

DARWIN INITIATIVE FOR THE SURVIVAL OF SPECIES

FINAL REPORT

1. Basic Project Details

Project title: Plant information and technology transfer for Nepal.

DoE Project Ref. No: 162/6/052

UK institute The Natural History Museum, London

Host country
collaborating institute: Tribhuvan University, Nepal

Grant round: 5

Grant value: £126,413

2. Project Expenditure

<i>Category</i>	<i>Original estimate of spend</i>	<i>Actual spend</i>
Staff costs (for Nepalese Co-ordinator)		
Postage, telephone and stationery		
Travel and subsistence		
Printing		
Conferences, seminars etc.		
Capital items		
Other: photographic charges		
Total of spend*	126,413	125,390.83

Note that all changes to budgets heads were formally agreed with the Darwin Office as they arose.

3. Project Background

Nepal is a country with a vast floristic biodiversity and one which relies heavily on local usage of plants. A meeting at the XV International Botanical Congress (Tokyo 1993) identified the need for a *Flora of Nepal*, a project would enable documentation of the flora, as a high priority. However, the within country capacity for such biodiversity work is extremely limited. Moreover, work of this kind is severely hampered by the taxonomic impediment i.e. lack of access to relevant information not held in Nepal and few trained personnel. This data repatriation project was developed as an essential first step towards enabling necessary taxonomic and systematic work in Nepal to be carried forward.

Conservation of rare and endemic plants and sustainable usage of others, especially for medicinal purposes and local uses, are high priorities in Nepal. Any consideration of these areas first requires knowledge of exactly which species are involved. The taxonomic work of defining and describing species depends upon study of type specimens (the unique vouchers on which species concepts are founded. Types may not be held in the country of origin and, in the case of Nepal, local conditions make it difficult for Nepalese taxonomists to gain access to this material, the bulk of which is held in the UK. A second requirement is accurate inventory – which species occur where and in what numbers. Much baseline data already exists in literature and herbaria but again, this is not readily available in Nepal.

The aim of the project was to overcome the problems of access by repatriating this essential information in various forms. Moreover, the taxonomic base in Nepal is narrow, with few individuals having any experience of or contacts within the wider scientific community. The training element of the project addressed these issues.

Three principal end-users were identified by the project.

i) Tribhuvan University.

The named partner in the host country was the Central Department of Botany of Tribhuvan University. The department is sited at Kirtipur, Kathmandu but the University maintains campuses in various other towns throughout Nepal, e.g. Biratnagar. This research and teaching network comprises the largest single audience for the project.

ii) The Natural History Museum, Kathmandu.

Linked to Tribhuvan University, the Natural History Museum is a taxonomic institute in its own right.

iii) The National Herbarium, Kathmandu.

By far the largest herbarium in Nepal and the repository for most of the type specimens held in the country. Although much depleted in recent times, the National Herbarium still maintains a research programme. This institute was responsible for much of the early survey work on medicinal plants.

It is worth mentioning a fourth organisation under this heading. RONAST (the Royal Organisation for Nepalese Science and Technology) has a similar organisation and role to our own Royal Society and provides an academic and quasi-governmental umbrella for scientific work in Nepal. It was not originally targeted as an end-user but has taken an interest in the project, effectively identifying itself as an end-user and has smoothed some of the potential political differences between other interested parties.

4. Project Objectives

As stated in the original application the main objective is to transfer vital information on vascular plants and bryophytes in Nepal by:

- i. repatriating data on types, historical and other important collections as high-quality electronic images and hard copy.
- ii. making available existing baseline data to Nepal by converting the *Enumeration of the Flowering Plants of Nepal* (published by the Museum in the 1970s and 1980s) into a database format.
- iii. facilitating further studies by providing a bibliography of works covering or including Nepalese taxa which post-date the *Enumeration*.
- iv. providing a core of Nepalese workers trained in capturing specimen data.

To these should be added:

- v. the setting up of a Nepalese node for the project which would continue to function as the information centre after project completion (stated elsewhere in the original application).
- vi. producing paper-based versions of a checklist of flowering plants and a catalogue of bryophytes for use by workers lacking access to the electronic databases (a late revision to the project, agreed with the Darwin Office).

5. Project Outputs

The original output targets were all achieved but some were substantially revised and new outputs added at various points in the life of the project such that the total has more than doubled. All changes were agreed with the Darwin Office.

For simplicity, the actual outputs achieved are shown in the table below. Any which are additional to, or substantially different from, the original are marked and an explanation given in a footnote.

Output Ref. No	Details
5	1 Nepalese researcher spent 2 years in UK for work experience
6A ¹	<p>4 Nepalese workers each undergo training in UK.</p> <p>Mr D. Bajracharya Mr T. Gautam</p> <p>Mrs N. Pradhan Ms S. Rajbhandary</p> <p><i>For nature of training see Project operation below.</i></p>
6B ²	60 weeks training
8	9 weeks spent by UK project staff in Nepal
11A ³	<p>One paper accepted by peer-reviewed journal:</p> <p>Collections of flowering plants by Francis Buchanan-Hamilton from Nepal 1802-1803. In <i>Bulletin of the Natural History Museum (Botany)</i>.</p> <p>One book published:</p> <p><i>Annotated Checklist of the Flowering Plants of Nepal</i>. 430pp. The Natural History Museum, London.</p>
11B ⁴	<p>Two catalogues published for distribution mainly within Nepal:</p> <p><i>Catalogue of type specimens from Nepal</i>. 123pp.</p> <p><i>Material for a checklist of Bryophytes of Nepal</i>. 79 pp.</p> <p>Two papers published in non peer-reviewed journal:</p> <p>Repatriation of historical and type specimen data for Nepal. In <i>Newsletter of Himalayan Botany</i> 24: 18-23 (1998).</p> <p>News related to Flora of Nepal. In <i>Newsletter of Himalayan Botany</i> 26: 22-23 (2000)</p>

12A ⁵	<p>3 databases handed to Nepalese Government & University authorities</p> <p>Databases established:</p> <p>i) <i>The Nepal Plants Database</i></p> <p>A very large, relational database incorporating numerous separate data sets relating to vascular plants.</p> <p>ii) <i>Bibliography of literature relating to Nepalese plants</i></p> <p>Also relating to vascular plants.</p> <p>iii) <i>Nepalese bryophytes</i></p> <p>A relational database incorporating separate data sets, including an extensive bibliography and information on Nepalese specimens held in herbaria world wide.</p>
13A	<p>Image reference collection handed over to Nepalese Government & University authorities</p> <p>The digital image library is a reference collection relating specifically to type specimens. The library contains c. 1000 images.</p>
14A ⁶	<p>Closing workshop held in Nepal. Attended by c. 100 people. 1 weeks, including field visits.</p>
14B ⁷	<p>2 workshops, 3 review meetings.</p> <p>Opening workshop (London). Attended by 10 people.</p> <p>One workshop at international conference (International Botanical Congress, St. Louis, USA). Attended by 30 people.</p> <p>Two project review meetings (London).</p> <p>One review meeting with World Bank (Washington, USA).</p>
17A ⁸	<p>One dissemination network established in Nepal.</p> <p>This consists of four nodes, at Kathmandu (3) and Biratnagar (1) with the Central Department of Botany, Tribhuvan University, Kathmandu as the control point.</p>
17B ⁹	<p>Three dissemination networks established elsewhere.</p> <p>One based at the Natural History Museum, London; the others at Royal Botanic Garden, Edinburgh and Tokyo University, Tokyo.</p>
20	<p>Physical assets to host country = £10K (mainly computer equipment)</p>
21 ¹⁰	<p>Four permanent research and training facilities established in host country (Nepal). These are based in various parts of Tribhuvan University, at the Central Department of Botany, the campuses of Kirtipur Multiple (Kathmandu) and MMAM (Biratnagar) and at the Natural History Museum, Kathmandu.</p>

¹Original output was 6 trainees, reduced to 4 because of a) difficulties in filling places with suitable candidates and b) problems with visas compressed the available slots in the project timetable. However, the total training time was raised by 20% over the original.

²Original output was 48 weeks.

³Additional output.

⁴Additional output.

⁵Expanded outputs. The original target of making baseline data from *An Enumeration of the Flowering Plants of Nepal* available in electronic form is included within the Nepal Plants Database. Subsets of information on collectors, collections and a gazetteer of collecting sites are additional to the original output. Data on flowering plant types held in Japanese herbaria is also additional.

The Nepalese bryophytes database is greatly expanded over the original output, including all Nepalese collections known to be held in major herbaria in Japan, India and Nepal, as well as in the UK.

⁶Originally two workshops were planned for Nepal. The opening one was transferred to London at the request of the host to take advantage of a visit there by Japanese colleagues.

⁷Two workshops additional to original output target.

⁸Expanded output. The original called for a single node in Nepal. The three additional nodes made possible because of the trainees taken on, expand the network institutionally and geographically.

⁹Expanded output. The Edinburgh and Tokyo networks are additional.

¹⁰Expanded output. The original target was a single such facility.

6. Project operation.

i) Research

Much of the work in this project is compilatory in nature, thus scanning literature for references to Nepalese plants and building up a bibliography of such works. Similarly, producing digital images of specimens is a matter of photographic techniques.

The research elements are more or less confined to dealing with the specimens themselves. For non-type material this is mainly a matter of identification – what species does the specimen belong to? For type material the situation is more complex: is the specimen an original element; does the specimen match the description and other information in the original protologue; does the specimen match the concept of the species in current use; is the name validly published according to the Botanical Code of Nomenclature; if only some or none of these what must be done to address the situation?

The research on types was peer-reviewed. Experts in particular taxonomic groups e.g. orchids were consulted and the Museum's own typification and nomenclature experts were extensively consulted in general and on specific aspects of the work. This approach is standard procedure for dealing with typification work.

ii) Training

The Nepalese co-ordinator had been identified as the principle candidate at several meetings prior to the application being submitted to the Darwin Initiative. This was confirmed by discussion with various parties, including Tribhuvan University, after the grant was awarded.

Selection criteria and procedures for the Darwin Scholars was agreed in discussion with Tribhuvan University and administered by that institute. Given the nature of the work, possession of an MSc in botany or a related subject was agreed as the minimum qualification. Details of the posts were circulated to all relevant institutes in Nepal with an invitation for suitably qualified individuals to apply. A panel consisting of the project leaders at the Natural History Museum and the Nepalese co-ordinator selected the most appropriate on the basis of the potential benefits to both the host and the applicant. Agreement from their home institute for the applicant to undertake training was one of the criteria for selection, to ensure support for the individual on returning to Nepal.

Training for the four Darwin Scholars covered the following areas:

- Library skills including electronic catalogue searching
- Herbarium techniques & working with collections, data capture
- Typification & nomenclature; use of the Botanical Code
- IT skills; Access software course; basic database design and use
- Preparation of digital images; scanning and converting text
- Preparation of manuscripts for scientific publications

All training was accompanied by working alongside recognised experts in these areas.

Training for the Nepalese co-ordinator covered similar areas but at a higher level commensurate with his greater experience. Additionally project management was included.

All trainees were presented with a certificate from the Museum confirming their successful completion of the training. This, together with their success in (effectively) gaining a bursary and the courtesy title of Darwin Scholar are all important to their immediate career prospects and thus to sustaining and developing the work of the project. Training undertaken abroad is considered very important in Nepal but is only accredited to researchers if it exceeds three months. We were able to turn the reduction in trainee numbers and concomitant increase in individual training time to advantage under this rule.

Problems encountered.

Few difficulties arose during the project but those that did were somewhat irksome. Halfway through the project the Head of the Central Department of Botany at Tribhuvan University and our main contact there was seconded to another post. His replacement was someone whom we had neither met nor discussed the project and the personal element was missing. Although generally supportive, this individual was less helpful than our original contact.

Work permits caused considerable problems and were the main reason of the reduction in the number of trainees on the project. Issuing the permits coincided with the problems encountered by the UK Immigration Directorate concerning passports etc. Delays in issuing permits meant putting back start dates and, worse, our first two trainees were unable to return home because their passports had been lost. One passport was never retrieved. This caused considerable distress to the trainees and, because of the system for replacement of documents, considerable extra work for the project manager.

Buying equipment for the project raised some issues. That needed for the Nepalese co-ordinator to work in the UK (pc, printer, etc) was obviously best bought in the UK. However, the cost of shipping to Nepal at the end of the project was just as clearly not cost effective, especially for a machine now two years old. A brand new, next generation pc could have been purchased at Nepalese prices for the cost of shipping out the old pc. The ruling that all capital items must be sent to the host at the end of the project needs revisiting and might perhaps be waived in certain circumstances.

7. Project impact

This project is essentially about enabling future work by providing the essential underpinning for any taxonomic and systematic plant research in Nepal as well as a variety of related topics. Ecology, forestry and especially conservation work can only be carried out accurately if the identities of the species involved are not in doubt. As well as providing baseline data for taxonomic work, the project has provided a comprehensive information source which is available for consultation by anyone dealing with wild plants in Nepal.

The project also provides the basis for a proposed *Flora of Nepal* project. This Flora is envisaged as an international project describe the vascular flora of the country in some detail. A similar but much larger project is underway in China and another, smaller, project in Sikkim.

Training has certainly improved the capacity of the host country to conserve biodiversity. Five Nepalese received training during the project:

Dr Krishna Shrestha (Nepalese Co-ordinator) has returned to his job as a researcher in the Central Department of Botany, Kirtipur. He is actively involved in organising and promoting the proposed *Flora of Nepal*.

Mr Devendra Bajracharya (Darwin Scholar) is completing his PhD while lecturing at Amrit Campus, Kathmandu. His work focuses on orchids and he is engaged in surveying rare and endangered species. He is also preparing a popular book using information from the project to promote interest in conserving the endemic flora of Nepal.

Mr Tilak Gautam (Darwin Scholar) is a lecturer at MMAM Campus, Biratnagar in eastern Nepal. He is developing research in the lowland tropical forests of the region. Floristic expertise is somewhat concentrated in central Nepal and this extension to another region is important.

Mrs Nirmala Pradhan (Darwin Scholar) works at the Natural History Museum, Kathmandu as a curator and lecturer. Following her training period on the project the Museum created a new unit specialising in bryophytes (the first of its kind in Nepal) and which she now heads. Already contacts have been made with other institutes and collaborative work put in train with the Royal Botanic Gardens, Edinburgh.

Ms Sangeeta Rajbhandary (Darwin Scholar) is a lecturer and researcher at the Central Department of Botany, Kirtipur specialising in local use of plants. She will be starting a PhD in the near future.

The first four trainees named above each run one of the nodes in the Nepalese dissemination network. All five have been able to make invaluable contacts within the botanical community.

Wider impacts.

Collaboration levels have been raised considerably as a result of the project, not only between the UK and Nepal but between these countries and Japan. Several institutes within each country are involved. There has also been considerable interest from other projects and through them other institutes elsewhere.

For the future, collaborative work on bryophytes has already been mentioned while the proposed *Flora of Nepal* would be a major collaborative initiative.

8. Sustainability

The host country contributed four trainees to the project and staff time in organising the final workshop. No estimates are available for the monetary value of these.

The Darwin funding did not attract other money but did attract contributions in kind. Curators and researchers at various institutes in the UK and abroad contributed considerable time and expertise to the project and to the trainees. It is not possible to put a value on this. The institutes include:

- Conservatoire et Jardin Botanique, Geneva
- Kyoto University
- Linnean Society, London
- Liverpool Botanic Gardens
- Royal Botanic Gardens, Edinburgh
- Royal Botanic Gardens, Kew
- Tokyo University

Tokyo University also contributed data in electronic format from *An Enumeration of the Flowering Plants of Nepal* as well as records from their own herbarium databases. This was worth an estimated £12K (equivalent to 2 months work by the Nepalese co-ordinator).

Work on the project will certainly continue in the future. Users of the databases are strongly encouraged to feed back any changes or new information from their work and

the databases will be updated regularly. Scanning of new literature relating to Nepal is continually carried out at Tokyo University and will be fed into the system.

The project has already acted as a catalyst for new initiatives in Nepal and others are likely in the future. These are discussed in the section above.

9. Outcomes in the absence of Darwin funding

Without Darwin funding it is most unlikely that the project would have proceeded in any way. Some aspects of the project are being covered in a limited way in Japan but mainly for the benefit of researchers there with an interest in Nepal. Certainly the information now made available to the host country could not have been provided by other means.

10. Key Points

Key success factors for the project are:

- project designed to meet a genuine need
- project carefully circumscribed as to goals but with sufficient flexibility to take advantage of unexpected opportunities
- the dedication shown by the Nepalese project staff
- the support and monitoring systems used
- management by experienced staff

Main problems encountered

- too high/unrealistic expectations of the host about working with a “rich” western country
- visa and permit problems for non-UK personnel
- managing from a distance (liaison with host country)

The current arrangement for developing and managing projects need little or no change. The Darwin Office provide excellent support and were very helpful with all problems within their power to solve. It is up to project managers to make use of that support and above all to inform the Darwin Office of any problems or changes at as early a stage as possible.

11. Project contacts

UK project leader:

J.R. Press
The Natural History Museum
Cromwell Road
London SW7 5BD

Nepalese co-ordinator

Dr K.K. Shrestha
Central Department of Botany
Tribhuvan University
Kirtipur
Nepal

End-users

Prof. D. Bajracharya
RONAST

Prof. S. Joshi
Central Department of Botany
Tribhuvan University
Kirtipur
Kathmandu
Nepal

Mr M.S. Bista
HMG Department of Plant Resources
Ministry of Forest & Soil
Conservation
Post Box No. 2270
Thapathali
Kathmandu
Nepal

Project trainees

Mr D. Bajracharya
Amrit Campus
Tribhuvan University
Lainchaur
Kathmandu
Nepal

Mr T. Gautam
MMAM Campus
Tribhuvan University
Biratnagar
Nepal

Mrs N. Pradhan
The Natural History Museum
Swoyambhu
Manjushree Bazar
Kathmandu
Nepal

Ms S. Rajbhandary
Central Department of Botany
Tribhuvan University
Kirtipur
Nepal

Other key players

Prof. H. Ohba
Tokyo Herbarium
University of Tokyo
3-7-1 Hakusan
Bunkyoku
Tokyo-shi
Tokyo 112
Japan