DARWIN INITIATIVE FOR THE SURVIVAL OF SPECIES : APPLICATION FOR GRANT FOR ROUND 9 COMPETITION

Please read the accompanying Guidance Note before completing this form. Give a full answer to each section; applications will be considered on the basis of information submitted on this form. Applicants are asked not to use the form supplied to cross refer to information in separate documents except where this is invited on the form. The space provided indicates the level of detail required but you may provide additional information on a separate sheet if necessary. Copies of this form are available on disk or by e-mail on request. You are asked also to complete the summary sheet attached at the end of this form. Although you may reproduce this sheet in a reasonable font, you should not expand it beyond an A4 sheet (leaving the allocated space for DETR comments to be made) as additional information will not be taken into account.

1. Name and address of organisation

Royal Botanic Gardens, Kew

2. Principals in project

Details	Project leader	Deputy project leader	UK project co-ordinator	Main project partner in host country
Surname	Dransfield	Baker	To be appointed	Maturbongs
Forename	John	William John		Rudi Aprianto
Post held	Senior Principal Scientific Officer (Head of Palm Research Team and Geographical Officer for SE Asia)	Scientific Officer (Palm Researcher, Manager of Palms of New Guinea Project)		Lecturer and Keeper of Herbarium
Institution				Biodiversity Study Centre, Universitas Cenderawasih, Manokwari, Papua, Indonesia
Department	Herbarium	Herbarium	Herbarium	Fakultas Pertanian
Telephone				
Fax				
Email				

Please provide a one page CV for each of these named individuals.

3. Project title (not exceeding 10 words)

THE UK DARWIN INITIATIVE PAPUAN PLANT DIVERSITY PROJECT

4. Abstract of study (in no more than 750 characters)

The Herbarium at the Biodiversity Study Centre, Universitas Cenderawasih, Manokwari, Papua, Indonesia is the only plant diversity reference collection in Papua, one of the least studied and most diverse areas of the humid tropics. Its collections are in urgent need of rehabilitation. This project aims to safeguard the Herbarium and to increase self-sufficiency by establishing a cadre of highly motivated botanists who will be trained to develop and maintain the collections. It will build plant diversity research capacity and initiate collaborative links with relevant institutions. Key outputs will include annotated field guides to the families of Papuasian seed plants and to the palms and rattans of New Guinea. The project will empower the people of Papua to take a lead in determining the future of the plant diversity of their home province.

5. Timing. Give the proposed starting date and duration of the project.

April 2001 for three years

6. Describe briefly the aims, activities and achievements of your organisation. (Please note that this should describe your unit, institute or department within a university.)

Aims

To enable better management of the earth's resources and environment by increasing knowledge and understanding of the plant and fungal kingdoms – the basis of life on earth.

Activities

Conservation and curation of national and international plant and fungal collections, both living and preserved; scientific research and documentation to support the conservation and sustainable use of wild plant genetic resources; collaborative field work inventorying the botanical diversity of the tropics and subtropics; development of plant conservation strategies; provision of plant related services; maintenance of a public garden; education aimed at increasing public awareness of plants; preservation of historic buildings.

Achievements

The Royal Botanic Gardens, Kew (RBG Kew) is widely recognised as one of the leading botanic gardens in the world with major living and preserved reference collections of plants and fungi, consulted on a daily basis by scientists, conservationists and historians. The Herbarium maintains a collection of more than 7 million specimens, which form the basis of an extensive research programme. Important recent achievements of the Herbarium include the production of numerous monographs, floras, checklists and other publications, for example: Genera Palmarum, The Genera of the Araceae, Palms of Madagascar, Legumes of Madagascar, Orchids of Madagascar, Mistletoes of Africa, the Genus Inga, Conservation Checklists of Mt. Cameroon and Mt. Oku, a Checklist of the Flowering Plants and Gymnosperms of Brunei Darussalam, a Checklist of the Flora of the Kepala Burung, CITES Orchid Checklists, the "World Checklist and Bibliography" series, the Herbarium Handbook and continued publication of the Flora of Tropical East Africa and Flora Zambesiaca. Comparative plant biology is a major strength of RBG Kew and involves staff from three departments (the Jodrell Laboratory, the Herbarium and the Living Collections). Outputs include large numbers of high quality research papers as well as some specialist publications such as the Anatomy of the Monocotyledons and Dicotyledons. RBG Kew is a major player in the Angiosperm Phylogeny Group that seeks to produce a new firmly based phylogeny of the flowering plants using a broad spectrum of data from morphological and molecular studies. A new ordinal classification of the flowering plants has been published recently. Funds have been obtained from the Millennium Commission for the establishment of the Millennium Seed Bank that aims to store seeds from 10% of the world's dryland species by 2010. The library at RBG Kew has built up a unique and prestigious collection of botanical books and journals, both historical and modern, which is used by numerous staff and visitors. Three major periodicals are published at RBG Kew: Kew Bulletin, Index Kewensis (representing a complete listing of all published names of seed plants), Kew Record of Taxonomic Literature. RBG Kew has established memoranda of understanding with many institutes throughout the tropics and has an active programme of collaborative research. It has taken a lead in the introduction of new working practices for the acquisition of biological materials in line with the Convention on Biological Diversity. It is playing a major role in the development and implementation of Common Policy Guidelines for access and benefit sharing of biodiversity. Staff of RBG Kew supervise PhD and MSc students in collaboration with UK and other European universities in a wide range of botanical research topics. The institute runs international training courses in herbarium techniques, conservation management and botanic gardens management, all of which have a proven track record of relevant training, and a three year horticultural diploma course. It holds regular international conferences that result in the publication of conference volumes.

7. Has your organisation received funding under the Initiative before? If so, please give details.

RBG Kew has received Darwin funding for the following:
Plant Biodiversity of the Brejo forests of Pernambuco, North East Brazil; International Diploma Course in Herbarium Techniques; Diploma Course in Herbarium Techniques – Russia; Cultivation and Conservation of Threatened Plant Species for UK Dependent Territories; Herbarium Techniques Course – Malaysia; Darwin Course in Plant Conservation Techniques – East Africa; Conservation of seeds from semi arid areas of Tunisia; Biodiversity Liaison Officers; Repatriation of Herbarium Data for the Flora of Bahia, Brazil; Conservation of Plant Diversity in Western Cameroon; Coastal vegetation survey and conservation – Lebanon.

RBG Kew has been a partner in a number of other Darwin projects, such as Rattans of the Lao PDR (administered through University of Oxford) and Forest Regeneration Studies on Mount Cameroon (administered through the University of North Wales, Bangor).

8. Which overseas institutions, if any, will be involved in the project? Please explain the responsibilities of these institutions.

The Biodiversity Study Centre, Universitas Cenderawasih, Manokwari, Papua, Indonesia
- Project host
- Provision of staff
- Provision of basic infrastructure, e.g. office space, herbarium building, telephone
- Provision of accommodation for UK project staff
- Facilitation of permits for fieldwork

Papua New Guinea Forest Research Institute, Lae, PNG
- Research collaboration

National Herbarium of the Netherlands (Leiden Branch)
- Provision of expert advice

PROJECT DETAILS

9. Define the purpose (main objective) of the project in line with the logical framework.

The main objective of the project is to develop research capacity in plant diversity at the Biodiversity Study Centre, Universitas Cenderawasih, Manokwari, Papua, Indonesia, through the rehabilitation of the Herbarium, the renovation and development of the herbarium collections and through the training of staff in curation and research. With well-curated and expertly named herbarium collections to act as a basic reference, and with training in fieldwork and research, the staff of the Manokwari Herbarium will be able to play an active role in the surveying of remaining natural vegetation in Papua, essential for the effective conservation of the region's biodiversity. Collaborative links with the Papua New Guinea Forest Research Institute will be established to open a channel of communication with a similar institution in neighbouring PNG. Thus, the project will develop the Herbarium to international standards so that it can fulfil its crucial role as the only plant diversity reference collection in Papua, while working towards greater scientific integration between the two political entities on the island of New Guinea.

10. Is this a new project or the continuation of an existing one?

This is a new project, but it has the potential to build on preliminary work carried out under the RBG Kew Flora of the Kepala Burung project, the RBG Kew Mt Jaya Project and the National Herbarium of the Netherlands project at Ayawasih, Sorong. A similar project proposed to the Darwin Initiative in 1998 was not chosen for funding.

11. What is the evidence for a demand or need for the work? How is the project related to conservation priorities in the host country(ies)? How would the project assist the host country with its obligations under the Biodiversity Convention?

How was the work identified?

Papua, the Indonesian part of the world's largest tropical island, New Guinea, remains one of the botanically least well known areas of the world. It has a very diverse geology and relief with consequently varied vegetation and includes the highest mountains in the eastern tropics. Mount Jaya, at over 5000 m elevation, carries remnants of a formerly extensive glacier and it and other mountains of the spine of the western part of the island are covered with alpine vegetation. The lowlands and montane areas support diverse tropical rain forest. There is a wealth of indigenous peoples. Large areas of the land surface are still relatively undisturbed, making this the most significant area of pristine vegetation in the eastern tropics.

There is one university in Papua, Universitas Cenderawasih, with a campus at the provincial capital, Jayapura, and another campus at Manokwari, at the northeastern extremity of the Kepala Burung (Bird's Head Peninsula or Vogelkop). The plant diversity of this huge area is only poorly represented by herbarium collections in the Indonesian National Herbarium at Bogor (Herbarium Bogoriense) in Java and in other herbaria worldwide. The only herbarium in Papua itself is in the Biodiversity Study Centre at the Manokwari campus of Universitas Cenderawasih. It incorporates the remains of the rich collections of the former Dutch colonial forestry service. For a long time languishing and deteriorating in inappropriate storage, these collections have been rescued by the University and form the core of the Manokwari Herbarium.

It is difficult to exaggerate the importance of the Herbarium. Although a significant amount of material was lost or had decayed beyond repair in the period between the end of the Dutch Colonial era and the late 1980s, rich representation of plant diversity survives. Rapid scanning of two large families, Rubiaceae and Moraceae, revealed that the Manokwari Herbarium has up to 30% more of these highly significant Dutch collections from Papua than do the two most important holders of plant specimens from Papua, the Leiden and Bogor herbaria.

The Rector of Cenderawasih University has recently created a Biodiversity Centre that incorporates the Herbarium. Although accommodation for the collections has been provided, the condition of the specimens is poor and curatorial standards

are inadequate. Unless the Manokwari Herbarium receives urgent help, the collections will continue to deteriorate, falling prey to insect and fungal pests, until little of any scientific value remains. It is estimated that approximately 30% of the specimens have already been lost.

The Biodiversity Centre staff include several young biologists who show commitment and enthusiasm and who would respond greatly to further training opportunities. The proposed project has evolved from extended discussions that RBG Kew staff have held with R. Maturbongs, J. Wanggai (Head of the Biodiversity Study Centre) and other staff during reciprocal visits to RBG Kew and Manokwari and incorporates many of their ideas concerning the needs of the Herbarium. An official memorandum of understanding has recently been established between Universitas Cenderawasih and RBG Kew as a written commitment between the two organisations to future collaborations and mutual support.

While the botanical research infrastructure of Papua New Guinea is better established and more secure, collaboration with the country's Indonesian neighbouring province on the island is almost non-existent. Given the very high degree of commonality between the biodiversity of Papua New Guinea and Papua, the lack of communication between the two regions hinders the achievement of their shared goals. This project seeks, in a small way, to work towards closer scientific relations between the two regions.

How is the project related to conservation priorities in the host country?

The project fits well within the framework of the Indonesian Biodiversity Action Plan (1993), especially in terms of its relevance to *in situ* conservation in terrestrial parks and protected areas, *in situ* conservation outside the protected area network, forest biological diversity and publication and distribution of scientific and technical information. Although large areas of pristine vegetation remain in Papua, the impacts of mining, forestry and agriculture are rapidly becoming more severe. Pressures on natural habitats are increasing dramatically as further logging concessions are granted and mineral resources discovered. If properly resourced, curated and staffed with committed and trained personnel, the Manokwari Herbarium could provide the critical botanical reference facility that is urgently required for the cataloguing of the plant diversity of Papua and for the determining of conservation priorities of this important area. Without a functional herbarium, the people of Papua are entirely dependent on the limited resources of the Indonesian National Herbarium at Bogor in Java or on foreign taxonomic expertise to identify conservation needs. The project will empower the people of Papua to take the lead in determining the future of the biological diversity of their home province.

How will the project assist the host country meet its obligations under the Biodiversity Convention?

The project takes into account major articles in the Convention on Biological Diversity to which both Indonesia and UK are committed, for example, *in situ* conservation both inside and outside protected areas in collaboration with local communities (CBD Art. 8), access to genetic resources and benefit sharing (CBD Art. 15), exchange of information (CBD Art. 17) and technical and scientific Cupertino (CBD Art. 18). In addition, RBG Kew has taken the lead in developing and adopting a policy in line with the CBD, the Common Policy Guidelines for Participating Botanic Gardens on Access to Genetic Resources and Benefit Sharing, which ensures fair and equitable sharing of any benefits arising from access to genetic resources. These principles are further upheld in the Memorandum of Understanding shortly to be signed by Universitas Cenderawasih and RBG Kew (see attached documentation).

12 In what ways can this project be considered a Darwin project? How does the project relate to the Darwin principles? How would the project be advertised as a Darwin project and in what ways would the Darwin name and logo be used?

This project meets all of the objectives of the Darwin Initiative.

- *"Assist countries rich in biodiversity, but poor in resources"* – Almost 15,000 species of flowering plants and ferns are thought to occur on the island of New Guinea, making it one of the most diverse areas of the humid tropics. Papua lacks the infrastructure and resources to catalogue and manage its diversity.
- *"Work on conservation and the use of biodiversity would not be carried out without such funding"* – Although Biodiversity Study Centre staff conduct fieldwork for floristic purposes, their specimens cannot be curated or made available to other researchers on account of the inadequate state of herbarium management. While rapid biodiversity assessments are being conducted by Conservation International in Papua, their surveys are generally zoologically biased, do not involve the depositing of voucher specimens in herbaria and do not invest in the botanical infrastructure of Papua.
- *"Funding will raise awareness of the potential worth of natural resources and use it in a sustainable way to eliminate poverty"* – The worth of natural resources and their potential sustainable use cannot be determined without accurately identifying the resources in question using a biodiversity reference collection. While such collections do exist outside Papua to a limited extent, they are not easily available in Papua itself. By renovating and developing the Herbarium at Manokwari and the training of staff in herbarium management and botanical research, the people of Papua will be in a position to determine the worth and usefulness of the province's plant diversity.
- The project involves *"British expertise"*.
- The project is *"collaborative"*.
- The project will have *"real and lasting impacts"* as it answers critical needs, it does not involve expensive, high maintenance technology and is readily sustainable with minimal financial input.
- We are confident that the project, once established, will be *"a catalyst to lever additional funding for project work"*. The

proposed project would provide the evidence required to persuade funding agencies to invest further in the Biodiversity Study Centre, perhaps to encompass a broader spectrum of biological disciplines.

- The project does *"not cut across work being funded through other mainstream environmental or research programmes"*. It is, in that sense, *"additional"* and complementary to other research such as the Palms of New Guinea project.
- We believe that the project represents *"good value for money"* as the initial investment will result in substantial long term benefits, well beyond the 3 year period of funding.
- The project addresses four out of the five principal Darwin project areas: institutional capacity building , training, research and environmental education and awareness.
- The Darwin name will be used in the project title (THE UK DARWIN INITIATIVE PAPUAN PLANT DIVERSITY PROJECT). The project name and Darwin logo would appear on all letterheads, all equipment purchased by the project and all herbarium material collected during the project.

13. Set out the proposed timetable for the work, including the programme's measurable outputs using the attached list of output measures.

Project Title: UK Darwin Initiative Papuan Plant Diversity Project

Year One: April 2001 – March 2002

- Recruitment of UK project co-ordinator by RBG Kew to execute principal project activities in UK and Papua.
- Project co-ordinator takes Indonesian language course if necessary.
- Project co-ordinator prepares for first period in Manokwari, begins initial research for Field Guide to Families of Papuasian Seed Plants.
- May 2001, C. Heatubun to RBG Kew for four months study visit to work on Field Guide to the Palms and Rattans of New Guinea. [Output: 6A – 1, 6B – 12]
- September 2001, project co-ordinator and two staff from Manokwari attend Fifth International Flora Malesiana Symposium, Sydney, Australia [Output: 14B – 1]
- October 2001, project co-ordinator to Manokwari for six months, familiarisation with Manokwari Herbarium, discussions with main project partner and Head of Biodiversity Study Centre, begin main project work. [Output: 8 – 24]
- Acquisition and installation of physical assets and consumables (computer, five herbarium cupboards, herbarium resources, air-conditioning, field collecting equipment, freezer, hand lenses, GPS, renovation of drying equipment). [Output: 20 – £15,150]
- Herbarium database established. [Output: 12A – 1]
- Occasional lectures to Universitas Cenderawasih students given by project co-ordinator. [Output: 4A – 20]
- Organisation of two field trips and curation of material collected. [Output: 13B – 1]
- Herbarium technicians training by project co-ordinator begins. [Output: 6A – 8, 6B – 24]
- March 2002, herbarium techniques course takes place in Manokwari, involving project leader, project co-ordinator, W. Baker and two other RBG Kew staff. [Output: 7 – 1, 8 – 8, 13B – 1]
- March 2002, Project leader and W. Baker conduct supervisory visit. [Output: 8 – 4, 13B – 1]
- March 2002, R. Banka (Papua New Guinea Forest Research Institute) visits Manokwari for two weeks to meet research collaborators on the Field Guide to Palms and Rattans and to participate in herbarium techniques course. [Output: 6A – 1, 6B – 2]
- End of March 2002 project co-ordinator returns to RBG Kew.
- Approximately six papers submitted to peer-reviewed journals [Output: 11B – 6]
- Project co-ordinator compiles Annual Report.

Year Two: April 2002 – March 2003

- Project co-ordinator continues work back at RBG Kew. Starts work on naming specimens from Manokwari, distributing duplicate specimens, informing Manokwari of identifications, working on repatriation of New Guinea plant data from RBG Kew as required (e.g. key literature, type photographs, duplicates), continues work on guide to families of New Guinea seed plants, prepares for second visit to Manokwari.
- May 2002, R. Maturbongs to RBG Kew for 4 months to work on Field Guide to the Palms and Rattans of New Guinea, later joined by J. Wanggai for 1 month. [Output: 6A – 2, 6B – 16]
- October 2002, project co-ordinator to Manokwari for six months, continues with work as described above, including two field trips. [Output: 8 – 24, 13B – 1]
- Further acquisition and installation of physical assets and consumables (10 herbarium cupboards, microscope). [Output: 20 – £6,700]
- Herbarium database continued. [Output: 12A – 1]
- Occasional lectures to Universitas Cenderawasih students given by project co-ordinator. [Output: 4A – 20]
- March 2003, project leader to Manokwari for four weeks to discuss progress and participate in fieldwork. [Output: 8 – 4]

- Organisation of two field trips and curation of material collected. [Output: 13B – 1]
- November 2002, R. Maturbongs and C. Heatubun visit R. Banka at the Papua New Guinea Forest Research Institute for two weeks to continue collaboration on the Field Guide to the Palms and Rattans of New Guinea. [Output: 6A – 2, 6B – 4]
- End of March 2003 project co-ordinator returns to RBG Kew.
- Approximately six papers submitted to peer-reviewed journals. [Output: 11B – 6]
- Six papers submitted in year 1 published. [Output: 11A – 6]
- Project co-ordinator compiles Annual Report.

Year Three: April 2003 – March 2004

- Project co-ordinator continues work at RBG Kew, naming specimens from Manokwari, distributing duplicate specimens, informing Manokwari of identifications, working on repatriation of New Guinea plant data from RBG Kew as required (e.g. key literature, type photographs, duplicates), continues work on guide to families of New Guinea seed plants, prepares for third and final visit to Manokwari.
- May 2003, R. Maturbongs and C. Heatubun visit RBG Kew for one month, and R. Banka for 4 months to finalise Field Guide to Palms and Rattans of New Guinea with J. Dransfield and W. Baker (funded through Palms of New Guinea Project). [Output: 6A – 3, 6B – 24]
- September 2003, project co-ordinator to Manokwari for four months, continues with work described above, including one field trip. [Output: 8 – 16, 13B – 1]
- Further acquisition and installation of physical assets and consumables (5 herbarium cupboards, etc). [Output: 20 – £2,950]
- Herbarium database continued. [Output: 12A – 1]
- Occasional lectures to Universitas Cenderawasih students given by project co-ordinator. [Output: 4A – 20]
- December 2003, project leader and W. Baker to Manokwari for 2 weeks for supervisory visit, concluding workshop and finalising exit strategy. [Output: 8 – 8, 14A – 1]
- January 2004, project co-ordinator returns to RBG Kew to finalise Field Guide to the Families of Papuasian Seed Plants
- March 2004, Field Guide to the Palms and Rattans of New Guinea and Field Guide to the Families of Papuasian Seed Plants published [Output: 10 – 2].
- Approximately six papers submitted to peer-reviewed journals [Output: 11B – 6]
- Six papers submitted in year 2 published. [Output: 11A – 6]
- Project co-ordinator compiles Final Report.

14. Do you know of any other individual/organisation carrying out similar work? Give the details of the work, explaining the similarities and differences.

The National Herbarium of the Netherlands recently completed a biodiversity project at Ayawasih near Sorong at the extreme western end of Papua. During this project, the Manokwari Herbarium was assisted by the purchase of plant drying equipment, herbarium mounting paper and newspapers. A significant database of botanical collections from this area of New Guinea has also been compiled. The help given to Manokwari was valuable but incidental to the main aim of their project. The proposed project seeks specifically to address the problem of the long-term security of the botanical collections in Manokwari and the training of its staff to underpin biodiversity research and conservation in Papua.

Conservation International is involved in rapid biodiversity surveys in Papua related to the identification of priority areas for conservation. These surveys have tended to use zoological rather than detailed botanical evidence. The current project, while not intending to compete with or duplicate this effort, will build up local botanical expertise and safeguard botanical reference collections that can be used to verify such general conservation surveys, thereby strengthening their value.

A major research project based at the RBG Kew, coordinated by W. Baker and J. Dransfield, aims to produce an account of the palms of the whole island of New Guinea. This is an international project with collaborators in several countries (John Dowe, James Cook University; Anders Barfod, University of Aarhus; Scott Zona, Fairchild Tropical Garden; Rudi Maturbongs and Charlie Heatubun, Universitas Cenderawasih, Manokwari; Roy Banka, PNG Forest Research Institute, Lae; Johanis Mogea and Ary Keim, Herbarium Bogoriense, Bogor). The project is purely scientific and the activities proposed in this document have been designed so that the two projects complement each other well. For example, the proposed Field Guide to the Palms and Rattans of New Guinea will allow the scientific information in the *Palms of New Guinea* to be reproduced in an accessible, abbreviated format suitable for a broader audience and for use in the field. It will be published in both English and Indonesian.

RBG Kew is completing a floristic study of the PT Freeport Indonesia Concession in Mt Jaya. During this project, extensive herbarium collections have been made and databased, with a complete set being deposited in the Manokwari Herbarium. Staff from Manokwari have also collaborated in the project.

15. Will the project include training and development? Please indicate how many trainees will be involved, from which countries and what will be the criteria for selection. How will you measure the effectiveness of the training and will those trained then be able to train others? Where appropriate give the length of any training course.

Training of Manokwari Herbarium staff will represent a major component of the project.

- A formal four-week course in herbarium techniques, taught in Indonesian, will be given by RBG Kew staff in Manokwari to lay the foundation for effective herbarium management. All staff (approximately 10) involved in the running of the Herbarium will attend. Much practical knowledge will be imparted to the staff which will be readily passed on to future personnel who will be trained by existing Herbarium staff. Course notes and copies of *The Herbarium Handbook* will be provided as basic reference sources. Some students will also attend the course as new Biodiversity Study Centre staff are often selected from graduates of Universitas Cenderawasih. Effectiveness of the training will be assessed through supervisory visits.
- Throughout the project, staff of the Manokwari Herbarium will be trained "on the job" by the project co-ordinator in routine herbarium management, plant collecting methods and identification techniques, and in database maintenance on an informal basis. Again, the practical knowledge imparted will be readily passed on to others.
- Two staff members from Universitas Cenderawasih, Manokwari (R. Maturbongs and C. Heatubun) and one from PNG Forest Research Institute (R. Banka) will collaborate, together with J. Dransfield and W. Baker, to research and produce a Field Guide to the Palms and Rattans of New Guinea. They have been chosen for their existing enthusiasm and commitment to research on the palms of New Guinea. The collaboration will provide many opportunities for the transfer of research skills and knowledge from the UK counterparts. To facilitate further the collaboration and provide opportunities for concentrated research training, Maturbongs, Heatubun and Banka will visit RBG Kew for four months each to work with the UK counterparts (PNG counterpart to be funded from other sources). The collaboration will continue through correspondence and during visits by the UK counterparts to Papua and PNG during the project period. Reciprocal visits to Papua and PNG for R. Maturbongs, C. Heatubun and R. Banka will be arranged. As lecturers, R. Maturbongs and C. Heatubun will be able to pass on specialist knowledge gained during their study visits and throughout the collaboration to students at the University.
- The Director of the Biodiversity Study Centre (J. Wanggai) will visit RBG Kew for a period of one month to gain experience of the running of a major herbarium.
- If required by Universitas Cenderawasih, the project co-ordinator will give lectures to university students in taxonomic botany.
- The UK project co-ordinator will take an Indonesian language course if he/she is not already fluent.

16. How will trainee outcomes/destinations be monitored after the end of the training?

The work of the Herbarium staff will be monitored throughout each of the six month periods spent in Manokwari by the project co-ordinator and by J. Dransfield and W. Baker during supervisory visits. During these times, it will be straightforward to check that curatorial standards are improved and maintained through examination of the Herbarium and its collections. At times when UK counterparts are not present in Manokwari, the project co-ordinator will communicate with the main project partner on a regular basis. The main project partner will provide brief progress reports on a two-monthly basis at these times. Research training outcomes will be monitored by regular communication between counterparts, during subsequent visits to Manokwari by the UK counterparts and UK project co-ordinator. The Palms of New Guinea project (funded independently) will continue beyond the end of the proposed Darwin project and will provide opportunities for monitoring the effectiveness of the research training.

17. How is the work of the project expected to continue after the end of grant period? A clear exit strategy must be included.

The project will result in a legacy of well-trained staff with communicable herbarium management skills. A routine for herbarium maintenance will be well established and can be expected to continue effectively beyond the end of the project. Research collaboration links will be well established and will be maintained through joint RBG Kew/Universitas Cenderawasih projects. Universitas Cenderawasih will need to commit to the continued staffing of the Herbarium, to the maintenance of the Herbarium building and to the purchase of inexpensive herbarium supplies as required. Very few of these commitments are additional to those already made by the University and are realistic expectations for an exit strategy.

MONITORING AND EVALUATION

18. Describe how progress on the project would be monitored and evaluated in terms of achieving its aims and objectives, both during the lifetime of the project and at its conclusion. How would you ensure that it achieves value for money? What arrangements will be made for disseminating results? If applicable, how would you seek the views of clients/customers?

Monitoring and evaluation of project progress will take place through the following mechanisms:

- Establishment of management committee in RBG Kew, comprising J. Dransfield, W. Baker, project co-ordinator and one other relevant member of staff at RBG Kew to meet bi-monthly.
- Management of project co-ordinator through existing RBG Kew line management structure.
- "On the job" monitoring by co-ordinator during 6 month periods of residence in Manokwari, and by correspondence at other times.
- Preparation of full annual reports by project co-ordinator, with briefer interim six-monthly reports.
- Annual supervisory visits to Manokwari by J. Dransfield and/or W. Baker during co-ordinator's residences.
- Workshop held at conclusion of project in Manokwari for all interested parties to evaluate the success of the project and make recommendations for exit strategy and sustainability.

The achievement of "value for money" would be assessed continually through these same mechanisms.

Results will be disseminated as follows:

- A Field Guide to the Families of Papuasian Seed Plants (in English and Indonesian, written by project co-ordinator).
- A Field Guide to the Palms and Rattans of New Guinea (in English and Indonesian, written by Maturbongs, Heatubun, Banka, Dransfield and Baker).
- Assisting Manokwari staff to bring their research results to international standards for publication in peer-reviewed journals.
- Assisting Manokwari staff to improve their occasional research journal, *Beccariana*, so that it is sustainable and distributed more widely.
- Papers published by all UK personnel on Papuan plant diversity.
- Advertising project activities at appropriate international conferences (e.g. Flora Malesiana Symposium), in newsletters such as Flora Malesiana Bulletin and internet bulletin boards, and through the media where possible.
- Construct web page within RBG Kew web site to highlight project and its progress.

19. Logical framework. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note.

Project summary	Measurable indicators	Means of verification	Important assumptions
Goal To develop the Manokwari Herbarium to international standards so that it can fulfil its crucial role as the only plant diversity reference collection in Papua.	Papuan flora well-represented in the Herbarium, and Herbarium consulted as a key conservation reference collection; international profile of the Herbarium and staff raised.	Herbarium collections; annual reports; scientific publications	Staff commitment; continued international interest.
Purpose To build capacity in plant diversity research at the Biodiversity Study Centre, Manokwari through the rehabilitation of the Herbarium, the renovation and development of the Herbarium collections and through the training of staff in curation and research.	Increase in use of Herbarium; expansion of Herbarium; Herbarium recurated to international standards; staff expertise called upon; staff conducting research independently.	Annual and interim reports; staff publication lists; expedition reports.	Universitas Cenderawasih maintains support after project conclusion; public awareness of Herbarium is raised.
Outputs Herbarium curated and managed to international standards; Herbarium database; palm and rattan field guide; field guide to Papuasian seed plant families; skills transferred; research collaborations established.	Specimens preserved; pests under control; database updated; field guides published.	Supervisory visits; annual and interim reports; management committee meetings; field guides available in public domain.	As above
Activities Herbarium curation; Herbarium renovation; integrated pest management; fieldwork; staff training; writing field guides; databasing; identification of specimens; study visits to UK	Herbarium curated and renovated; backlog of un-mounted material incorporated; pest management implemented; training implemented; databasing implemented, specimens identified; study visits successfully completed.	Supervisory visits; annual and interim reports; management committee meetings.	As above