

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

EDEN PROJECT WATERING LANE NURSERY, PENTEWAN. ST AUSTELL, CORNWALL PL26 6BE
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2. Principals in project

Details	Project leader	Other UK personnel (if working more than 50% on project)	Main project partner or co-ordinator in host country
Surname	Kendle		Dogley
Forename(s)	Anthony David		Didier
Post held	Assistant Director, Science		Director, Botanic Garden
Institution (if different to the above)			Ministry of Environment and Transport, Seychelles
Department			Environment Division
Telephone			
Fax			
Email			

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

3. Project title (not exceeding 10 words)

PROPAGATION, NURSERY AND ESTABLISHMENT PROTOCOLS FOR SEYCHELLES ENDEMIC PLANTS
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4. Abstract of study (in no more than 750 characters)

<p>The Seychelles flora is of international importance, with many endangered endemics. The national programmes for species recovery include creating a new biodiversity centre for <i>ex-situ</i> storage and cultivation. Help is needed to bridge between seed storage and propagation to nursery production and establishment, especially where material is needed for species recovery in degraded conditions. This project will use UK expertise to provide guidance and research and develop skills to build the capacity of the Seychelles species recovery programme in the longer term. It will use UK information retrieval infrastructure for collating existing knowledge and disseminating results. In partnership with the <i>ex-situ</i> and <i>in-situ</i> plant conservation teams on the Seychelles it will support successful protocols of 90% of the endemic flora. Dissemination of the work will be supported through the high-profile Eden Project.</p>
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5. Timing. Give the proposed starting date and duration of the project.

April 2001 to April 2003

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

Eden Mission: to promote the understanding of the vital relationship between plants, people and resources and to encourage responsible management of these, leading to a sustainable future.
We aim to be a centre of excellence for communication and public understanding of environmental and scientific issues, underpinned by research programmes that promote sustainable land use and conservation of nature.

Activities

Eden Project is best known for the construction of a 15Ha showcase in Cornwall where living plant collections are used as the basis for communicating the importance of plants and the interdependence of plant and human survival. A key activity is the construction of a humid tropics conservatory covering 1.5 ha, the largest clear-span greenhouse in the world, capable of containing tropical forest trees to 45m in height and presenting an image of working ecosystems. This will be focused not on the myth of the humid tropics as pristine systems but rather as working landscapes. The displays will showcase real people's efforts at living sustainably. Eden's relationship with the Seychelles grew out of development of the Oceanic Islands conservation section of the display. There are also complementary displays of temperate and warm temperate regions.
We also carry out interdisciplinary research and develop partnerships, nationally and internationally, encouraging projects in line with the Eden mission. These are usually solution-focused and field-based projects and all contain a particularly strong focus on effective communication and dissemination of results, through our site, web, publications seminars etc. We have research facilities including modern greenhouses and controlled propagation facilities.

Achievements

The Eden Project opened its visitor centre in early summer 2000 to show the project in construction and it will have received over 400 000 preliminary visitors before it closes at the end of the year. The project formally opens next year.
The project has established links in many countries to identify projects and initiatives that will be showcased through the displays, further interpretation material and education programmes. These links have formed the basis for research collaboration such as:
1999 Establishment of pilot study on ethnobotanical knowledge amongst Amerindians of Guyana.
1998 Management plans for sustainable harvesting and exploitation of Coco de Mer on Seychelles linked to ecotourism initiatives.
1998 Assistance to research programme on ecology of Dipterocarp forest in Sabah, linked with INFAPRO.
2000 Partnership with English Nature for showcasing heathland restoration in Cornwall including student attachment.

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

No.

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

The Botanic Gardens, Ministry of Environment and Transport, Seychelles. The existing botanic garden facilities are being expanded by the creation of a new biodiversity centre that provides an *ex-situ* conservation resource and educational facility for the islands. The biodiversity centre includes a seed bank and a new nursery facility aimed at the cultivation and propagation of endemic plants to maintain the *ex-situ* collection and to support species recovery and habitat restoration programmes. The biodiversity centre will provide a lead in developing and maintaining national expertise in plant propagation of these plants. However it will not be the only unit that carries out such work, and it will also play a role in supporting the activities of NGO conservation bodies and also the Ministry of Education which has programmes of endemic plant propagation focused on preserving ethnobotanical knowledge.

National Parks Section, Department of Forestry, Seychelles All *in-situ* endemic plant management programmes are run by the National Parks Section on the Seychelles, and their responsibilities are rapidly evolving in areas of species recovery and habitat restoration. Planting programmes to restore viable populations and ecosystem function have already been carried out on several islands of the Seychelles group, focusing so far on the Coco-de-Mer (*Lodoicea maldivica*) and six other endemic species. The National Parks Section represent the major user of the propagated endemic plants and will play a key role in this project by defining the number and type of plants needed, and carrying out trials of the optimum plant form for effective establishment.

PROJECT DETAILS

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

To produce protocols for effective propagation and nursery culture suitable for recovery programmes for 90% of the Seychelles endemic flora. To collate known propagation experience for 100% of the endemic species using the information retrieval infrastructure of the UK. To improve the standard of propagation on the Seychelles through consultancy and trials, and to produce an easily accessible database and support effective information dissemination of protocols. To ensure best practice in conservation nursery management and plant cultivation for re-introduction through consultancy and trials in establishment methodology. To improve skills on island through training programmes. To disseminate results and publicise the conservation work of the Seychelles and Darwin support through the Eden Project.

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

A new project.

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?

Links with the Seychelles have been established since the mid 1990s through the University of Reading School of Plant Sciences where Dr Kendle has been supervisor of a project to develop a management plan for sustainable use of Coco de Mer with the National Parks Section. Links with the Eden Project evolved when Eden identified the conservation of island endemics as one of the priority themes for showcasing within its educational and public understanding programme.

The proposal to develop the Biodiversity Centre of the Seychelles represents a major leap forward in the infrastructure of plant conservation on the islands, but through our collaboration we have identified areas where support and the input of external skills and expertise are needed in order to fulfil its potential, notably propagation of endemics, effective nursery production of plants suitable for establishment in degraded conditions and trials of establishment techniques. The island is clearly not using the most effective or up to date methodology (such as new nursery container design to minimize root spiraling etc.); the scope for identifying low cost but efficient and effective improvements to techniques and supporting skills development is clear.

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

The Seychelles is fully committed to conserving through *ex*- and *in-situ* programmes their endemic plants. Seychelles conservation staff have recognised the difficulties in propagation and re-establishment of some endemics species; some of the plants have achieved almost legendary status amongst conservationists because of their difficulty, such as the Coco de Mer (*Lodoicea maldivica*), which is specifically mentioned in the RHS Dictionary of Horticulture because of the challenges of germination.

As with many small island states, the Seychelles has a global responsibility for biodiversity conservation, with many endemic species of outstanding international scientific importance, but an extremely limited internal capacity to meet that obligation. The Seychelles has demonstrated its commitment to conservation through its investment in a new biodiversity centre including the establishment of seed bank and nursery facilities for maintenance of the *ex-situ* collection. The National Biodiversity Strategy and Action Plan for the islands identifies the need for *ex-situ* care and recovery of endemic populations. This project is targeted to provide the necessary expertise and experimental support to ensure that these goals are successful. The staff have already had training in seed collection and seed bank management techniques.

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

The Seychelles were the second country to sign the Biodiversity Convention. The need for these activities is identified in the National Biodiversity Strategy and Action Plan of the Republic of Seychelles (developed in accord with Article 6 of the Biodiversity Convention). *Ex-situ* propagation of threatened species is addressed in Article 9 and staff training in recovery planning and horticultural techniques in Article 12.

All plant materials exchange with the UK will be carried out in strict accordance with the Convention. The ethos of the project is strongly rooted in the concept of benefits sharing.

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 is a collaborative project linking UK expertise with conservationists in the Seychelles. The Seychelles islands have endemic biodiversity of outstanding importance. Their extreme isolation and age (they are remnants of Gondwanaland) and unusual geology (they are the only granitic island group in the world) make them unique. Approximately 35% of indigenous angiosperms are endemic, there are 12 endemic genera and one endemic family (Medusagynaceae). There are 6 monospecific palm genera including the coco de mer (*Lodoicea maldivica*). The Seychelles have been recognised as a Centre of Plant Diversity (Site IO3, Davis, Heywood and Hamilton Centres of Plant Diversity 1994). The native lowland forests have been largely cleared and upland forests are threatened by invasive species and other forms of degradation.

This project provides the opportunity for carefully targeted UK expertise to make a fundamental and long-term contribution to the conservation of the flora. The input will have a lasting benefit and influence on conservation practice.

The study will of course be advertised as a Darwin project and accompanied by the logo in all material produced, including the electronic database and manuals, both in the UK and within the Seychelles. The Eden Project is committed to the concept of Public Understanding of Science and to effective communication of issues related conservation and sustainable development. The progress of this research will therefore be disseminated widely through the electronic and published output of Eden for public through to academic audiences. There will also be media coverage in the Seychelles.

The Darwin support will also attributed within the oceanic islands displays of the Eden humid tropics biome which will focus on a display of Seychelles endemic species and the conservation efforts to maintain them. This display will have a projected 750 000 visitors per annum and will also feature in TV programmes and other outputs of Eden.

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

Collation of known propagation experience for 100% of endemics or their nearest researched taxonomic group (UK).
Peak workload April 2001- April 2002, continued monitoring for duration of the project.

Consultant review of propagation methodology for species where current protocols are not well established (Seychelles)
June 2001- August 2002
Output 8: 8

Trials of improved propagation methodology (UK and Seychelles)
July 2001-November 2002

Preparation of database of propagation protocols for 90% of endemic flora (UK)
First draft November 2001, revised throughout project.

Electronic publication of same (UK)
First draft May 2002, revised version Feb 2003, ongoing afterwards.
Output 12A: 1

Paper publication of same (Seychelles)
April 2003.
Output 9: 1 report covering 70 species. Output 11a 4

Consultant review of nursery practice for preparation of plants focused on *in-situ* recovery in degraded conditions (Seychelles, supported by UK lit review)
June 2001- August 2002
Output 8: 8

Trials of improved nursery practice (Seychelles)
July 2001-November 2002

Preparation of handbook of best nursery practice (UK)
Jan 2003

Electronic publication of same (UK)

Jan 2003

Paper publication of same (Seychelles)

April 2003.

Output 9: 1 report covering 70 species. Output 11a: 3

Review of establishment methodology in species recovery programmes (Seychelles, supported by UK lit review).

June 2001-August 2002

Output 8:6

Establishment of trials in improved methodology and monitoring programme

Jan 2002 and ongoing

Output 22: 8

Preparation of handbook of best establishment practice (UK)

Jan 2003

Output 9: 1 report covering 70 species. Output 11a 2

Training of *ex-situ* and *in-situ* staff on Seychelles.

May and September 2002

Output 6A: Formal training 12 people, 2 weeks training each. Informal training through partnering scheme - 24 weeks total for min. 2 people each week.

Training of staff from Seychelles in the UK.

June 2001 and June 2002

Output 6A: 2 people, 2 weeks each.

Dissemination of project work through Eden Project facilities

Commencing June 2001, ongoing for duration of project.

Output 15A. Press release Seychelles 4. National UK 2 Local UK 4. Output 16A Newsletter UK 5000 (Friends and links of Eden). Output 18A Seychelles 1. UK National 1, UK local 4. Output 19A Seychelles 2. UK National 2, UK local 6.

Others include web site, electronic publication and the on-site interpretation of the Eden Project displays.

Non Darwin financial contribution: £38200 excluding indirect project dissemination and promotion costs, public understanding of science programme etc.

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

There is no coherent programme of similar work taking place with regard to Seychelles endemic plants, other than that coordinated through the partner organisations for this project.

Expertise has developed in the propagation of a few specific Seychelles endemics in scattered botanic gardens around the world. For example the Botanic Garden at Nancy has some success at propagating *Medusagyne*. One of the goals of this project is to identify and collate this scattered expertise and provided a coherent repository for updating this information.

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.

All consultancy input into the development of propagation methodology, nursery best practice and establishment methodology will involve partnering UK and Seychelles staff so that this review represents informal training and development leading to improvement in skills on island – 24 weeks of informal contact allowed for.

The project includes two formal one-week training courses in the Seychelles to brief local staff of the Ministry of Environment and Transport and the Ministry of Education in the techniques of propagation and young plant management. Consultation with the Ministries involved has allowed us to identify that there will be a minimum of 12 attendees on these courses. Evaluation of the skills learnt will be through a practical workshop. This is not intended as 'assessment for its own sake', but rather to allow the trainers to identify the areas where more support is needed.

Provision is made for two key members of staff from the Seychelles, one representing the biodiversity nursery and one representing the species recovery team, to spend a training period of 3 weeks in the UK becoming more practised in these skills. They will be hosted in the Eden Projects's own nursery in Saint Austell. These staff will be able to maintain the impetus of skills development on the islands.

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

The trainees will remain members of the wider conservation teams in the Seychelles government. The long-term benefits of the training programme will be assessed through a staff appraisal scheme.

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 Seychelles has instigated projects to maintain and cultivate *ex-situ* populations of endemic plants, and to undertake species recovery and restoration programmes. The grant bid is intended to provide expertise to bridge through a vulnerable start-up period where it is apparent that on-island skills need enhancement.

After the support of the Darwin Award the programmes will continue with the full support of the Seychelles government, the exit strategy is therefore already established, but we will have left a robust framework of information and improved skills on which their planned programmes can build. The Eden Project will continue to highlight the need for continued scientific support for conservation.

The Eden Project is keen to ensure that ownership of this work rests with the Seychelles staff, but we recognise the limitations that sometimes plague small island states. We will therefore maintain a permanent mirror of the propagation database and good practice handbook in an electronic form on our web site.

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?

The project will be monitored in the UK by a Project Review Team comprised of Dr Kendle of Eden Project and two assessors external to the project team, Professor Sir Ghillean Prance and Dr Tim Upson of Cambridge Botanic Gardens and in the Seychelles by the Principal Secretary of the Ministry of the Environment.

All training programmes will be evaluated through formal student feedback but also through practical workshops where the effectiveness of information transfer is assessed.

The immediate targets are clear. The number of endemic plants for which there are satisfactory and reliable propagation protocols will be constantly monitored and updated information published. There can be no commitment to identifying propagation needs for all endemic species as some are bound to prove intractable, but we have set a target of 90%. Where reliable techniques can not be determined for some species this will act as a focus for further research, so it is important that good records are maintained of unsuccessful propagation techniques as well as successful.

A database will be maintained of the research results, and this will be published in the form of a propagation handbook, a handbook of best nursery practice, a handbook of best practice in establishment and, where appropriate, academic papers wherever the trials result in significant advances in methodology. Because small island states often lack the infrastructure necessary for effective storage and dissemination of published material the handbook will be maintained in an electronic form in the UK, updated as and when new information is available, which will be published in PDF format on the Eden Project web site and in paper form for dissemination in the Seychelles.

The ultimate clients of the research are the National Parks unit responsible for species recovery programmes; their participation in the project is essential to provide the specifications for the propagation work.

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
<p>Goal</p> <p>To bridge gaps in biodiversity protection methodology and practice in the Seychelles by solving key technical problems, information retrieval and developing skills.</p>	<p>Identification of numbers of species for which successful propagation protocols have been identified, and ones for which further research is required.</p> <p>Availability of published information.</p> <p>Improved staff skills and performance.</p>	<p>Data and evidence reviewed by Project Review Team, external assessors and Principal Sec.</p> <p>Research data on species-specific propagation protocols.</p>	<p>The continued commitment of the Seychelles government to the National Biodiversity Action Plans, the Biodiversity Centre and the species recovery programmes.</p>
<p>Purpose</p> <p>To produce protocols for effective propagation and nursery culture suitable for recovery programmes for 90% of the Seychelles endemic flora and to build skills and capacity to manage these programmes.</p>	<p>Identification of protocols for successful propagation</p> <p>Identification of system for staff review and support</p> <p>Identification of successful management programmes</p>	<p>Results of literature review, expert advice and data from propagation trials.</p> <p>Feedback from management staff and results of staff evaluation.</p>	<p>Continued commitment of the Seychelles Department of the Environment to resourcing the propagation programme and ongoing staff and management review procedures.</p> <p>Appropriate strategic management skills in the research and consultancy team.</p>
<p>Outputs</p> <p>Database of propagation protocols for 90% of endemic flora, incorporating review of known success and species recovery procedures for the endemic flora and results of trials on propagation methods.</p> <p>Handbook of best nursery practice.</p> <p>Training courses.</p> <p>Trials on species establishment.</p>	<p>Compilation of database.</p> <p>Publication of the Best Practice Handbook.</p> <p>Running training courses.</p> <p>Completion of species trials.</p>	<p>Data collected for 90% of endemic flora.</p> <p>Distribution records and user feedback for Handbook.</p> <p>Training course evaluation.</p> <p>Collection of research data from species trials.</p>	<p>Continued commitment of the Seychelles National Parks Section and the Botanic Garden to the propagation and species recovery programme.</p> <p>Appropriate production skills in the research and consultancy team.</p>
<p>Activities</p> <p>Collation of known propagation experience for 100% of endemics.</p> <p>Consultant review of propagation practice</p> <p>Trials of improved propagation methodology.</p> <p>Preparation and publication of database of propagation methodology.</p> <p>Consultant review of nursery practice.</p> <p>Preparation of handbook of good practice.</p> <p>Initiation of trials of nursery techniques and establishment methodology in species recovery programmes.</p> <p>Training of ex- and in-situ staff on Seychelles.</p> <p>Training of team leaders from Seychelles in the UK.</p>	<p>Collated information on propagation techniques for endemics.</p> <p>Technical review of propagation methods.</p> <p>Instigation of trials of improved propagation techniques.</p> <p>Review of current nursery practice.</p> <p>Production of Good Practice Handbook.</p> <p>Initiation of nursery trials.</p> <p>Conducting training programmes.</p> <p>UK based training for Seychelles staff.</p>	<p>Literature review & expert advice.</p> <p>Research data collected from nursery and site trials.</p> <p>Information & expertise from Seychelles staff.</p> <p>Data collected from current nursery practice in the Seychelles.</p> <p>Feedback from participants of training programmes.</p>	<p>Continued commitment of the Seychelles National Parks Section and the Botanic Garden to the need for external support and ongoing staff development.</p> <p>Appropriate technical skills in the research and consultancy team.</p>