

# The Darwin Initiative: Achievements in support of the Global Taxonomy Initiative

## Taxonomy and the GTI

Through the Convention on Biological Diversity (CBD), national governments have acknowledged the existence of a “taxonomic impediment” to the management and conservation of biodiversity. The removal of this is crucial to the implementation of the CBD and has been established as one of the CBD’s cross-cutting issues by Conference of Parties (COP).

### What is the ‘Taxonomic Impediment’?

Taxonomy is the science of discovering, describing and naming the individual species of plants and animals, including microscopic forms, that make up the biota, and of working out their relationships to provide a classification. This has been reasonably well completed for some groups of species - but little is known of the taxonomy, distribution, biology, and genetics of the vast majority. The “taxonomic impediment” is a term that describes the gaps of knowledge in our taxonomic system, the shortage of trained taxonomists and curators, and the impact these deficiencies have on our ability to conserve, use and share the benefits of our biological diversity.

The Global Taxonomy Initiative (GTI) provides a framework to address the taxonomic impediment. It was established to underpin the CBD by addressing the lack of taxonomic information available to help identify the components of biological diversity and the need to build capacity for taxonomic activity in all regions of the world, but especially developing countries.

### Darwin Initiative’s contribution to GTI

The Darwin Initiative (DI) works across the globe, especially in developing countries, and has supported at least 50 projects which include taxonomy as a main focus – either developing or using taxonomic knowledge. A recent review commissioned by Defra investigated how these projects have contributed to the GTI (full report available at [www.darwin.gov.uk](http://www.darwin.gov.uk)).

DI projects have contributed to all key areas of the GTI operational objectives. Objectives 2, 3 and 5 are perhaps the most significant areas – as demonstrated by the case studies below.



## GTI Operational Objective 1

To assess taxonomic needs and capacities at national, regional and global levels for the implementation of the CBD.

DI project leaders have a good understanding of national taxonomic needs arising from previous collaboration with host country institutions, and projects clearly address these needs. Through contributing to knowledge of species, taxonomic projects have identified and highlighted needs and capacities for future action - this will have a lasting impact through national biodiversity strategies and action plans (BAPs).

## GTI Operational Objective 2

To provide focus to help build and maintain the human resources, systems and infrastructure needed to obtain, collate and curate the biological specimens that are the basis for taxonomic knowledge.

Training is a major component of the DI's own objectives, and the majority of DI projects reviewed have had an enormous impact upon this. These impacts resulted from establishing and developing collections, transferring technology, providing infrastructure and training motivated students and their subsequent employment post-project. Training and capacity building range from low intensity activities, such as awareness-raising and short courses, to high intensity mentoring and degree courses. Informal, in-country, on-the-job training has increased the skills base of a large number of trainees, while formal qualifications have helped students to play an important ongoing role in maintaining collections, developing policy and training subsequent generations of taxonomists. The case study from Ecuador shows a typical example of the legacy that DI projects can leave in terms of trained personnel.

### A legacy of training: Ecuador

In Ecuador, a DI marine invertebrate study developed a strong team of taxonomists, working in their home country. They are all now transferring their expertise to a second generation, and maintaining contact with their UK partner.

- Elba Mora, a university teacher, has remained in her post, making increased use of the collections and publications generated by the project;
- Manuel Cruz, a professor and navy marine biologist, has continued his role as well as registered for a part-time PhD through Heriot-Watt University in the UK and is heavily involved in Ecuador's marine biodiversity working group;
- Three of the project's trainees secured posts related to taxonomy: Daisi Merino, now a teacher in marine biodiversity; Maria Fernanda Arroyo, employed as a researcher at the university with responsibility for maintaining the collection set up by the project; and Alba Calle, now working in polychaete taxonomy at another university in Guayaquil and also working on a PhD.



Ecuadorian Darwin project team members plus Guayaquil University students on a shore sampling survey (picture courtesy Elba Mora, University of Guayaquil, Ecuador)

The successful legacy of this project was due to a number of key factors including:

- The incredible dedication of the trainees themselves;
- A good balance between training, research and capacity-building; and
- Strong regional links with other DI projects in Panama and Colombia through regional conferences.

*(Project 6-029: Marine Benthic Invertebrate Study in Coastal Waters of Ecuador. Based on discussions with Dr. James Mair, Heriot-Watt University, and Professor Manuel Cruz, Oceanographic Institute, Guayaquil, Ecuador).*

### GTI Operational Objective 3

To facilitate an improved and effective infrastructure/system for access to taxonomic information; with priority on ensuring that countries of origin gain access to information concerning elements of their biodiversity.

This objective highlights the need to make taxonomic collections accessible, particularly in their country of origin. Many DI projects contributed to this through developing databases, repatriating specimen information from institutions in the developed world and publishing field guides and manuals. A case study from Brazil shows a good example of DI contributing effectively to improving host country taxonomic information and making it available where it is most needed for conservation in the country.

#### Impact of repatriating taxonomic data: Brazil

Prior to 1998, botanical collections in Brazil were minimal: few type collections were represented in-country and the state of naming all specimens was limited. Based at the *Herbário da Universidade Estadual de Feira de Santana (HUEFS)* in Brazil, this DI project:

- In a single year, repatriated data on 7,504 specimens of more than 1,200 plant taxa, along with images of a further 556 type specimens;
- Led to a continued improvement in collections, with a database of specimens being continually maintained and the project's methods evolving to suit advances in technology – from cibachromes to digital images;
- Produced repatriated collections that were used to produce a Flora of Bahia region, a checklist of plants from Northeastern Brazil, and contributed to a list of endangered species for the whole of Brazil;
- Contributed to possible conservation efforts by targeting areas for future research and identifying areas of endemism for protection; and
- Developed a methodology which has been used for similar projects elsewhere, extending the vital transfer of taxonomic capability from the developed to the developing world.



*(Project 7-108: Repatriation of herbarium data for the flora of Bahia, Brazil. Information provided by Dr. Daniela Zappi, Royal Botanic Gardens, Kew).*

The Brazilian Repatriation Officers (Elaine Miranda, see photo, and Fabrício Juchum) are in charge of the digitization of specimens (Photo from RBG Kew website.)

### GTI Operational Objective 4

Within the major thematic work programmes of the Convention, to include key taxonomic objectives to generate information needed for decision-making in conservation and sustainable use of biological diversity and its components.

DI projects have been involved in generating the taxonomic information needed for decision-making in conservation in all of the major thematic work programmes of the CBD through: increasing knowledge of species in all major habitats; discovering new species and populations; and, identifying key areas and taxa for conservation.

### GTI Operational Objective 5

Within the work on cross-cutting issues of the Convention, to include key taxonomic objectives to generate information needed for decision-making in conservation and sustainable use of biological diversity and its components.

DI projects contribute to many of the cross-cutting issues of the CBD, in particular public education and awareness, sustainable use of biodiversity, technology transfer and cooperation, and setting up protected areas. A couple of case studies demonstrate some of the DI's contributions.



### Taxonomy contributing to ecosystem conservation: Borneo

The project titled "Biodiversity of Butterflies in Tropical Rainforests of Sabah" carried out detailed research on the ecology of butterflies as a useful indicator group to investigate the short and long term impacts from logging on biodiversity. Key outcomes included.

- A large Lepidoptera collection was established in the University of Borneo, where it became seen as a key indicator of research success;
- A succession of projects supporting both collecting and storage facilities developed in tandem, with each providing leverage and support to the others;
- Recommendations on forest management approaches that mitigate biodiversity loss ;
- Students motivated and trained to competence in identifying, preparing specimens and databasing.

This project was able to generate a large, complex dataset to support conservation monitoring and action. Taxonomy played a crucial role in developing this dataset and the capacity underlying it.

*(Project 7-040: Biodiversity of butterflies in tropical rainforests of Sabah, Borneo. Based on discussions with Dr. Keith Hamer, University of Leeds, Dr. Jane Hill, University of York, and Dr. Chey Vun Khen, Forest Research Centre, Borneo).*



Junonia orythia, a species that prefers disturbed habitats (pictures courtesy Dr. Jane Hill, University of York).

### Taxonomy contributing to genetic conservation: West Africa

The strong focus of most DI projects is at the organismal and ecosystem level - but genetic diversity within species (i.e. the gene pool) is also a crucial component of the GTI, especially for socio-economically valuable species. One DI project trained taxonomists to engage in genetic level conservation, in partnership with the primary international body tackling this, the International Plant Genetic Resources Institute (IPGRI).

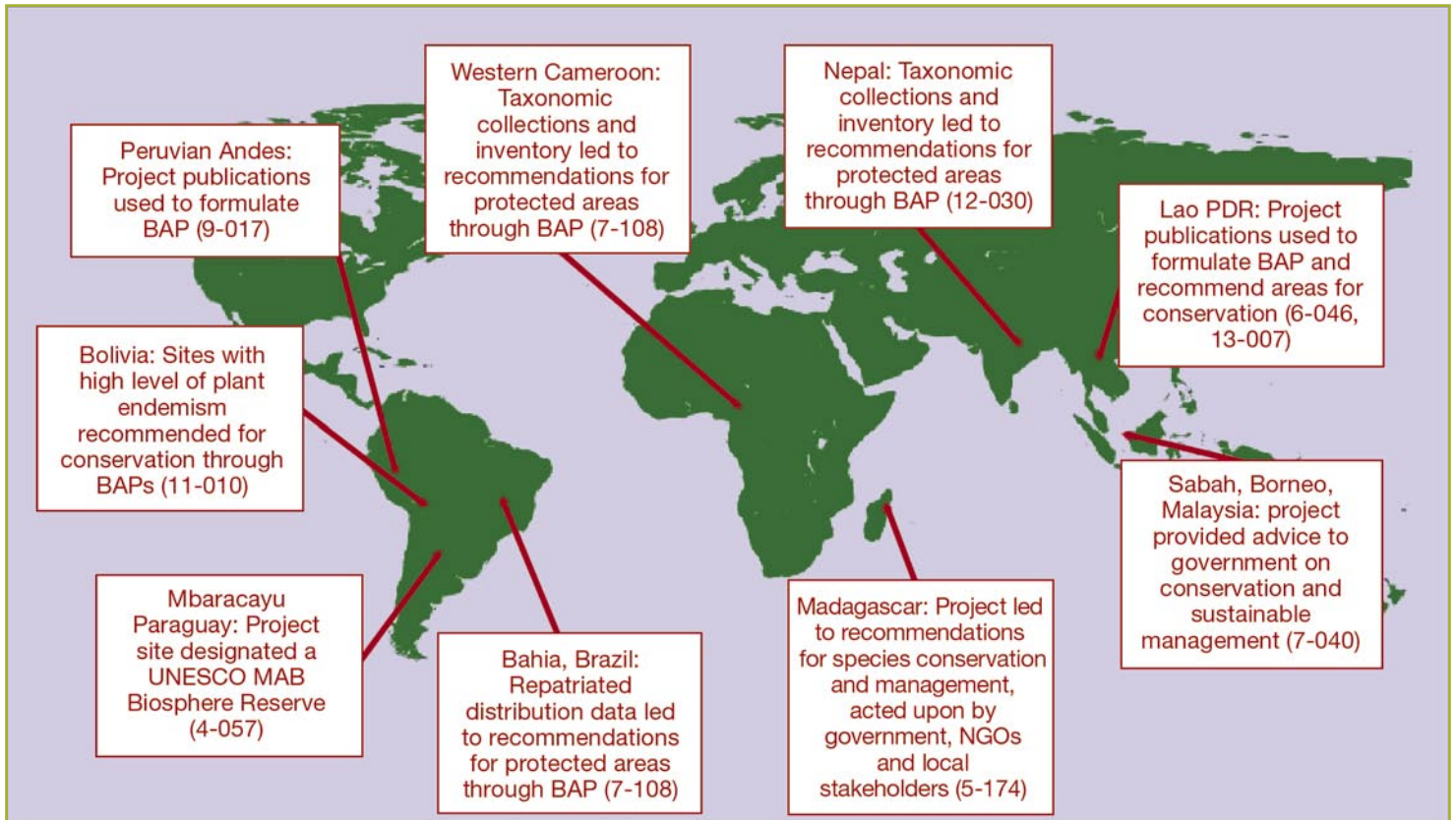
Molecular taxonomic techniques and assumed correlations with habitat or ecogeographic features were used to sample populations of endangered wild relatives of cultivated crops, generating a geographic profile to preserve genetic diversity. Taxonomic data then underpinned conservation through monitoring, preventing genetic pollution by introgression from cultivated species, and maintaining a gene pool for the future. Through their training, project participants were better able to organize conservation of their mandate crop species.

These activities also clearly support implementation of the Global Strategy for Plant Conservation (GSPC), another cross-cutting issues of the CBD.

*(Project 6-100: Plant Biodiversity Conservation and Sustainable Utilisation Training in West Africa. Based on discussions with Dr. Nigel Maxted, University of Birmingham and Raymond Vodouhe, INRAB, Benin).*



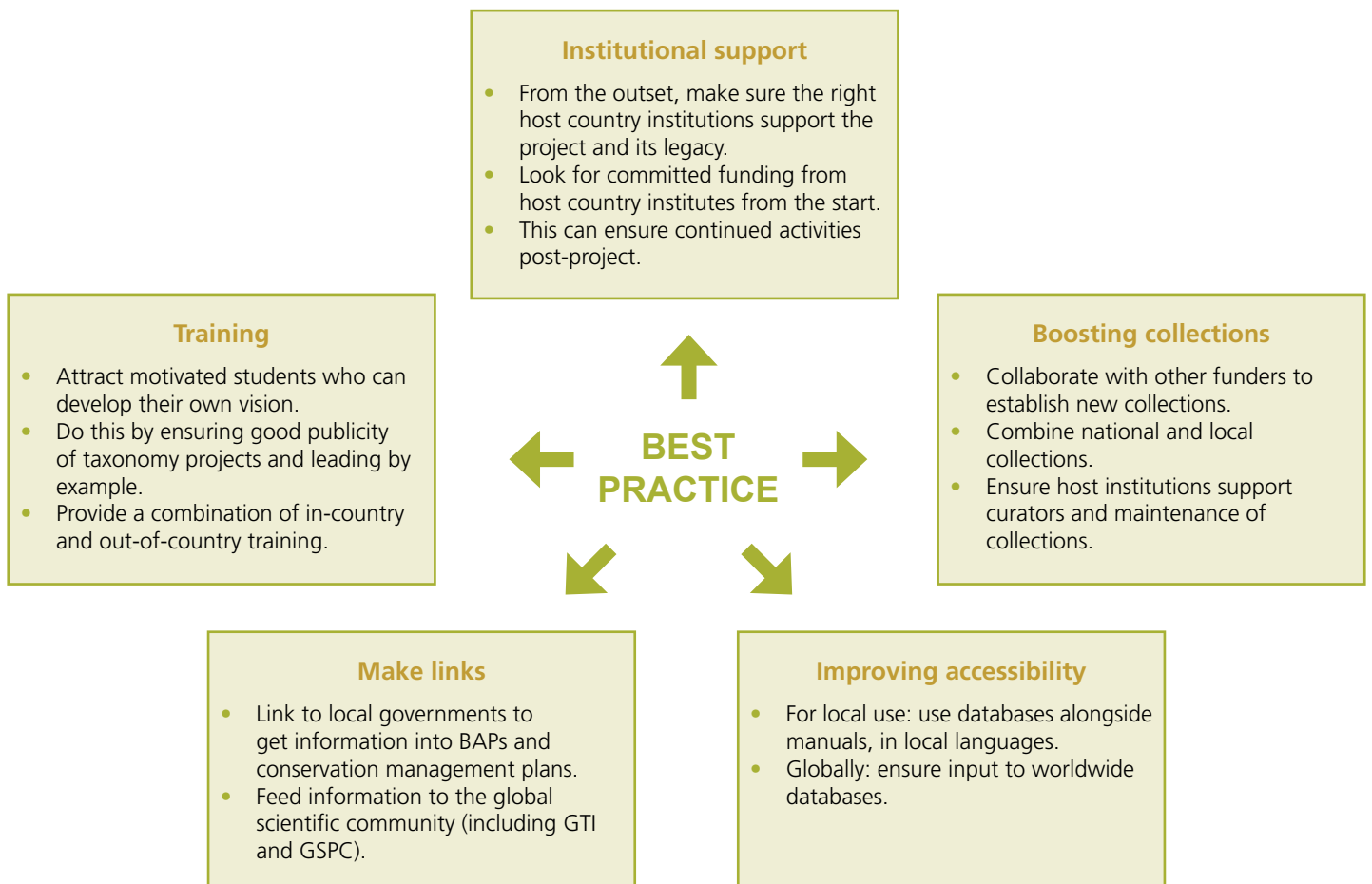
Members of the training course at work (pictures courtesy Dr. Nigel Maxted, University of Birmingham)



Worldwide impact taxonomic projects on conservation.

## Best practice highlighted by DI projects

The review highlighted a number of key areas of best practice for projects supporting taxonomy.



## Recommendations for improving the contribution

Clearly, the DI is making positive contributions to the achievement of the GTI's objectives. But there are opportunities for the complementarity to be greater and for the DI to have a greater impact. Key recommendations to be considered by the DI include:

### Operational Objective 1

- Projects which look at assessing capacity directly should be encouraged;
- Closer links between CBD, DI and GTI reporting are needed;
- Closer links between DI projects in the same region would enable greater dialogue and coordination;
- DI projects should be encouraged to submit information to global taxonomic capacity databases.

### Operational Objective 2

- Independent DI monitors - to maintain quality of training;
- Monitor the accessibility of training;
- Produce outputs such as manuals in local languages;
- Make more use of the DI Scholarship Scheme;
- Undertake better training needs assessments;
- Support taxonomic collections-based projects that will greatly increase taxonomic capacity.

### Operational Objective 3

- Projects should be encouraged to submit their taxonomic information to international databases, to prevent the loss of information if project-based web-sites shut down within a short time after the projects' end.

### Operational Objective 4

- The DI should ensure that projects target all the CBD major thematic programmes.

### Operational Objective 5

- Target resource allocation to addressing CBD cross-cutting issues, including the GTI;
- Emphasise protection of intellectual property rights of indigenous peoples;
- Capacity-building for taxonomy is long-term - consider a longer funding cycle.

The Darwin Initiative is a distinctive programme - an important and unique source of funding for biodiversity research, including taxonomy. The DI aims to successfully ensure that taxonomic research gets to the right people. Further development will be considered in light of this review, and its recommendation, to help maximise the impact of the DI towards the GTI objectives.

Full details of the report can be found at the Darwin Initiative website : [www.darwin.gov.uk](http://www.darwin.gov.uk).

The Darwin Initiative aims to promote biodiversity conservation and sustainable use of resources around the world. It uses UK expertise working with local partners to help countries rich in biodiversity but poor in resources to fulfil their commitments under the CBD. The Initiative is funded and administered by the UK Government's Department for Environment, Food and Rural Affairs (Defra). Since 1992, the DI has committed over £45m to over 450 projects in over 100 countries.

This note was produced by the Edinburgh Centre for Tropical Forests (ECTF) [www.ectf.co.uk](http://www.ectf.co.uk)

For information on the Darwin Initiative see [www.darwin.gov.uk](http://www.darwin.gov.uk)

For information on the CBD see [www.biodiv.org](http://www.biodiv.org)

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