



Submit by 13 January 2006

DARWIN INITIATIVE APPLICATION FOR GRANT ROUND 14 COMPETITION:STAGE 2

Please read the Guidance Notes before completing this form. Applications will be considered on the basis of information submitted on this form and you should give a full answer to each question. Please do not cross-refer to information in separate documents except where invited on this form. The space provided indicates the level of detail required. Please do not reduce the font size below 11pt or alter the paragraph spacing. Keep within word limits.

1. Name and address of organisation

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| Name: Royal Botanic Gardens, Kew | Address: The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB |
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2. Project title (not exceeding 10 words)

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| Habitat Restoration and Sustainable Use of Southern Peruvian Dry Forest |
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3. Project dates, duration and total Darwin Initiative Grant requested

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|--------------------------------------|---------------------------|-------------------------------------|----------------------------|-----------------------------|------------------|
| Proposed start date: May 2006 | | Duration of project: 3 years | | End date: April 2009 | |
| Darwin funding requested | Total £ 198,214 | 2006/07 £ 68,198 | 2007/08 £ 63,095 | 2008/09 £ 66,921 | 2009/2010 |

4. Define the purpose of the project in line with the logical framework

The project, due to be launched during the UN *International Year of Deserts and Desertification* (2006), aims to develop and promote effective techniques for **habitat restoration and sustainable use of threatened native dry forest in southern Peru**. This will make significant contributions to desertification control, biodiversity conservation and improvement of local livelihoods in the region.

The desert coast of Peru, which supports the majority of the country's population, is widely recognised by relevant stakeholders (including Government bodies, NGOs and local communities) to be undergoing rapid environmental deterioration, desertification and biodiversity loss. On the southwest coast the situation is particularly critical, exacerbated by several years of drought. The *Prosopis* (Huarango) dry forests, essential to local livelihoods for at least 4,000 years (providing food, forage, fuel, timber and crucial ecosystem services), have been depleted almost to the verge of extinction. Remaining relics provide key refuges for biodiversity including the endemic Slender-billed finch *Xenospingus concolor* (IUCN – vulnerable).

This project contributes to three of the Darwin Initiative's priority areas – **training, research and education/awareness**:

- Strengthening local/national **capacity** for applied biodiversity research;
- Developing and disseminating **technology** for **habitat restoration** to protect biodiversity and combat desertification;
- Increasing **understanding** of dry forest ecosystem dynamics and biodiversity;
- Evaluating the capacity for increased production of native forest products (*Prosopis* pod flour and syrup) as **sustainable economic options** for forest use, and promoting wider uptake;
- **Protecting biodiversity** of remaining native forest relics by buffering with restored habitats;
- Raising **awareness** of the importance of south coast dry forests and associated biodiversity, resource values, threats and management strategies.

5. Principals in project. Please provide a one page CV for each of these named individuals

| Details | Project Leader | Other UK personnel (working more than 50% of their time on project) | Main project partner or co-ordinator in host country |
|---------------------|-------------------------------------|---|--|
| Surname | Milliken | Whaley | Reynel |
| Forename (s) | Dr William | Oliver Quentin | Dr Carlos |
| Post held | Head of Tropical America Section | Honorary Research Associate | Head of Forestry & Biodiversity |
| Institution | Royal Botanic Gardens, Kew | Royal Botanic Gardens, Kew | Universidad La Agraria, La Molina |
| Department | The Herbarium | The Herbarium | Forestry |

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

The Royal Botanic Gardens, Kew has received seventeen grants from the Darwin Initiative since 1992.

7. IF YOU ANSWERED NO TO QUESTION 6 describe briefly the aims, activities and achievements of your organisation. (Large institutions please note that this should describe your unit or department)

Aims (50 words) N/A

Activities (50 words) N/A

Achievements (50 words) N/A

8. Please list the UK (where there are partners in addition to the applicant organisation) and host country partners that will be involved in their project and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development. What steps have been taken to ensure the benefits of the project will continue despite any staff changes in these organisations? Please provide written evidence of partnerships.

Project partners in Peru provide a wide range of relevant expertise and capacity for local/national impact on biodiversity research, conservation, legislation, dissemination, education and sustainable use of biodiversity:

- *Universidad Nacional Agraria, Facultad de Ciencias Forestales, La Molina (MOL), Peru (Dr Carlos Reynel and 2 postgraduate students).* Involved in research, feasibility study and project planning over the last 4 years. Will: (i) supervise and engage in habitat restoration programme; (ii) undertake background biodiversity studies and monitoring; (iii) act as principal liaison point with INRENA.
- *INRENA (Instituto Nacional de Recursos Naturales): focal point for United Nations Convention to Combat Desertification (UNCCD and CBD).* Has helped develop and will supervise the project, advising on UNCCD and assisting in project's integration into national strategies and legislative framework.
- *Universidad San Luis Gonzaga de Ica (UNICA), Peru (Dr Felix Quinteros and 2 undergraduate students).* Has been closely involved with project planning since 1998. Will: (i) take responsibility for development and supervision of the 2 tree nurseries; (ii) identify and record *Prosopis* land race individuals for seed selection; (iii) help develop education project for children.
- *GAP - Grupo Aves del Peru (Oscar Gonzalez).* Developed the ornithological component and conducted initial reconnaissance. Will: (i) monitor avian biodiversity and population dynamics of restoration areas over the 3 years, advising on habitat requirements; (ii) publish data in scientific peer-reviewed journals and the Darwin Net CDM; (iii) oversee training of local students, communities & landowners.
- *Productos Ecológicos de Samaca (Alberto Benavides).* Has been involved with the project concept development since 1996. Will: (i) help supervise production of pod (*Prosopis pallida*) flour and syrup; (ii) undertake market research and product marketing; (iii) facilitate organic certification (from BioLatina); (iv) provide office and logistical support in Ica.
- *Asociación Cultural Nasca (Olivia Sejuro Nanetti).* Has been campaigning locally for forest conservation and organising cultural events since 1982 and involved in project development since inception. Will organise the project's local Huarango cultural events and workshops.
- *ANIA - Asociación para la Niñez y su Ambiente – Programa Bosques de los Niños (Joaquin Leguía).* Recently involved in project planning. Will assist in education, capacity building and legal designation and representation for management of forest restoration areas as *Bosques de los Niños* with local school children.

- *DarwinNET and CONAM (Consejo Nacional de Medio Ambiente)*: Have advised on project development in recent months and will assist under the CHM with online publication and dissemination of results.
- *SPDA - Sociedad Peruana de Derecho Ambiental – Programa de Asuntos Internacionales y Biodiversidad (Pedro Solano)*. Will assist in legal advice on the site designation and government/landowner liaison with INRENA.

Circumstances requiring staff changes will result in swift appointment of suitable replacements facilitated by strategic arrangements for transfer of project data and responsibilities. To assist this, the project will establish clear data sharing and management systems from the outset.

NB – Supporting letters for all partners are included in Annex 1.

9. What other consultation or co-operation will take place or has taken place already with other stakeholders such as local communities? Please include details of any contact with the government not already provided.

The project concept has been developed through a series of discussions and consultations with many community groups, mayors, landowners and local subsistence farmers during 10 years of collaboration in the region (including historical ecology research with Cambridge University, and workshops). During this period excellent working relationships have been formed with a wide range of organisations, providing a strong foundation for development of project activities. Local stakeholder groups, including *Club de Madres* and *Santa Rosa School Parcona* in Ica, *Asociación Cultural Nasca*, *Nasca Asociación Civil* and ex-charcoal burners and small communities on the Ríos Ica, Grande and Poroma (Nasca), have strongly supported project development and will be fully engaged as project partners.

Recent discussions with local landowners (Municipality of Ica – see Annex 1) have secured provisional allocation of land for the project's habitat restoration trials, and commitments to addressing forest conservation and desertification issues in the region. These include an association of large agricultural producers, which is keen to collaborate with the project, and farmer managers who have requested advice on habitat restoration as shelter belts, wildlife corridors and biological control habitats. This demonstrates local demand for planned project outputs, and scope for immediate application on a larger scale.

Discussions with INRENA (the national government agency responsible for natural resources), CONAM and SPDA have clarified land ownership and initiated the process of officially designating the largest Huarango forest relic as a conservation area. This will help to strengthen and consolidate action on a national scale and prepare the local context for project development. These organisations have agreed to advise the project on legislative matters and provide educational capacity building. *Gerencia de Recursos Naturales del Gobierno Regional de Ica* (responsible for regional natural resource management) has offered support for the project, and the Municipal authority has offered to designate the remaining area of forest in the city as a reserve and education forum. Through its community-based work programme, stakeholder workshops and awareness-building programme, the project will continue dialogue and interaction with all groups.

PROJECT DETAILS

10. Is this a new initiative or a development of existing work (funded through any source)? Are you aware of any other individuals/organisations carrying out similar work, or of any completed or existing Darwin Initiative projects relevant to your work? If so, please give details explaining similarities and differences and showing how results of your work will be additional to any similar work and what attempts have/will be made to co-operate with and learn lessons from such work for mutual benefits.

This is a new initiative that has recently been strengthened by the acquisition of seed funding for a feasibility study. Initiated in November 2005 (ending March 2006), this is focusing on preparing the ground for the development of project activities through local consultation (identification of current priorities and principal partners), collaborative planning and the establishment of working agreements. This has resulted in the commitment of land for the establishment of a tree nursery and restoration trials, strategic proposals for product development and marketing, and progress towards designation of a core conservation area of relic Huarango forest.

Within the regional context, the Comision de Derechos Humanos de Ica (CODEH-ICA) has applied for funding to begin a large agroforestry project in the area. We have been requested to provide technical advice for the inclusion of native species, and have discussed strategies for providing learning outcomes that will contribute to their plans for

establishment of biodiversity corridors (thus maintaining the ecological role of natural riparian oasis habitat) and inclusion of socio-economic benefits.

The Tumbesian dry forest region (N Peru and SE Ecuador) is the focus for DarwinNet (Darwin Project 13006), which provides bulletins serving local communities and stakeholders in the dry forests of Northern Peru. The project will contribute new information for southern Peru and create an impetus for a regional CHM node (provisional agreements in place). DarwinNet will also provide a valuable portal for sharing project information on biodiversity, habitat restoration, *Prosopis* forest products and their marketing. The Algarrobita Project (*Naturaleza & Cultura Internacional*) is developing sustainable co-operative models for *Prosopis* forest products in northern Peru, and has provided advice on project development. Agreements have been put in place for information sharing and reciprocal capacity building. Contact will also be established with ongoing Darwin projects working on related issues in the region (e.g. 13005 Awacachi Corridor), to maximise uptake and sharing of relevant information, methodologies and lessons.

11. How will the project assist the host country in its implementation of the Convention on Biological Diversity? Please make reference to the relevant article(s) of the CBD thematic programmes and/or cross-cutting themes (see Annex C for list and worked example) and rank the relevance of the project to these by indicating percentages. Is any liaison proposed with the CBD national focal point in the host country? Further information about the CBD can be found on the Darwin website or CBD website.

The project will assist Peru in meeting cross-cutting CBD themes including Forest Biodiversity, Sustainable Use of Biodiversity, Protected Areas, Public Education and Awareness, and Traditional Knowledge Practices. Direct contributions to Peru's capacity to implement the CBD will draw on its strong, applied focus on *in situ* conservation and monitoring of fragmented dry forest habitats (Article 8 – 30% and Article 7 – 5%) and sustainable use (Article 10 – 20%). The collaborative research and training programme, including integration of traditional knowledge into applied project activities (Article 8j – 5%) will develop understanding of threatened Peruvian biodiversity whilst building capacity for further research in the country (Article 12 – 5% Article 5 – 5% and Article 18 – 10%). The inclusion of a substantial local and national dissemination and outreach component, including schools programmes, community workshops and engagement of children in forest restoration, will make a significant impact on public education and awareness (Article 13 – 15%), both within Peru and internationally (Article 17 – 5%).

Contact has been established with the local focal point for the CBD and UNCCD (Leoncio Álvarez Vásquez, INRENA). In addition to the impacts described above, the project's work towards conservation of ancient *Prosopis* individuals, locally understood to be the remnants of original landraces, will address the Agricultural Biodiversity theme. Meanwhile, building visitor experience and appreciation of the environmental context of the Ica and the World Heritage Site of Nazca Lines will address the Biodiversity and Tourism theme.

12. How does this project meet a clearly identifiable biodiversity need or priority defined by the host country? Please indicate how this work will fit in with National Biodiversity Strategies or Environmental Action Plans, if applicable.

Coastal forest has been clearly identified as a major biodiversity conservation concern in Peru, where 65% of the population inhabit the coastal zone. In recognition of this, INRENA adopted a conservation plan to address coastal deforestation and desertification at the UN Convention to Combat Desertification (2002), and supports the role of the project in this context (see Annex 1). Furthermore, the Huarango forest of Ica is considered so important that Juan de Dios Ramirez Canchari (Congress representative for Ica) has proposed a law specifically to protect it (Proyecto de Ley del Congreso No. 04377 Huarango Patrimonio Ecológico del Peru).

The Project will work alongside CONAM (the government authority charged with protection of the environment and sustainable development) and the Regional Government of Ica (see Annex 1), providing information for the national and regional clearing house mechanisms. In CONAM's 2002-2004 regional strategic plan for sustainable use and conservation of biological resources in Ica and Nasca (subsequently assumed by the Regional Government Agency of Natural Resources), forest resources were identified as the main future priority. The action plan emphasised the need for the following four actions: evaluation of forests; dissemination and control under existing regulations; campaign of reforestation and promotion of alternative forest use. CONAM's regional plan also included 'education of environmental culture to promote a sustainable vision for the region with participation and events to disseminate the environmental message'. All of these priority issues will be directly addressed by the project, and our close collaborative arrangements with key regional and national players will help to ensure that project outputs remain aligned with identified needs.

The project is driven by local as well as national needs, and its development has been given impetus by increasingly vehement calls from local communities and the media (including regular articles in *El Comercio*) to address deforestation, loss of biodiversity and desertification in the region.

13. If relevant, please explain how the work will contribute to sustainable livelihoods in the host country.

The native Huarango forests of southwest Peru have provided vital resources for local communities for over 4,000 years. Thanks to its deep root system, Huarango is capable of producing subsistence food even when there is insufficient river water from the Andes for other crops. The pods are rich in valuable proteins, carbohydrates, minerals and vitamins, and a single 10-year-old tree can produce 30 kg of pods per year. As well as furnishing important sources of food, fodder and timber, these forests play vital roles in controlling desertification and maintaining local biodiversity.

Desertification, exacerbated by forest clearance for intensive agricultural land, groundwater pumping and charcoal burning, is having a significant impact on the livelihoods of communities in the Ica and Nasca basins through the loss of productive land. By addressing these issues through the development of habitat restoration techniques and permanently protected trials, this project will have a direct impact on sustainable livelihoods. The project will also work with local communities to evaluate and promote the development of sustainable forest products. Huarango flour (manufactured from sun-dried pods) is easily harvested, processed and marketed. Production of Huarango syrup will be trialled on a smaller scale, using invasive (fast-growing) *Tamarix* wood as fuel. Initial market research has indicated that demand for Huarango flour and syrup currently exceeds supply, and provisional agreements have been reached to supply six outlets in Lima under the known label *Samaca Productos Ecológicos* (with Darwin logo).

The tree nursery will produce saplings from highly productive ancient Huarango trees selected for their productivity, helping to ensure that reforestation initiatives ultimately yield productive forests whilst ensuring conservation of an important genetic resource. Other native species within these ecosystems offer potential for supporting livelihoods and providing economic returns, including wild tomatoes (*Solanum* sp.), jam berries (*Lycium* sp., *Galvesia* sp.), dyes (*Indigofera* sp.) and cactus fruits (e.g. *Neoraimondia* sp.). The project will incorporate these into its experimental habitat restoration regimes.

14. What will be the impact of the work, and how will this be achieved? Please include details of how the results of the project will be disseminated and put into effect to achieve this impact.

The project's impact will draw on its strong focus on locally identified priorities, and on the development and dissemination of appropriate solutions:

Increased understanding and awareness of the biodiversity and importance of fragmented *Prosopis* woodlands, and **increased national/local capacity for biodiversity research**, will be achieved through a programme of research and dissemination/interpretation including inventory, mapping, monitoring, and ecological studies. This will be undertaken by specialists and undergraduate/postgraduate students from local/national universities, supported by Kew expertise, with the involvement of local community members. The research process will involve a significant training element, contributing to the development of Peru's research capacity for biodiversity research. Results will be disseminated through local educational events and materials (one school with whom collaborative plans have been discussed, Escuela Daniel Merino, Tinguina, has 3,500 pupils), scientific papers, the project website and international databases.

Increased capacity for habitat restoration and desertification control will be achieved through experimental habitat restoration. Trial sites have been identified and agreements reached with the landowners. The project nursery will propagate *Prosopis* trees and other native dry forest species for use in restoration trials. Workshops run by the Millennium Seed Bank Project (Kew) and MOL will provide training for germination/propagation techniques and seed storage. The habitat restoration manual (in Spanish), together with journal and online publications, will provide significant and novel contributions towards local/national capacity for biodiversity and habitat restoration. Sites for restoration have been selected to maximise awareness-raising and education for sustainable use and conservation of dry forest biodiversity. Four sites have been selected: two in the Ica region and two in the Nasca watersheds.

Protection of remaining fragments of *Prosopis* woodland and preservation of ancient *Prosopis* landraces will be

achieved by establishing restoration areas as buffer zones around the largest surviving area of native woodland (Nasca). The paperwork and management plan for a Concession for Conservation are presently being prepared for this (state-owned) area, and the project will contribute to the ratification process. The project had been designed to encourage and propagate the concept of **wildlife corridor regeneration** through private farms. The positive outcomes of decreased desertification, soil conservation, increased biocontrol and sustainable forest use have been discussed with landowners, who are keen to put into practice the techniques developed during the project. Undergraduates from the University of Ica will survey ancient *Prosopis* 'heritage trees' in the area, which will be marked with plaques (endorsed by councils, schools, haciendas and local individuals) and their seeds propagated in the project nursery.

By evaluating and promoting development of economically viable, **sustainable forest products** from the project area (see Question 13) the project will have an impact both on livelihoods and forest management practices. This work will be undertaken by local community members, trained in relevant techniques. Targeted market research, conducted by *Samaca Products*, will inform the development of market development strategies. Results of these trials will be disseminated via a practical, Spanish-language Huarango production manual, as well as workshops and events (below).

Additional activities such as the annual Huarango festival (organised by Escuela Libre de Puerto Huamani and Asociación Cultural Nasca), together with radio shows, newspaper articles, posters, leaflets, workshops and other awareness raising events, form a crucial part of the dissemination strategy, complementing the practical manuals and scientific outputs. Wider, long-term uptake of the lessons, experiences and procedures derived from the Project will be promoted through a range of portals including the DarwinNet and project websites.

15. How will the work leave a lasting legacy in the host country or region?

The project will leave a legacy of improved capacity (local and national) for research and sustainable development, technological advances in biodiversity management and utilisation, heightened awareness of key issues, and development of sustainable livelihoods. These offer long-term benefits, both for the region and the country, and various measures have been taken to ensure that this legacy is a lasting one. These include: high levels of community involvement; a strong training and capacity building element (including UK expertise in vegetation research, Huarango ecology, habitat restoration, nursery commercialisation, seed management and NTFPs); active development of local project ownership and awareness; a focus on practical, locally appropriate outputs designed for wider uptake; teaching of teachers; involvement and empowerment of children; information exchange and experience sharing with other projects and bodies; establishment of long-term conservation/management agreements, and a strong exit strategy (see Question 16).

By working directly with appropriate government organisations on the development of mechanisms and strategies for environmental restoration, desertification control and biodiversity conservation, we aim to influence relevant areas of policy and practice beyond the lifetime and geographical scope of the project. In addition, the project will work to raise additional funds and establish frameworks for the continuation of project activities beyond the three years of Darwin funding (see Question 25). This is particularly significant considering the intrinsically long-term nature of habitat restoration and environment.

16. Please give details of a clear exit strategy and state what steps have been taken to identify and address potential problems in achieving impact and legacy.

One of the primary objectives of the recent feasibility study was to identify key issues surrounding project sustainability and, through discussions with relevant stakeholders, to develop mechanisms and arrangements to overcome them. Particular issues faced by the project include the long-term nature of habitat restoration trials, and the inherent difficulties of guaranteeing sustainability and long-term economic viability for non-timber forest product initiatives.

Most importantly, this project has been designed to work in partnership with a wide range of local stakeholders to establish clear evidence for the environmental, social and economic benefits of biodiversity conservation and sustainable management, and appropriate mechanisms to achieve this. Long term impact and legacy depends on successful engagement, capacity building and awareness-raising in order to influence practice beyond the lifetime of the project, and successful dissemination strategies to attain a wider outreach. In order to achieve this we have adopted a strongly collaborative approach from the planning stage, involving a team of local and national organisations/projects with complementary, multi-disciplinary skills including research, conservation, community and social relations, education,

environmental management, policy development and marketing, supported by appropriate UK expertise.

To help guarantee the long-term viability of the restoration areas established by the project, two will be designated (in perpetuity) as Areas de Conservación Privada (ACP). This has already been agreed by landowners who have offered to make their land available (see supporting letters). Through our work with ANIA, we will transfer responsibility and capacity for the long-term management of a further two restoration areas through the *Bosque de los Niños* programme. This will involve the development and implementation of management plans in collaboration with local school children, promoting a strong sense of ownership and relevance. Long-term (post-project) monitoring of regeneration and biodiversity conducted by MOL will provide another mechanism for timely identification of management issues.

It is intended that the tree nursery be established as a going commercial concern at the end of the project, managed by UNICA. Economic viability of seedling production will be assessed throughout the lifetime of the project, and management regimes adjusted to maximise efficiency. Meanwhile the project will work with its partners to develop markets for native tree seedlings in the region, partly through the establishment of supply agreements with agricultural producers and programmed agroforestry initiatives (see Question 9).

The project will work with the local community towards the establishment of a co-operative for the production of *Prosopis* pod products. Two families involved in restoration trials will be trained and able to train others in the necessary skills, including basic accounting, processing and production, packaging and market supply. Where possible, formal agreements to supply fixed quantities of *Prosopis* products will be established with a range of outlets, and income derived from the products during the project lifetime will be reinvested in equipment for co-operative use. We aim to maximise the likelihood of long-term success by marketing the products in partnership with existing local businesses, adding value through organic certification and developing new market options (e.g. the adjacent World Heritage Site of The Geoglyphs of Nasca and the Pampas of Jumana). However, it is recognised that the viability of establishing a cooperative is unpredictable, and fallback agreements have been established whereby custodianship of the equipment purchased by the project could be transferred to UNICA for ongoing use by the local communities.

17. How will the project be advertised as a Darwin project and in what ways will the Darwin name and logo be used?

The project will provide a range of opportunities for displaying the Darwin name and logo, and for raising local, national and international awareness of the Initiative and its role, including: (i) project publications (manuals, leaflets and other dissemination outputs); (ii) educational products and public awareness campaigns through local and national media; (iii) reserve billboards and tree plaques; (iv) Huarango festivals; (v) project product labelling; and (vi) the project website.

18. Will the project include training and development? Please indicate who the trainees will be and criteria for selection and that the level and content of training will be. How many will be involved, and from which countries? How will you measure the effectiveness of the training and will those trained then be able to train others? Where appropriate give the length and dates (if known) of any training course. How will trainee outcomes be monitored after the end of the training?

The Project includes a substantial training element for Peruvian personnel (at least 104 individuals). Two **postgraduate students** from Universidad Agraria La Molina will be contracted for biodiversity and restoration studies, selected by Carlos Reynel on the basis of research capacity, enthusiasm and communication skills. They will remain under Dr Reynel's supervision during the first two years of the project, receiving specialist training from UK and Peruvian staff including William Milliken (vegetation survey and monitoring, NTFP management), Oliver Whaley (Huarango ecology and habitat restoration) and Oscar Gonzalez (ornithological survey and monitoring). Two **undergraduate students** from the Universidad de Ica (UNICA), selected each year on the basis of aptitude/ commitment, will undertake management of the tree nursery and landrace conservation projects. These students will be supervised by Felix Quinteros (UNICA) with specialist training and supervisory input from the UK including Kate Gold (Millennium Seed Bank Project: seed propagation, collection and storage).

Students working on the project will **pass on their acquired skills** to their successors during a hand-over and mentoring period. Effectiveness of the training will be measured against supervision reports, achievement of planned objectives, student feedback and, in the case of the postgraduate students, the achievement of Masters degrees. Much of the student training experience will be gained through direct involvement in project activities.

During specialist training exercises, **added value** will be obtained by involving additional students from relevant organisations in Peru (beyond those directly engaged in the project). Annual ornithological training and monitoring will be accompanied by volunteers from Grupo Aves del Peru (GAP), and seed propagation (years 1 and 2) by additional students from UNICA.

Two families (nine individuals) have been provisionally selected for work on the habitat restoration and sustainable product trials, partly on the basis of their proximity to the remaining forest areas and partly on their enthusiasm and suitability for the role. Practical work on project implementation will be accompanied by a combination of **short intensive courses and long-term monitoring**, advice, and collaboration. The families will be trained to train others in biodiversity monitoring, ornithological guiding and the production of *Prosopis* pod products. Educational events will provide opportunities for evaluation of the effectiveness of the training, supplemented by feedback from long-term monitoring and from the trainees themselves (all trainees attending focused training events will be requested to provide structured responses). Visits to the University of Piura's Algarrobo project and the Tamarugo project in Northern Chile will provide additional training and capacity building experience.

Finally, at least 60 **children** from schools in Ica and 15 from the local school in Rio Poroma Nasca will be encouraged to take part in restoration planting activities and provided with appropriate training. The most enthusiastic will be trained by ANIA to lead forest management activities associated with the establishment of the 'Bosques de los Niños'.

LOGICAL FRAMEWORK

| 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: <ul style="list-style-type: none"> • the conservation of biological diversity, • the sustainable use of its components, and • the fair and equitable sharing of benefits arising out of the utilisation of genetic resources | | | |
| Purpose Development and application of techniques for habitat restoration and sustainable use of native dry forest to combat desertification and conserve forest relics in southern Peru | Habitat restoration trials established and learning outcomes produced Increased local awareness of huarango conservation importance, and engagement in research and project extension Active participation of partner organisations in habitat restoration & prevention of desertification Increased understanding and uptake of sustainable options for huarango forest use Areas of restored habitat buffering forest relics | Field survey outputs and experimental monitoring reports Records of local project input/ participation; teaching records, numbers attending Agreements with partner organisations and reports of collaborative activities Local Ministry of Agriculture records; survey of huarango product producers Aerial survey and field data | Project retains support of government agencies and local communities Sustainable use trials prove attractive to local communities Climate change does not exacerbate uncontrollable desertification and drought or prevent successful restoration |
| Outputs Baseline information on biodiversity of forest fragments and degraded vegetation; use of forest resources Tree nursery and seed handling/ propagation methodologies | Research undertaken; reports and papers produced (habitat mapping, bird survey, plant survey) Minimum of 8,000 seedlings of 3 major tree species & <i>Prosopis</i> land races established yr1 & 2 | Research data and reporting; annual monitoring outputs; publication records, Tree nursery inventory and provenance records; herbarium vouchers | Permits for plant collection granted Seeds available for planting |

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| Habitat restoration trials buffering forest relics, using native species | Land use agreements and designation (ACP) signed; restoration areas established (2 yr1, 2 yr2) | Planting records & maps, 2-monthly seedling monitoring; biodiversity surveys; ratification of ACP | Land remains available for habitat restoration trials |
| Students and local land owners engaged in habitat restoration techniques & research | 2 local students & 6 landowners/yr engaged in tree nursery & plots; 2 national postgraduate students in research (yr1) | Employment and participation records; University reports and supervision | Local families remain committed to active role in project and support its aims |
| Production and processing trials and marketing of sustainable <i>Prosopis</i> pods flour and syrup | 2 pod harvest and processing/sustainability trials running (yr1); market research completed (yr2); market trials (yr2-3) | Pod production (kg) monitoring, production records, survey reports | Huarango pod harvests do not fail; market outlets continue to demand <i>Prosopis</i> syrup and flour |
| Children trained in tree planting, aftercare and habitat regeneration | 1 school actively engaged in projects in local forest relic (yr1); 10 children able to train & disseminate (yr3) | School activity records and examination results; Club de Madres feedback, interviews | School and Club de Madres remain open to participation with Bosque de los Niños |
| Information network developed for SE Peru dry forest conservation, included in CHM | Education and dissemination available online and via partners | Review/monitoring of information portals; hits to website | Existing dissemination networks remain viable |
| Increased appreciation of forest ecosystem/ livelihood value among local communities and government agencies | Stakeholder meeting and workshops (annual); Huarango Festival (annual); 10 press and radio releases; 1 poster; 1 website | Project activity and output reports; meeting minutes; workshop feedback; media monitoring | Project partners and CONAM (as above) remain committed |
| Manuals for habitat restoration in dry forests and sustainable production of <i>Prosopis</i> pod products | 2 Illustrated manuals produced and distributed (sustainable production yr2, restoration yr3) | Publication and distribution records; independent review of uptake and feedback | N/A |
| Activities | Milestones | | |
| Fieldwork and baseline research/ monitoring | Fieldwork completion & reporting of plant diversity and vegetation mapping of forest relics targeted for buffering with habitat restoration (yr1); report of avian diversity and forest use (yr1). Development of monitoring indicators (yr1); annual biodiversity monitoring (yr1-3). | | |
| Establishment and management of tree nursery | Seed storage and germination evaluation (May 2006); seed selection with provenance records mapped and databased, herbarium vouchers lodged with La MOL and SLGI (July 2006 and following yrs); tree nursery constructed & nursery staff contracted (Jul 2006); 8,000 seedlings of 3 major tree species & <i>Prosopis</i> land races established (Dec 2006 and subsequent yrs); nursery commercialisation strategy developed (yr2). | | |
| Habitat regeneration research & dissemination | Research plots identified and land use agreements established (Sept 2006); students recruited (May 2006); fencing completed (Nov 2006), planting regimes and experimental plots established (Dec 2006); plots monitored (2-monthly); final research results compiled; research publications submitted (yr3); Dry forest habitat restoration manual produced and distributed (yr3). | | |
| Local education and capacity building | Collaborative agreement established with school (Jun 2006); school activities initiated (Nov 2006 and following yrs); educational poster/leaflet produced (Mar 2007); Huarango festival (Apr 2007 and following yrs); teachers workshops held (Feb 2007 & following yrs); schools' planting and education award scheme announced (Jan 2007). Students' visit to <i>Prosopis</i> Tamarugo regeneration scheme in Chile (July 2006). | | |
| National and international education and dissemination | Project website and DarwinNet portal established (June 2006); First radio broadcast (May 2006 & min. 6 per year); first press article (May 2006 & min. 3 per year), schools education materials incorporated into CONAM and GAP educational output (Feb 2008); Website integrated to National CHM CONAM (Sept 2008) | | |
| Pod processing and sustainability research; market development | Pod processing equipment procured (July 2006); pod processing trials commence in Nasca and Ica (Apr 2007); market research commences (Oct 2006); trials initiated (Oct 2007); Huarango pod product manual produced (Jan 2009). | | |

20. Provide a project implementation timetable that shows the key milestones in project activities.

| Project implementation timetable | | |
|---|--|---|
| Date | Financial year | Key milestones |
| May 2006 | Apr-Mar 06/7 | Project steering group set up |
| May 2006 | | Project office established and equipment purchased |
| May 2006 | | First stakeholder meeting |
| May 2006 | | First press release with MoUs established in INRENA and CONAM |
| May 2006 | | Construction of nurseries initiated (1 large Ica, 1 small Rio Poroma Nasca) |
| May 2006 | | 4 Students recruited |
| May 2006 | | First radio broadcast (6 per year <i>La Hora Jamunnanta</i> and others) |
| May 2006 | | First press article (3 per year <i>El Comercio</i>) |
| Jun 2006 | | Research plots finalised and land use agreements/designation initiated |
| Jun 2006 | | Student workshop to design monitoring methodology |
| Jun 2006 | | Start of plot assessment for restoration programme |
| Jun 2006 | | Start of plot biodiversity baseline study/monitoring |
| Jun 2006 | | Agreements/timetables for schools education programme established (Bosque de los Niños) |
| Jun 2006 | | Project initiation workshop (Nasca) |
| Jun 2006 | | Project website and DarwinNet portal established |
| Jul 2006 | | Pod processing equipment procured |
| Jul 2006 | Report of Avian diversity (GAP) and forest use restoration plan | |
| Jul 2006 | Tree nursery construction complete & nursery staff contracted | |
| Jul 2006 | Seed selection; provenance records databased; herbarium vouchers lodged La MOL/SLGI | |
| Jul 2006 | Project posters and information leaflets printed | |
| Jul 2006 | Students visit <i>Prosopis</i> Tamarugo regeneration scheme in Chile | |
| Jul 2006 | Workshop (Ica) for development of monitoring indicators | |
| Aug 2006 | Project website in Spanish hosted by RBG Kew with DarwinNet portals | |
| Aug 2006 | Stakeholder meeting of project participants | |
| Aug 2006 | Start of public awareness-raising programme (run-up to festival) | |
| Sep 2006 | Completion of research plots land use agreements/designations | |
| Sep 2006 | Start of research plots planting and monitoring (monthly) | |
| Oct 2006 | Start of pod processing training (Samaca Productos); research participation initiated | |
| Oct 2006 | Market research and certification commences (Samaca Productos & BioLatina) | |
| Nov 2006 | Research plot fencing and water tanks set-up completed | |
| Nov 2006 | School activities initiated (and following yrs) | |
| Nov 2006 | Report of fieldwork; reporting of plant diversity, vegetation mapping of forest relics targeted for buffering with habitat restoration | |
| Dec 2006 | 8,000 seedlings of 3 major tree species & <i>Prosopis</i> land races established in nursery | |
| Dec 2006 | Planting regimes and 4 experimental plots fully established | |
| Dec 2006 | Submission of first research publications on desertification thresholds and indicators (In Peru, published in <i>Zonas Aridas</i> and in year following) | |
| Jan 2007 | Schools' planting and award scheme announced (Bosque de los Niños) | |
| Feb 2007 | Teachers workshops held (including ANIA training) | |
| Feb 2007 | Exchange visit to University of Piura Algarrobo project | |
| Mar 2007 | Installation of landrace plaques | |
| Apr 2007 | Apr-Mar 07/8 | Pod processing trials commence in Rio Poroma Nasca |
| Apr 2007 | | Workshop; local family training; forest protection and habitat regeneration. |
| Apr 2007 | | 1 st Huarango festival after pod harvest; radio broadcasts Huarango festival |
| May 2007 | | School talks Ica and Nasca with field-trips |
| May 2007 | | Educational poster/leaflet produced |
| Jun 2007 | | Nursery commercialisation strategy developed |
| Jul 2007 | | Workshop: local family training, forest protection and habitat regeneration. |
| Oct 2007 | | Trial marketing of <i>Prosopis</i> labelled products |
| Nov 2007 | | Annual biodiversity monitoring report |
| Dec 2007 | | Huarango pod product manual produced |
| Dec 2007 | | Second paper submitted to peer reviewed journal |

| | | |
|----------|--------------|--|
| Feb 2008 | | Schools education materials incorporated into CONAM and GAP educational output |
| Apr 2008 | Apr-Mar 08/9 | 2 nd Huarango festival (after pod harvest Easter w/e); radio broadcasts |
| May 2008 | | Beginning of procurement of funds for continuation/exit |
| May 2008 | | Workshop; local family training; forest protection and habitat regeneration. |
| Jun 2008 | | 3 rd paper submitted to peer journal |
| Sep 2008 | | Website integrated to National CHM CONAM |
| Nov 2008 | | Annual biodiversity monitoring report |
| Nov 2008 | | Final research results compiled; research publications submitted |
| Dec 2008 | | Dry forest habitat restoration manuals produced and distributed |
| Jan 2009 | | Huarango pod product manual produced |
| Feb 2009 | | Equipment made over to co-operative/University |
| Feb 2009 | | Ica tree nursery commercially registered and made over to University |
| Mar 2009 | | Final workshop |

21. Set out the project's measurable outputs using the separate list of output measures .

| PROJECT OUTPUTS | | |
|-------------------|---------------------|---|
| Year/Month | Standard output No. | Description (include numbers of people involved, publications produced, days/weeks etc.) |
| Apr-Mar 2006/2007 | | |
| | 8 | 3 UK project staff in Peru: OQW 31 wks, KG 2 wk, WM 2 wk |
| May | 15A/B/C | First local and national press releases |
| May | 14A | Methodology workshop for restoration and multiple stakeholder meeting of project participants |
| May | 4A/B | 2 Students UNICA; training/experience in nursery and seed management, germination techniques, landrace conservation - 24 wks each |
| May | 6A | 6 Landowners/employees receive training in habitat restoration with productive <i>Prosopis</i> |
| May | 6A/B | 4 GAP members trained in Avian biodiversity monitoring |
| May | 4C/D | 2 Postgraduate students Universidad La Agraria; training/experience in habitat restoration techniques & biodiversity research – 24 wks each |
| May | 12A | Employment and participation records database |
| June | 15C | National press release UK |
| July | 21 | Tree nurseries established: 1 large at UNICA; 2 small at restoration sites |
| July | 7 | Project poster and roadside signs (Spanish and Quechua), leaflets for Huarango exhibition Museo de Ica |
| July | 6A/B | 3 Nursery staff receive training/experience visit to Tamarugo project Northern Chile (7 days) |
| Aug | 15A/B | 2 Local press articles; 2 national press articles (per year) |
| Aug | [12A] | 2 Project website; RBG Kew and Peru (Spanish) including research data |
| Aug | 17B | Project data included in DarwinNet and CHM (CONAM) |
| Sep | 6A/B | 1 Teacher from project area to train with ANIA (1 week) |
| Sep | 6A/B | Tree planting, ecology & cultural use education with local school (20 pupils, 14 days) |
| Oct | 6A/B | 2 Local families trained in <i>Prosopis</i> pod flour production (3 weeks each) |
| Oct | 7 | 1 Training video; edited from filmed activities over project |
| Nov | 12A | 1 Tree nursery inventory, seed provenance (map) and landrace database at UNICA |
| Nov | 9/11A | Report of biodiversity assessments of restoration sites |
| Dec | 19C | 6 Local radio interviews/profiles per year |
| Dec | 18C | 1 Local TV report on project to highlight UNCCD year |
| Dec | 11B | 1 Paper (minimum) submitted to peer reviewed Peruvian journal (<i>Zonas Aridas</i>) |
| Dec | 22 | 4 Habitat restoration areas established with designations |
| Feb | 6A/B | Exchange/training visit of product stakeholders to Algarrobita project in Pura N. Peru (1 week) |
| Mar | 14A | Huarango exhibition; products, culture and ecology show (1 wk) |
| Mar | 7 | 1 Poster (Spanish and Quechua), for education and festival |
| Mar | 10 | 1 Annual report of biodiversity monitoring data from restoration sites |

| Apr-Mar 2007 / 2008 | | |
|---------------------|-----------|---|
| Apr | 8 4A/B | 2 UK project staff in Peru: OQW 24 wks, KG 2 wks, WM 2 wks 2 Students UNICA; training/experience in nursery and seed management, germination techniques, landrace conservation - 24 wks each |
| Apr | 4C/D | 2 Postgraduate students Universidad La Agraria; training/experience in habitat restoration techniques & biodiversity research – 31 wks each |
| Apr | 19C | Radio show to promote festival, with interview (Escuela Libre) |
| Apr | 14A/B | Huarango products workshop, families trained by Samaca products |
| Apr | 6A/B | 3 Visitors from University of Pura Algarrobita project for demonstration (5 days) |
| Apr | 23 | Sale of Huarango products (flour and syrup) estimated value equivalent to £1500 |
| Apr | 14A | 1 st Huarango festival in Nasca after pod harvest |
| May | 15A/B/C | Local and national press releases |
| May | 6A/B | 10 GAP members trained in Avian biodiversity monitoring |
| May | 6A | 6 Landowners/employees receive training in Habitat restoration with productive <i>Prosopis</i> |
| Jul | 14A | Workshop: local family training, forest protection and habitat regeneration. |
| Aug | 22 | 2 Habitat restoration areas established with designations |
| Aug | 14A | Workshop and stakeholder meeting of project participants |
| Aug | 17B | Project data included in DarwinNet and CHM (CONAM) |
| Sep | 6A/B | Tree planting, ecology & cultural use education with local school (20 pupils, 14 days) |
| Sep | 2 | 2 Masters students graduate from Universidad Agraria |
| Oct | 6A/B | 2 Local families trained in <i>Prosopis</i> pod flour production (3 weeks each) |
| Dec | 7 | 1 Educational poster for school classrooms and 1 leaflet |
| Dec | 11B | 2 Papers (minimum) submitted to peer reviewed Peruvian and international journals |
| Dec | 13 B | 2 Dry forest herbarium reference collections enhanced at La MOL and UNICA |
| Dec | 18C | 1 Local TV report on project results |
| Feb | 14A | Teachers workshop to incorporate Huarango ecology into schools |
| Mar | 7 | 1 Poster (Spanish and Quechua), for education and festival |
| Mar | 14 | <i>Huarango</i> exhibition; products, culture and ecology show (1 wk) |
| Mar | 9 | 4 Species action plans for key threatened species produced by GAP and included in Management plans and habitat restoration manual |
| Apr-Mar 2008 / 2009 | | |
| Apr | 8 4A/B | 2 UK project staff in Peru: OQW 25 wks; WM 2 wks 2 Students UNICA; training/experience in nursery and seed management, germination techniques, landrace conservation - 24 wks each |
| Apr | 4C/D | 2 Postgraduate students Universidad La Agraria; training/experience in habitat restoration techniques & biodiversity research – 31 wks each |
| Apr | 19C | 2 Local radio show interviews |
| Apr | 10 | 1 Annual report of biodiversity monitoring data from restoration sites |
| Apr | 23 | Sales of Huarango products (flour and syrup) estimated value equivalent to £2500 per family |
| Apr | 14A | 2 nd Huarango festival in Nasca after pod harvest |
| May | 6A/B | 10 GAP members trained in Avian biodiversity monitoring |
| May | 15A/B/C | Local and national press releases |
| May | 14A | Workshop: local family training, forest protection and habitat regeneration. |
| Jun | 11B | 2 Papers (minimum) submitted to peer reviewed Peruvian and international journals |
| Oct | 6A/B | 2 Local families trained in <i>Prosopis</i> pod flour production (3 weeks each) |
| Sep | 17A/B | Project data included in DarwinNet and regional node for CHM websites |
| Sep | 17B | 2 Bosque de Niños restoration sites join ANIA Network |
| Sep | 6A/B | Tree planting, ecology & cultural use education with local school (20 pupils, 14 days) |

| | | |
|-----|-----|---|
| Nov | 12b | 4 Online databases enhanced with project-generated data: DarwinNet, SEPASAL, CONAM, ABIS, LOMAFLO |
| Dec | 18C | 1 Local and 1 national TV report |
| Dec | 9 | 1 Huarango forest sustainable use manual (Spanish) |
| Jan | 10 | 1 Annual report of biodiversity monitoring data from restoration sites |
| Jan | 9 | 1 Habitat management plan for restoration areas and buffer zones in Ica/Nasca |
| Jan | 7 | 1 Habitat restoration manual (Spanish & Quechua) |
| Feb | 15C | National press release UK |
| Mar | 14a | Final project workshop |
| Mar | 20 | £13,600 including vehicle and processing equipment transferred to UNICA for community use (value not including wear/tear) |
| | 23 | Additional funding for continuation of project activities |

PROJECT BASED MONITORING AND EVALUATION

22. Describe, referring to the Indicators in the Logical Framework, how the progress of the project will be monitored and evaluated, including towards delivery of its outputs and in terms of achieving its overall purpose. This should be during the lifetime of the project and at its conclusion. Please include information on how host country partners will be included in the monitoring and evaluation.

Overall monitoring and reporting on the project will be the responsibility of the project leader and steering group (including INRENA and other host country partners), undertaken on the basis of field visits, progress and supervision reports, workshop results/feedback and training results, measuring progress against agreed outcomes, indicators and milestones. This will be facilitated by regular communication between project partners via phone, email and website uploads. In addition, the project will be assessed through the Royal Botanic Gardens, Kew's internal project and financial monitoring system and the Darwin Initiative's own monitoring procedures. Specific elements will be evaluated as follows:

- **Habitat restoration** trial plots will be set up within the restoration/reforestation target areas. Detailed habitat inventories and standardised monitoring, conducted on a three monthly basis, will record change from the project baseline. MOL students will be trained to prepare brief two-monthly reports (including photo points) on the four contrasting trial plots, specifically noting planting success, invasive species, indicator species, mycorrhiza formation, seed dispersal etc. Spatial monitoring data will be obtained by remote sensing. Desertification indicators and threshold levels of habitat degradation from overgrazing and deforestation will be determined in order to facilitate long-term habitat monitoring. Understanding and publishing the process of natural plant succession in the region, including aspects such as pioneers plants and 'nurse' species (for which there are no published data) will be essential.
- **Tree nursery and landrace conservation** will be managed by two undergraduate students (UNICA), supervised and monitored by Felix Quinteros. Planting regimes and treatments (e.g. *Rhizobium* inoculation), seed sources, inventories, germination and growth rates will be databased on a weekly basis, both for monitoring purposes and eventual analysis for publication. **Sustainable product trials** will be monitored through records of raw material supply and production, supported by ongoing economic evaluation of financial returns from staff at *Samaca Products*. Achievement of longer-term project goals in these respects will be evidenced by wider uptake of sustainable use options.
- **Training and workshops** will be monitored by attendance records, trainee feedback and supervision reports (Carlos Reynel). **Public awareness and education** progress will be monitored by the steering group through attendance of *Huarango* festivals (Olivia Nanetti), production and uptake/distribution of education/dissemination activities via regional museums and schools (Alberto Benavides, ANIA) and coverage in local and national media. **Policy uptake and conservation impact** will be monitored by the steering group through evaluation of progress towards APC and *Bosque del Niños* status for habitat restoration sites and evaluation of integration into national policy and practice, facilitated by INRENA (SPDA) and CONAM.