Darwin Initiative

Annual Report

1. Darwin Project Information

Project Ref. Number	162/12/030
Project Title	Building Capacity for Plant Biodiversity, Inventory and Conservation in Nepal
Country(ies)	Nepal
UK Contractor	Royal Botanic Garden Edinburgh
Partner Organisation(s)	Royal Nepal Academy of Science and Technology, Kathmandu, Nepal (RONAST). HMG Ministry of Forests and Soil Conservation, Department of Plant Resources, Kathmandu, Nepal (DPR). Tribhuvan University, Central Department of Botany, Kirtipur, Kathmandu, Nepal (TU-CDB).
Darwin Grant Value	£112, 150 [£41,750 in Year 3]
Start/End dates	1st June 2003 - 31st March 2006
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3)	1st April 2005 - 31st March 2006, Annual Report No. 3
Project website	http://rbg-web2.rbge.org.uk/nepal/darwin
Author(s), date	Dr Mark F Watson, Prof. Stephen Blackmore, Prof. Dayananda Bajracharya, 30th June 2005

2. Project Background

Note: *following recent political changes in Nepal the name HM Government of Nepal has been officially changed to Government of Nepal. As this report covers the period up to 31st March 2006 the old terminology will be continued for this report.*

For its area the Kingdom of Nepal is one of the most biologically diverse countries, with 118 distinct ecosystems and great altitudinal range (60 to 8848 m), even within short distances. However, unlike neighbouring countries such as Bhutan, Nepal has no published Flora. An earlier Darwin Initiative project (1997-1999 between The Natural History Museum, London and TU-CDB) established an important taxonomic database, and this provides a platform for documenting the distribution and conservation status of plants as basis for establishing conservation priorities and action plans and, ultimately, the preparation of a Flora. However, the baseline of reference collections in Nepal (e.g. the national herbarium, KATH) is incomplete, and trained taxonomists are few in number.

HM Government of Nepal's 10th Five-Year Plan (2002) and the National Biodiversity Strategy (2002) have recently prioritised institutional strengthening and human resource development as key areas needed for the management of the biodiversity of Nepal. In the light of this, RONAST approached RBGE on behalf of the participating institutes requesting assistance through the Darwin Initiative. The

current capacity building Darwin Initiative project was developed from this collaboration and addresses the needs identified in these two government policy documents.

3. Project Purpose and Outputs

The purpose of the project is to strengthen the institutional base for plant taxonomy in Nepal (in particular the herbarium collections and staff at DPR and TU-CDB), 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 will receive training in field techniques of data recording and plant specimen collection, and the assessment of conservation status (according to new IUCN categories). Training will also be provided on modern herbarium techniques for collection management, documentation and utilisation. The aim is 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 will attend training workshops in Nepal and then, in groups, take part in field training in Nepal and attend a study visit to RBGE. Additionally, this training programme will develop 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 Darwin Initiative project will contribute to the aims of the Global Taxonomy Initiative (GTI) and the Global Strategy for Plant Conservation (GSPC) established under the CBD.

The Logical Framework is provided in Appendix 1 (revised following the reviewers comments on the first annual report) and summarises the project outputs. Specific outputs for the reporting year are treated in more detail in the following sections.

Owing to political instability and safety concerns, modifications were made to the location of fieldwork training events. These were relocated to National Park areas where the safety of participants was more assured. Approval was not sought for this from the Darwin Secretariat. The last in-country event of the project was a high profile one-day symposium showcasing the results of the project to decision makers in the biodiversity and government sectors and to media in Nepal. This was timed for mid March 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 2006-7. No further major alterations are foreseen.

4. Progress

Project History

This project is an outcome of a meeting held at RBGE in May 2002 involving Prof. Bajracharya (RONAST), Dr K.R. Rajbhandari [KRR] (DPR) and Prof. K.K. Shrestha [KKS] (TU-CDB), and supported financially by The British Council, Kathmandu. It builds on collaborative links developed during an earlier Darwin Initiative project (Plant Information and Technology Transfer for Nepal [Project No. 162/06/052]) and a joint RBGE-DPR botanical expedition in Nepal in 2001. Although the first scheduled event for the project was the Edinburgh Planning Meeting, Drs M.F. Watson [MFW] and M.R. Pullan (RBGE) visited Kathmandu in June 2003 (separately funded) and met with project partners to discuss the project. Representatives of the Nepalese partner organisations and RBGE staff met in Edinburgh in September 2003 for the Planning Meeting. These two meetings provided good discussions of concerns and misunderstandings between the project partners and set a formal basis for collaboration and shared management of the project. Reports were produced for these and subsequent events which provide a valuable record of what

was discussed, decisions made and lessons learned. The project website was launched in January 2004, at the same time the selection procedure for Darwin Scholars was initiated. The website provides background information on the project, project timetables, downloadable application forms, reports, etc. It is the major means of publicising the project and disseminating documentation. Eighteen Nepalese scientists were recruited onto the project in February, two as Project Co-ordinators (KRR & KKS) and sixteen as Darwin Scholars. Darwin Scholars comprise a set number of institutional nominees (from RONAST, DPR and TU) and six appointed by open competition. The First Training Workshop in Nepal (March/April 2004) was preceded by a high profile Inaugural Ceremony attended by the British Ambassador and senior representatives from HM Government of Nepal and Tribhuvan University. The First Training Workshop laid the foundation for future project work by providing comprehensive coverage of fieldwork plant collecting and data recording techniques, including practical sessions in the field. An introduction to the KATH and TUCH Herbaria and herbarium-based research was also given to initiate work on the Darwin Scholars' personal projects. A project monitoring meeting after the workshop, where the problems encountered during the year were discussed, and solutions found. During the first year field collecting equipment, computers, books and other teaching materials were procured, sent to Nepal, and given to the partner organisations and Darwin Scholars. Four main events were undertaken during the second year of the project: two Fieldwork Training Expeditions (May and November 2004), one in-country workshop (November 2004) and the first of the UK Study Visits (January/February 2005). Further books and equipment were sent to Nepal and capacity building grants were given to the two major herbaria (KATH and TUCH) to enable them to address some of the priority issues they faced. As in the first year project monitoring meetings were held after the in-country events and the lessons learned incorporated into future activities.

Summary of Progress 2004-5

During this third year of the project three main events were undertaken: the third and final Fieldwork Training Expedition (September and October 2005), the third and final in-country workshop (November and December 2005) and the second and final of the UK Study Visits (January/February 2006). As in year two further books and equipment were sent to Nepal and again capacity building grants of £1000 were given to both of the two major herbaria (KATH and TUCH) to enable them to address some of the priority issues they faced. Darwin Scholars were active throughout the year, primarily working on their personal project groups examining herbarium specimens and preparing a Flora of Nepal-style account. All Darwin Scholars met the deadline for submitting their personal project reports on 14th March and these were assessed and feedback given.

As in the second year some Darwin Scholars undertook fieldwork studies on their own initiative and they participated on student field courses (hence passed on the training received on the Darwin Initiative project). Kamal Maden has made a careful study of the plants in the eastern terai and has discovered several species that have not previously been reported for Nepal. He has herbarium specimens and photographs of these and they are being looked into further. One student (Bhaskar Adhikari) was successful in gaining a Ph.D. scholarship to study at RBGE and University of Edinburgh starting June 2006 (funded by Edinburgh University, RBGE and the Royal Horticultural Society).

As in previous years in-country progress meetings and personal project sessions were undertaken by Darwin Scholars, Nepalese collaborators and UK participants from RBGE. Almost all outputs and activities for the reporting year were accomplished, although some adjustments to timings and locations were necessary

(see below). The final symposium had to be postponed (see above) and will be held in 2006 (probably mid September).

This year we were more successful in engaging the media and several pieces appeared in Nepali, UK and international newspapers (see attachments to the events reports). These resulted from a combination of interviews at RBGE by UK journalists, articles submitted by Darwin Scholar Kamal Maden in Nepal, and press releases by RBGE. One article in the Guardian gained international coverage as it was taken up by several national newspapers around the world (see Third workshop report). One excellent article in the Sunday Times (January 2006) even included a explicit reference to the Darwin Initiative (in our experience this is something that is usually deleted by the copy editor!). Images and text were submitted to the Darwin Initiative and used in the official DI Annual Report.

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 (see attached full report). Four RBGE staff members (two not funded by the Darwin grant) participated in the expedition and, along with the two Nepalese co-ordinators, provided training for six Darwin Scholars. Two of the RBGE staff members were entirely self-funded. 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), along with silica gel dried leaf material and digital photographs (habit and close up) for the majority of these collections and approximately 1000 field records. We were privileged that Dr Uday Sharma (Director General of Department of Forests, HM 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 with four from the UK 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 on basic techniques in seed collecting for seed storage and voucher collection was aimed at DPR staff (especially those of the Botanical Garden) who had not been able to participate in the Darwin Initiative project, and to give them the grounding for moving towards 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).

Organisation and permissions for the botanical expedition went smoothly, aided by excellent collaboration with our Nepalese partners. As the political situation was not resolved we elected to return to Sagarmatha National Park and so explored it at a different time of the year to the first expedition. All the collections had accurate 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 in to conservation assessments and action plans. Three sets of herbarium specimens have been left in Nepal (with DPR, TU-CDB and the National Park administration), and two were brought back to RBGE and used during identification sessions. Verbal feedback from the expedition participants was very

favourable, and we were all very pleased with the outcomes. One Darwin Scholar (Ram Poudel borrowed equipment to undertake fieldwork of his own following the expedition.

The most significant problem encountered was an accident of one of our Darwin Scholars, Ms Sangeeta Rajbhandary, who dislocated her elbow in camp (see attached report for further details). Although she was able to receive medical assistance from a trained nurse at this remote location, one of the RBGE team (Neil McCheyne) had participated on a specialised Wilderness First Aid training course and his knowledge was extremely useful in handling this event. The incident reinforced the decisions to provide personal insurance for all participants and the provision of first aid equipment and satellite phones. Furthermore, RBGE staff will be undertaking the Wilderness First Aid training course.

We were very pleased that Mr Kattel, one of the National Park officers, was able to join the team for some of the days collecting around Namche Bazar and himself participate in the training. Formal and informal discussions with the National Park officials during the expedition highlighted the need for a guide book to the vegetation and plants of Solu Khumbu aimed at trekkers and for the redevelopment of the biodiversity information panels within the Park Visitor Centre in Namche Bazar. Concept plans for such a guide book were subsequently incorporated into the Third Training Workshop (see report for this event) and funding will be sought to carry this forward.

Third Training Workshop, November-December 2005.

Three members of staff from RBGE visited Kathmandu for the third Training Workshop which lasted for eight days, involved 16 Darwin Scholars and the two Coordinators (see attachment for the full report). Ten guest lectures and practical sessions were presented by representatives of the HM Government of Nepal [Now 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 teaching materials and presentations were compiled on a CD-rom and each scholar, trainer and institution was given a copy at the concluding ceremony and it is available on our website. 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

Feedback from previous workshops was used to improve the arrangements for this last workshop. Sessions were held at the British Embassy compound, Kingdon Hall, with kind permission from the British Ambassador. Feedback from this last workshop was generally very positive showing that we were now getting most things right.

The one-day fieldwork during the workshop was aimed at updating all scholars on the field methods used during the final expedition and as a way of testing how successful the training has been in enabling the Scholars to work on their own. The trainers were very pleased with the way the Scholars organised themselves and with the quality of the 40 collections that resulted from this activity.

The exercise discussing the proposed Field Guide to the Plants of Sagarmatha National Park using the similar guidebook *Flowers of Western Himalaya* was also

successful in generating debate and an outline for a future project. We hope we will be able to secure funding to carry this forward.

Mark Watson travelled out a week before the workshop to meet up with Prof Mary Gibby (RBGE Director of Science) and Dr David Rae (Director of Horticulture) who were returning from Bhutan via Kathmandu. The purpose was to meet the Minister for Forests and Soil Conservation and the Secretary, and discuss recognising formally the collaboration between RBGE and Nepal and formulating an Access and Benefit Sharing agreement. The meeting was very positive with both sides committed to collaborative research. Initial steps on forming an Access and Benefit Sharing agreement were made pending the legal ratification of the Genetic Resources Access and Benefit Sharing legislation current being debated.

Second UK Study visits, January-February 2006

In May 2005 the participants on the First UK Study visits got together in Nepal and, under the direction of Co-ordinator Dr Keshab Rajbhandari, produced a detailed report on that event. "A Report on the UK Visit by Darwin Scholars in 2005" was privately published in August 2005 as an illustrated 22-page booklet co-authored by all the participants. This booklet (photocopy attached) was given to all Darwin Scholars and was an excellent introduction for the participants on the Second UK Study visits.

In January and February 2006 ten Nepalese botanists visited the UK during the second set of two-week Study Visits. Prof. Krishna Shrestha (Co-ordinator) lead both the groups, the first comprising Darwin Scholars Mr Lalit Mandar, Dr Lokesh Shakya, Mr Sunil Acharya, Mr Bhaskar Adhikari, Ms Sajan Dahal, and the second Ms Sangeeta Rajbhandary, Ms Sheetal Vaidya, Mr Umesh Koirala and Mr Ram Chandra Poudel. Prof. Shrestha stayed in the UK for the two days between the two groups and nine days after the return of the second group revising data for the list of endemic plant of Nepal and corrections and additions to the Annotated Checklist. Mr Poudel also stayed in the UK for 9 days after the second group as he was working on the Plant Information for Nepal database initiated by the first Darwin Inititative project in Nepal. A full account is provided in the attached report.

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 insitutes: 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 revisionary studies.
- 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 reasearch.
- 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 186 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 for each group to Dawyck Botanic Garden (the nearest of RBGE's specialist gardens), which is developing a research collection of woody Himalayan plants. In order to extend the cultural experiences gained whilst living and working in the UK, each group was taken to an evening ceilidh and a restaurant specialising in Scottish cuisine.

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.

Securing UK visas for the Nepalese participants was much more straightforward this time (see UK Visit Report) due to the proven track record from the successful first visit, improved understanding with the visa officers in Kathmandu and alterations to the visa application procedure. No problems were faced and visas for all attendants were secured during the third workshop well in advance of the UK visit.

Upgrading of the Nepalese Plant Information System

Work on upgrading the Nepalese Plant Information System (initiated during the first Darwin project) was undertaken on three levels. Firstly the database structure itself was reviewed in detail during the Second UK Visit by Darwin Scholar Ram Poudel working with Martin Pullan, Mark Watson and Krishna Shrestha. This is reported on in detail in the Second UK Visit report. Ram was able to remove redundant tables in the database and improved the current data structure. He also developed a revised model for managing the data more efficiently. It is hoped that funding will be found to implement the revised structure and migrate these data across. Secondly, Krishna Shrestha has been working on the corrections and revisions to the dataset using new records of plants in Nepal, new species descriptions and newly published revisions. These data are currently collated in a manuscript ready for publication and will also be made available via the project website and incorporated into the database. Lastly, the checklist data presented via the eFloras website has been migrated into the Padme database as a basis for the Flora of Nepal dataset. This has uncovered several errors in the data and a checklist output from the Padme dataset is currently being checked by Darwin Scholars against the published checklist. It is planned to have the corrected checklist online through the project website by the final symposium.

Herbarium Specimens: identification and documentation

Approximately 1800 herbarium collections have been gathered during the three training expeditions (representing over 8000 individual herbarium specimens). The task of accurately identifying these to species is a time consuming task requiring expertise in using botanical literature and herbarium collections. About 360 of these collections were identified during the UK Study Visit training sessions and the remainder were identified largely by RBGE staff. Colin Pendry and Mark Watson undertook the majority of the identifications with help on specialist groups by Henry Noltie (Monocots), Eona Aitken (Gentianaceae & Primulaceae); David Middleton (Apocynaceae), Lawrence Springate (Compositae in part). Maria Baden (*Lindernia*), and David Long (miscellaneous). As of June 2006 all collections that can be readily named have been done (a few, e.g. ferns, are awaiting visiting specialists) and the data entered into the Padme database. Field data has now been checked and the labels are now being generated directly from Padme. An example of a sheet of four herbarium labels is attached to this report to illustrate the detail of data collected for each specimen. Labels for the three sets of specimens in Nepal will be handed over during the final symposium.

It is important to note that during the three fieldwork training expeditions specimens were collected of at least 40 species (including five new genera) that were not previously known from Nepal. This includes at least one entirely new species that awaits description. There are still some critical groups that are with international experts and we expect the final total to be higher. This is a remarkable result considering the locations that we were forced to visit are among those most visited and collected in Nepal. It is an excellent indicator of the level of new discoveries that await the exploration of more remote areas. The political climate is now stabilising we are already planning fieldwork into targeted areas as they become accessible.

Institute Strengthening Grants given to KATH and TUCH

At the end of the 2004/5 reporting year small grants were given to KATH (£1300) and TUCH (£500) for them to use to address priority issues within their herbaria. Both herbaria utilised the money partly to employ assistants in helping curate and identify the collections and partly in buying some equipment. KATH have a major problem with a backlog of unidentified collections and it is very pleasing that over 1000 specimens were identified as part of this work. A report of the identification work undertaken at KATH is attached to this report.

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 RONAST 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. A full report of this activity, including a sample of one of the reports, is given as an attachment to this report. 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. Absolute grading of the Personal Reports was not considered appropriate, but instead the high achievers were acknowledged through the awarding of prizes which will be presented during the final symposium.

The coordinators were very pleased with the achievements made by Darwin Scholars during the training programmes and with their final reports. Efforts were made to provide feedback and guidance through the events during the training programme and the coordinators in Nepal were available to provide advice. Few explicit deadlines were set for completions of stages of the reports as it was thought that the Darwin Scholars should be responsible for managing their own research time.

Overall it was thought that this was a useful exercise that not only resulted in accounts that will contribute to the Flora of Nepal, but also provided a real training experience that benefited the Scholars and is a good means of assessing the success of the training. The organisers were generally very pleased with the running of the personal project exercises. The main lessons learned were that clear written instructions and deadlines are required so that trainers and trainees are fully aware of what is required and when it should be delivered. Feedback on this and the training programme as a whole will be solicited from the Scholars during the final workshop.

Procurement of Equipment and Institutional Capacity Building

An important element of the project is to provide equipment that will enhance the fieldwork capabilities of Nepalese botanists and for research in the partner institutes. A great deal of equipment was provided in years 1 and 2, and this was enhanced by additional materials as advised by the partner institutes. Taxonomic reference books have been bought for all three partners in Nepal, as directed by their institutional needs. As in previous years, shipping of these materials has been greatly helped by The British Council Kathmandu who allowed usage of the British Forces Post Office: a cheaper and more reliable service than regular airmail.

At the end of year two small grants (£1000 each) were given to the two main Herbaria KATH and TUCH for capacity building activities addressing their own priority areas. These grants were administered by RONAST. This was very successful and was repeated at the end of year 3.

Difficulties Encountered

Difficulties in fieldwork location due to the Maoist troubles were minimised by going to Solu Khumbu and so fieldwork training was still able to be undertaken, although the original aims to try and target under-represented areas of Nepal are not now possible. The current very encouraging political developments in Nepal with the Maoists now included in the political process means that peace and security are within sight. Plans are already in place to target the remote under collected regions in future years.

Difficulties with personnel were minimal this year and everyone was able to participate in the planned activities. There was the unfortunate accident during the final fieldwork expedition (see above), but this was coped with. As always maintaining a flexible approach to organisation and planning has benefited us and meant that we have successfully achieved our objectives.

Project Design
Apart from the changes to the localities of the fieldwork events, there have not been any major changes to the design of the project as it is working well and achieving the desired outcomes. Content of the workshops and fieldwork training have been adjusted and enhanced to take on board suggestions from our Nepalese counterparts.

The only major change has been in the timing of the final symposium which is aimed at showcasing the project and its achievements. In mid 2005 it was unanimously decided that it would be more appropriate to have this at the end of the project rather than after the final workshop. This was because half of the group would not have completed their UK visits and so could not finish their personal projects. The revised data for this was mid March, but a few weeks before that time the political situation in Nepal deteriorated rapidly and it was decided to postpone the event until calmer times. Permission to defer a small budget to run the workshop was given by the Darwin Initiative. Thankfully the political situation now looks very good and we hope to run the final symposium in September 2006.

Workplan for Reporting Year 2005-6
The timetable of work for the next reporting year is given in the form of the revised Logistical Framework (Appendix 1). Outstanding items that will be completed by the final symposium are:

- Production and distribution of labels for all the sets of herbarium specimens.
- Generation of a list of species collected including conservation status for at least 50%.
- Update project website with corrected Nepal Checklist data (interactive format).
- Finalise the electronic manual of teaching materials and distribute*.
- Run the final one-day symposium, distribute certificates and prizes.

* Darwin Scholars and partners requested that the Manual would be most useful to them in electronic format and that the money saved could then be used to undertake institute strengthening in the two major herbaria. This was agreed with the Darwin Initiative administration and grants of £1000 each was given to KATH and TUCH, administered through RONAST.

5. Actions taken in response to previous reviews (if applicable)
All issues raised in the review of last year's annual report were considered and discussed with our collaborators. These are as follows:

Proportion of the Flora covered
The reviewer rightly points out that restrictions on fieldwork locations have hampered the project fulfilling the 75% coverage anticipated in the proposal. At this stage it is difficult to predict what level of coverage the new collections will contribute. Identifications are now complete and some indication of coverage should be possible when the complete list is analysed. With the improving stability in Nepal we are keen to make recommendations of target regions of Nepal for future fieldwork. RBGE has a long term commitment (at least 15 years) to continue working in Nepal with the Nepalese partners in producing the Flora of Nepal, and we would be looking to act on such recommendations. Furthermore, future projects on digitising the collections held in UK herbaria will help in mobilising the data we hold on the species not yet represented in herbaria in Nepal. We see that completing the reference collection in

Nepal will be a combination of new fieldwork targeting poorly known areas and also digitising existing collections held outside Nepal.

Adaptation of Training Workshops

The lessons learned in the first two workshops were used to improve the final workshop (see above under Third Workshop). As well as the main theme we gave extra time to recap on subjects that people have said needed reinforcement, and continued with the personal project helpdesk sessions that were successful in the past. 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.

Impact of Fieldwork Restrictions on other outputs

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 has 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.

Website Updates

The project website will be updated to include the event reports, associated materials and image galleries. This will be completed by mid July 2006. On the broader website *www.floraofnepal.org* (of which the Darwin Project forms a part) pages on the biogeography of the Himalaya are near completion and will also be added then. Future plans before the final symposium are to include full data from the Annotated Checklist and to include identifications and conservation assessments for the plants collected during the three expeditions.

Darwin Scholar access to Computers in Nepal

All Darwin Scholars have access to computers 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 current project: a laptop computer each for DPR and TUCH, and a desktop for RONAST. Hence, all Darwin Scholars are able to utilise the CD-roms we distribute and access the resources on the project website. All Darwin Scholars produced their personal projects in electronic format.

Partnerships

The collaboration between UK and Nepalese partner institutes has been good throughout the project and continues to grow. Partners were involved in writing the all the reports of project events and this end of year report. Trust is a vital element of this, and has been built on through regular communication, delivery of promises, involvement, open discussions, and especially face-to-face meetings. Increase in trust is difficult to quantify, but it is apparent from the open expressions of views and concerns, and the free verbal and email exchanges between project members. The joint authorship of the account of Rhododendrons of Nepal by Keshab Rajbhandari and Mark Watson is the first time a non-Nepalese botanist has jointly published such a taxonomic account in a DPR publication and is a good indicator of the excellent collaboration that has developed. During the year the Director General of DPR, Dr Uday Sharma moved office to DG of the Department of Forests. Dr Sharma has been a strong supporter of our work and continues to be so in his new position (he was still keen to participate on the Third Fieldwork Expedition even though he was no

longer at DPR and there were considerable pressures on his time). There have been several meetings with the new DPR DG, Mr Hari Krishna Saiju, and he is also a strong supporter of all of our collaborative biodiversity work. There are no unforeseen problems with relationships between project partners.

Collaborations established earlier in the project have continued and expanded to include further organisations. Within Nepal the project has established new links with IUCN-Nepal and The Mountain Institute (see 3rd Workshop report). Nepalese partners also maintain strong links with the biodiversity conservation community in Nepal, often as active participants and prominent members of organisations such as: Nepal Botanical Society, Ethnobotanical Society of Nepal, and the Natural History Museum.

Prior to the third workshop (see above) senior science (Prof Mary Gibby and Mark Watson) and horticulture staff (Dr David Rae) met with the Minister for Forests and Soil Conservation and the Secretary to discuss the collaboration between RBGE and Nepal and formulating an Access and Benefit Sharing agreement. The meeting was very positive with both sides committed to collaborative research. This meeting was made possible by the very high level support within Departments of the Ministry building on our past collaborations and long term commitment to the Flora of Nepal. It is an excellent example of our strong partnerships at all levels within Nepal.

6. Impact and Sustainability

The established high profile of the project in Nepal continues, as is evident by the seniority of the guests attending the opening ceremony of the third workshop and the evening reception (see 3rd Workshop report for details). The Ministerial meeting (see paragraph above) to discuss Access and Benefit Sharing was only possible as a result of our highly regarded collaborative work and support from Nepalese colleagues.

Media uptake of press releases both in the UK and Nepal continues to increase. During the third workshop in Nepal many of the tourists and locals we met had read the articles in the popular Nepali English Language newspaper which talked about biodiversity and conservation activities. We try to promote of the work of the Darwin Initiative through our activities by using stickers and branding whenever possible (e.g. much of our expedition gear has large round vehicle stickers on it) and we always explicitly ask for journalists to make reference to the DI as our funding source. Very rarely does this make it through to the final copy and we were delighted when the piece in the Sunday Times (8th January attached) actually mentioned the DI.

Dr U. Sharma, former Director General of Department of Plant Resources (DPR), joined the team of Darwin Scholars in the third fieldwork expedition to Sagarmatha National Park. Influence on HM Government Nepal activities in biodiversity conservation will primarily be through our project partners in Nepal, especially the staff of DPR. Their active participation in many aspects of the project feeds directly into plant biodiversity conservation activities for which they are charged to undertake (as stated in the National Biodiversity Strategy, 2002).

The main components of the exit strategy (and legacy) are the continuation of biodiversity exploration, collection, research and documentation by the Darwin Scholars and participating institutions. Equipment supplied for this (both to individuals, and to institutes) will be available for them to undertake this work and train others. Fieldwork in 2006 will be connected with the PhD studies of Bhaskar Adhikari who started his PhD in Edinburgh at the beginning of June 2006. Plans are

already in place for a large expedition to a remote part of western Nepal given that the current increase in security continues. All three host country institutions are strongly committed to the project and to the Flora of Nepal. Staff time has been allocated to participation in the project activities and research on their personal projects. It is recognised that it will be essential to develop an active group of botanists working in the National Herbarium (KATH) including existing DPR staff at KATH and liaising with TU-CDB. We are still exploring ideas and funding opportunities to provide salaries for new researchers and office facilities at KATH which will form the nucleus of this group. This will also address the poor career opportunities for promising young botanists that exist at the moment.

7. Outputs, Outcomes and Dissemination

Progress was made on all agreed outputs, and those assigned to year 3 were almost all completed. The outstanding outputs will be completed in the next two months before the final symposium (see above under Workplan for the Reporting Year 2006-7 for details). An additional output was the running of a one day workshop on seed collecting for seed bank use (see Third Fieldwork Training Expedition for details).

Dissemination activities in the host country were primarily targeted at the participants of the workshop (including the guest speakers) and fieldwork training. However, a wider audience was addressed during the one day seed collecting workshop (see above) and the lecture at the British Council given by Mark Watson (also during the third expedition). Nepalese participants continued to disseminate information informally to colleagues, and formally to students on field courses and practical sessions. Project Co-ordinators in Nepal had occasional meetings with Darwin Scholars to exchange information, check on progress with their personal projects, and address their questions. The expanded website is an important vehicle for disseminating general information to a broad audience worldwide, and also more technical, specific information to those who require it. Future dissemination to others scientists and the general public in Nepal will continue through the long-term involvement of RBGE in biodiversity research in Nepal (especially the Flora of Nepal project) funded by a mixture of core RBGE funding, expedition grants, and private sponsorship. These activities would be greatly enhanced by the employment of young, enthusiastic Darwin Scholars to work in Nepal and we are seeking ways to do this. One success in this area is the securing of funding for one PhD position funded by University of Edinburgh, RBGE and the Royal Horticultural Society. This is being used to fund Bhaskar Adhikari to work on Himalayan *Berberis* and *Mahonia*.

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

Code No.	Quantity	Description
4C	48 Nepalese	16 Darwin Scholars and 2 Project Co-ordinators attending the main events, and ca. 30 attending the one-day Seed Technology workshop
4D	9 weeks	One 2-week workshop in Nepal & one 3-week fieldwork training in Nepal, one 4-week UK study visit
7	1	CD of PowerPoint workshop training presentations and handout materials
8	31	RBGE staff during 1 fieldwork and 1 workshop

Code No.	Quantity	Description
12B	2	Plant Information for Nepal database structure overhauled (see Second UK Visit report). Padme developed into operational system (see Third Expedition).
13A	2	Third expedition (886 collections in five sets, ca. 3600 specimens); Third workshop (40 collections in 5 sets, ca. 200 specimens).
14A	2	Third training workshop and Seed Technology workshop at end of Third Training Expedition
15A	4	Press releases and articles published in Nepali national newspapers (copies of articles included in reports)
15C	6	Press releases and articles published in International and UK national newspapers (copies of articles included in reports)
15D	5	Press releases and articles published in local UK newspapers (copies of articles included in reports)
17B	1	Darwin Scholars in Nepal news network
20	£4,500	Reference books, collecting equipment, herbarium supplies, capacity building grant
22	£8,500	Funding for 2 RBGE staff on third fieldwork, part funding for second workshop and fieldwork, discounted air tickets and excess baggage

Table 2: Publications *=published in Nepal

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Publishers (name, city)	Available from (e.g. contact address, website)	Cost £
Booklet*	Rhododendrons of Nepal, K.R. Rajbhandari & M.F. Watson (2005). pp 46	DPR, Kathmandu	Dept. Plant Resources, PO Box 2270, Thapathali, Kathmandu, Nepal	?
Booklet*	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*	Training material used in 3rd Workshop, anon (2004)	RBGE	www.floraofnepal.org	free

8. Project Expenditure

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April 2005 to 31 March 2006)

Item	Budget	Expenditure	Balance

Notes

Overspend in others covered by approved virement of £3,000 from printing to others for books & equipment.

Carry forward of £2,800 to 06/07 approved for final symposium (£1,800 from conferences, £1,000 from T&S).

Summary accounts for each of the major training events in Nepal and the UK are given in the attached reports for these events.

9. Monitoring, Evaluation and Lessons

Monitoring of activities was achieved by 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. Evaluation of the third workshop and UK Visits and the performance of the trainers were evaluated through these feedback sessions. Following previous experience we used formal written feedback for the workshop and verbal for the UK visits.

Direct evaluation of the performance of the Darwin Scholars through formal assessments was not considered appropriate given the variation in 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 (see spreadsheets of collection data). The quality of the collections and draft 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 Report of the Personal Projects).

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.

The lessons learned from this year are covered in detail above. Again, flexibility to adapt schedules was of prime importance to maintaining successful outcomes. One particular lesson merits specific reiteration: the need for adequate health and safety provision in the field. Although we were well covered with expertise, equipment and backup plans it was felt that all senior participants should 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.

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

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

Their have been several outstanding achievements, resulting from direct and spin-off activities of the project, which deserve particular attention.

Through the contacts and collaborations made during the project we have secured a unique funding package for one of our Darwin Scholars (Bhaskar Adhikari) to undertake PhD research on speciation and hybridisation in Nepalese *Berberis*, based at RBGE and administered by the University of Edinburgh. Support comes from a University of Edinburgh Torrance Bequest studentship with additional funding from RBGE and the Royal Horticultural Society. Bhaskar is an exceptionally gifted and motivated botanist who submitted the best personal project report of all the Darwin Scholars. The creation of PhD project is a direct result of Bhaskar's participation in the Darwin Project and, as he will certainly be one of the leading lights in Nepalese Botany in years to come, this is likely to be one of our more important legacies. Bhaskar's career will be immeasurably enhanced by carrying out his research in Edinburgh for three years, with opportunities to learn techniques unavailable in Nepal and to make important international contacts outside Nepal.

In addition to the Project's capacity building role there has been a significant direct contribution to the preparation of the Flora of Nepal. The accounts prepared by the Darwin Scholars have revised 38 genera including 226 species, and the accounts are now being processed and edited to Flora of Nepal standards. Research by

Darwin Scholars using specimens and literature in Nepalese and UK herbaria (Kathmandu, Edinburgh, London and Kew) have uncovered 14 additions to the 2000 checklist of flowering plants of Nepal, and the removal of two species now recognised as errors in past literature.

The field work undertaken during the training expeditions was even more productive than we had hoped, and has clearly demonstrated the need for an active collection programme throughout Nepal. In total about 1800 herbarium collections were made representing over 7000 individual herbarium specimens with complete label data on the plants and the habitats they were collected from. These specimens are shared between herbaria in Nepal, UK and Japan and are a valuable assess for current and future work. Identifications are now complete and final labels generated. Although the security situation restricted us to the comparatively well-collected National Parks of Sagarmatha (Everest) and Chitwan at least 40 new species have been added to the Flora, including five new genera and at least one undescribed species. The dramatic recent improvement in the political situation in Nepal means that we can now capitalise on the solid foundation built though the Darwin Initiative project work. Target areas for fieldwork have been identified and we are now well-placed carry out some long overdue work in the more remote and poorly known regions which have been completely inaccessible over the last decade.

We have had a particularly successful year of media activities with over ten articles in international, national (in UK and Nepal) and local newspapers. This is a result of our Nepalese colleagues submitting articles to newspapers in Nepal and RBGE staff sending press releases and engaging journalists in interviews. As in previous years, although we stress the involvement of the Darwin Initiative in this work, explicit reference to the Initiative rarely makes it through to final copy even when included by the journalist. We were delighted when a major piece in the Sunday Times (8th January 2006) actually explicitly mentioned the Darwin Initiative.

Finally we must draw attention to the vast improvement in relations among the different institutions in Nepal following their participation in the Flora. Access to the herbarium for researchers has been greatly improved, as have the facilities at both KATH and TUCH. There is a new spirit of cooperation within the Nepalese botanical community and relationships developed during the Project will certainly thrive into the future.

Attachments included with 3rd Annual Report

Annex 1: Progress report against Logical Framework

Appendix 1: Logical Framework (Revised)

Report of Plant Species Identifications at KATH hebarium

Sample sheet of Herbarium Labels

Photocopy of Sunday Times Press Cutting

Photocopy of *A Report on the UK Visit by Darwin Scholars in 2005*

Photocopy of cover of *Rhododendrons of Nepal*

Report of the 3rd Fieldwork Training (September-October 2005)

Report of the 3rd Training Workshop (November-December 2005) with CD-rom

Report of the 2nd UK Study Visits (January-February 2006)

Report of the Darwin Scholars Personal Project Reports with CD-rom

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2005/2006

Project summary	Measurable Indicators	Progress and Achievements April 2003-Mar 2004	Actions required/planned for next period
Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve • The conservation of biological diversity, • The sustainable use of its components, and • The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources			
Purpose To strengthen the capacity of Nepal to conserve and use sustainably its rich plant resources by training Nepali botanists to collect plants and assess conservation status in field. To enhance the representation of species in the collections and to train staff in collections and information management in the herbarium. Enabling Nepalese to contribute to international taxonomic research on Nepal.	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 in the training workshop; 6 Scholars and 2 Co-ordinators participated in the fieldwork training. 9 Scholars and 1 Co-ordinator participated in the UK Study Visit. 926 collections (in 5 sets) made with complete habitat, associated species, abundance and conservation data. All 16 Darwin scholars have submitted full accounts in their personal project reports.	Complete training manual in electronic format and distribute. Produce labels for herbarium specimens with final identifications and distribute. Publish list of collections on the project website. Complete conservation assessment assignment for 50% of species collected on expeditions. Update the Flora of Nepal website with corrected Annotated Checklist data in interactive format. Stage the final project one-day Symposium.

Outputs			
Training materials - course book on Plant , identification and Herbarium Management	Publication of manual as training resource for the future.	Training materials used in the third workshop are available on interactive CD and project website.	An interactive CD of all the teaching materials will be distributed at the final symposium.
Presentation of Nepal Plant Information System via the web.	Information accessible via the internet	Online version on eFloras website via link from project website.	Enhanced version planned for Flora of Nepal website (an additional activity).
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.	926 collections (in 5 sets) made with sets for KATH and TUCH. Identifications have been completed in year 3 and labels will be distributed soon.	As fieldwork location is very limited it will not be possible to target the very remote areas, so limiting coverage of plant species. Final labels for all collections will be ready in first quarter of 2006/7
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.	Completed.
Enhance human capacity in Nepal for herbarium management, plant collection, biodiversity assessment and description	18 Nepalese botanists to be trained	16 Darwin Scholars and 2 Project Co-ordinators participated in the training workshop; 6 Scholars and 2 Co-ordinators participated in the fieldwork training. 9 Scholars and 1 Co-ordinator participated in the UK Study Visit.	Workshops, expeditions and UK visits have all proved successful.

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

Appendix 1. LOGICAL FRAMEWORK (REVISED)

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 strengthen the capacity of Nepal to conserve and use sustainably its rich plant resources by training Nepali botanists to collect plants and assess conservation status in field. To enhance the representation of species in the collections and to train staff in collections and information management in the herbarium. Enabling Nepalese to contribute to international taxonomic research on Nepal.	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	Publication of manual as training resource for the future	Completion of publication	
Presentation of Nepal Plant Information System via the web.	Information accessible via the internet	Evaluation of web site	
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.	Enhancement of collections.	
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	Completion of manuscripts	
Enhance human capacity in Nepal for herbarium management, plant collection, biodiversity assessment and description	18 Nepalese botanists to be trained	Botanists attend workshops, fieldwork and study visits. Coursework evaluated	Botanists are able to attend all the activities
Activities 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	**Activity Milestones (Summary of Project Implementation Timetable)** 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.		