium specimens. Representation of native species in herbaria to be increased from c 33% to c 75% Completion of preliminary assessments of conservation status Preparation of descriptions and accounts for Flora of Nepal	Evaluation of participants at end of each training workshop Specimens incorporated into herbaria As above Status reports drafted for 50% of species collected. Manuscripts prepared for editorial committee.	Selection of participants will include individuals with differing levels of responsibility within DPR and CDB with qualifications ranging from school level or graduate to postdoctoral. The target for new herbarium specimens is a conservative one based on joint fieldwork, the numbers may be much higher if Nepali participants are able to undertake additional fieldwork.
Outputs Training materials - course book on Plant , identification and Herbarium Management Presentation of Nepal Plant Information System via the web. Collection and curation of new herbarium material for reference collections and documentation of status. Preparation of accounts for Volume 3 of the Flora of Nepal Enhance human capacity in Nepal for herbarium management, plant collection, biodiversity assessment and description	Publication of manual as training resource for the future Information accessible via the internet Herbaria of DPR (KATH) at Godawari and Tribhuvan University (TUCH) to include 75% of Nepalese plant species. Accounts for 18 plant groups in Volume 3 to be produced as part of the course assessment 18 Nepalese botanists to be trained	Completion of publication Evaluation of web site Enhancement of collections. Completion of manuscripts Botanists attend workshops, fieldwork and study visits. Coursework evaluated	Botanists are able to attend all the activities

Activities	**Activity Milestones (Summary of Project Implementation Timetable)**
Initial planning workshop in Edinburgh and three larger training workshops in Kathamndu. Botanical exploration, collecting and assessments. Encorporation of materials into KATH and TUCH herbaria, docuemntation. Extension of Information Systems to the internet	Year 1. Senior Nepalese botanists to RBGE for planning and training (collections and conservation status assessment), workshop in Kathmandu (focus on collection and field documentation) Year 2. Fieldwork followed up by identification of collections and workshop at RBGE (for first group of Nepalese botanists). Workshop in Kathmandu (adding curation and collections management skills) leading into fieldwork. Year 3. Final workshop (including presentation of results to Government officials) and field work in Nepal, and followed by identification of collections and workshop at RBGE (for second group of Nepali Botanists). Publication in Nepal of training manual derived from coursework and practical experience in the field and herbaria, revision of information systems and presentation via the web, completion of manuscripts for Flora of Nepal.

20 Appendix VI: Progress summarised against the Logical Framework

Project summary	*Measurable Indicators*	*Progress and Achievements for whole project*
Goal*:* To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources		
Purpose To enhance the human and institutional capacity within Nepal for the collection, description, storage, research and analysis of plant data (including specimens) and making this available for national and international level research and conservation.	18 (maximum) Nepalese botanists from DPR, CDB and other institutions to be trained. Collection of 2000-3,500 sets of herbarium specimens. Representation of native species in herbaria to be increased from c 33% to c 75% Completion of preliminary assessments of conservation status Preparation of descriptions and accounts for Flora of Nepal	16 Darwin Scholars and 2 Project Co-ordinators participated on all the training events (workshops, fieldwork training, UK visits, etc) 1800 herbarium collections (in 5 sets) made with complete habitat, associated species, abundance and conservation data. Representation of native species was restricted due to limitations of fieldwork areas available, but the collections have contributed significant additions to the knowledge of plants of Nepal (see below) All 16 Darwin scholars submitted full accounts in their personal project reports.
Outputs		
Training materials - course book on Plant , identification and Herbarium Management	Publication of manual as training resource for the future.	Training materials used on all three workshops were made available on CDs and the project website.
Presentation of Nepal Plant Information System via the web.	Information accessible via the internet	Online version on eFloras website via link from project website.
Collection and curation of new herbarium material for reference collections and documentation of status.	Herbaria of DPR (KATH) at Godawari and Tribhuvan University (TUCH) to include 75% of Nepalese plant species.	A total of 1800 herbarium collections (in 5 sets) was made with sets for KATH and TUCH. Identifications have been completed and labels distributed. 833 species have so far been identified including 32 new to Nepal, 106 extending the known range in Nepal and 2 new to science. All data regarding the collections and the assessments is published on the website.
Report on Preliminary Conservation Assessments for species collected	Preliminary Conservation Assessments for 50% of species collected	Both Global and Regional Preliminary Conservation Assessments were undertaken for all 833 species collected. Those identified as Likely Data Deficient or Likely Threatened are 37 Globally and 80 Regionally.
Preparation of accounts for Volume 3 of the Flora of Nepal	Accounts for 18 plant groups in Volume 3 to be produced as part of the course assessment	Accounts of personal project groups have been completed by all Darwin Scholars. These include 33 plant genera to a suitable level to send to foreign co-authors for comment.

Enhance human capacity in Nepal for herbarium management, plant collection, biodiversity assessment and description	18 Nepalese botanists to be trained	All 16 Darwin Scholars and 2 Nepalese Project Co-ordinators participated in the 3 training workshops; 3 fieldwork training expeditions and 2 UK Study Visits.