

Origin Details

Please provide the following details on the origin of this report

Contracting Party	UNITED KINGDOM
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Date of submission:	

Process Summary

Please provide summary information on the process by which this report has been prepared, including information on the types of stakeholders who have been actively involved in its preparation and on material which was used as a basis for the report

- Joint Nature Conservation Committee (JNCC) created first draft response
- Department for Trade and Industry (DTI) collated comments from other Government sources and then consulted with key biodiversity organisations
- DTI integrated comments.
- JNCC put out to wide consultation on the UK Clearing House Mechanism (www.chm.org.uk) websites and through normal consultative channels (statutory, non-governmental and civil society).
- DTI evaluated and integrated responses.
- DEFRA to submit to CBD secretariat and put final version of report on CHM website.

Inventory and Assessment

1. Has your country developed an inventory of existing technologies or category of technologies, including from indigenous and local communities, for the conservation and sustainable use of biological diversity and its components, in all the thematic areas and cross-cutting issues addressed by the Convention?	
a) no	
b) an inventory under development	
c) an inventory of some technologies available (please provide some details)	X
d) yes, a comprehensive inventory available (please provide details)	
2. Has your country assessed the potential impacts of relevant technologies on biological diversity and their requirements for successful application?	
a) no	
b) yes, please give some examples	X
3. Has your country carried out an assessment of the needs for relevant technologies?	
a) no (please specify the reasons)	X
b) yes, and please specify the needs met and the needs not met for existing technologies and for new technologies	

Implementation of some relevant articles of the Convention, relevant decisions adopted at the previous meetings of the Conference of the Parties and recommendations of SBSTTA

4. In implementing the thematic programmes of work adopted by previous meetings of COP, has your country achieved the outcomes identified in these programmes of work through technology transfer and technology cooperation? (Decisions II/10, III/11, IV/6, IV/7 and V/4)	
a) No	X
b) yes, but only a few activities in some programs	
c) yes, and a wide range of activities in many programs of work	
d) if yes, please specify these activities and programs of work	
5. Has your country undertaken technology cooperation with other Contracting Parties that lack the expertise and resources to assess the risks and minimize the negative impacts of introducing alien species? (Decision V/8)	
a) no	
b) yes – please give details below (including types of technology transferred, actors involved, terms for transfer and means of access to technology)	X

6. Has your country taken any steps or measures to facilitate transfer of technology to and technology cooperation with other Parties to develop and/or strengthen their capacity to implement the policy, program and practice for sustainable use of biological diversity? (Decision V/24)	
a) no	
b) yes, please specify detailed measures and steps	X
7. Could you provide examples or illustrations of benefit-sharing contractual agreements which have included technology cooperation and technology transfer as benefits to be shared? (Article 15)	
a) no	
b) yes	X
8. Has your government taken measures, as appropriate, to ensure, as set out in the Article 16(3) that Contracting Parties providing genetic resources are provided access to and transfer of technology which makes use of those genetic resources? (Article 16)	
a) no	
b) yes, please provide some details	X
9. Have the taxonomic institutions in your country taken any initiatives in developing national priorities, both individually and regionally, in new technology? (decision IV/1)	
a) no	
b) yes, in early stages of development	
c) yes, in advanced stages of development	
d) yes, some initiatives in place and some priorities identified	X
e) yes, comprehensive priorities identified	
10. Has your country been involved in technology development and/or transfer for the maintenance and utilization of ex situ collections? (Decision V/26)	
a) no	
b) yes – please give details below (including types of technology transferred, actors involved, terms for transfer and means of access to technology)	X
11. Has the clearing-house mechanism in your country been further developed in order to assist in obtaining access to information concerning access to and transfer of technologies? (Decision V/14)	
a) no	
b) yes, please provide some examples	X

Role of Public and Private Sectors in Technology Transfer and Technology

12. Do you know of any examples of technology partnerships between public R&D institutions from developing countries and private-sector firms from industrialized countries? If so, to what extent have these partnerships involved	
a) the training of developing country scientists in the application of new technologies for the conservation and utilization of genetic resources	X
b) information exchange on new scientific exchange and technological advances	
c) providing various technology components to developing country partner institutions	
d) engaging in joint R&D?	
13. Has your country taken any measures or developed any programs to encourage the private sector or the public-private partnership to develop and transfer technologies for the benefit of governments and institutions of developing countries, including South-South cooperation?	
a) No	
b) yes, please give details	X
14. Have any type of incentives been established in your country to encourage the participation of the private sector in conservation and sustainable use activities as a sources of new technologies and potential financiers of conservation programmes?	
a) no	
b) yes, please give details	X

Impact of Intellectual Property Rights on Technology Transfer and Technology Cooperation

15. Are the technologies your country has accessed or wishes to access in the public domain or covered by intellectual property rights?	
a) public domain	
b) intellectual property rights	
c) both	X
16. Have intellectual property rights been a limiting factor in acquiring technologies for the conservation and sustainable use of biological diversity?	
a) no	
b) yes, please provide an example and specify the following: the type of technology sought (hard or soft technology); the area to which it is to be applied (e.g. forest, marine, inland waters, agriculture, etc..)	X

Capacity building for technology transfer and technology cooperation

17. Have adequate institutional structures been established and/or is adequate human capacity available to access relevant technologies, in your country?	
a) no	X
b) yes	
18. What, if any, have been the limiting factor in implementing relevant technologies?	
a) institutional capacity	
b) human capacity	
c) others-please specify	X
19. Does your country consider that access to information and training or lack thereof has been a limiting factor in access to and transfer of technology?	
a) no	
b) yes, please provide some examples	X
20. Has your country been able to identify relevant technologies in specific areas for the conservation and sustainable use of biological diversity in your country?	
a) no	
b) yes, please give details	X
21. Has your country developed national policy and established international and national institutions to promote technology cooperation, including through the development and strengthening of technical, human and institutional capabilities?	
a) no (please specify the reasons)	
b) yes, please give some details or examples	X
22. Has your country established joint research programmes and joint ventures for the development of technologies relevant to the objectives of the Convention?	
a) no	
b) yes, please give some details or examples	X

Measures for facilitating access to and transfer of technology

23. Has your country established the mechanisms and/or measures to encourage and facilitate the transfer of technology to and technology cooperation with other Contracting Parties?	
a) no	
b) yes, please provide some details	X
24. Has your country established channels for access to the technologies developed and applied for attaining the objectives of the Convention?	
a) no	
b) yes, please provide detailed information	X

Success Stories of and Constraints to Technology Transfer and Technology Cooperation

25. Has your country identified any success stories and opportunities of and constraints to transfer of technology and technology cooperation?	
a) no	
b) yes, please provide detailed information	X

Further comments

Additional text relating to the above questions

Q1.c) There is no single inventory but there are many guidelines available for the use of relevant technologies in agriculture and nature conservation. These are available from DEFRA, statutory conservation agencies and some NGOs, including those representing the conservation and farming communities.

The Department of Trade and Industry (DTI) attempted to compile an inventory of activities on technology transfer technologies relating to environment including climate change. The list would have been a very useful tool to have in promoting UK activities and spreading best practice. However, it was soon recognised that, because of various obstacles, it was not possible to obtain comprehensive information on all activities. One key obstacle was that, in practice, the term 'relevant' encompasses an almost open-ended list and trying to track activities relevant to the development and diffusion of the technologies was an unmanageable task. As a consequence, we have strong doubts about the value of drawing up inventories of 'relevant' technologies.

The Natural Environment Research Council (NERC) has recently identified and consulted on a potential new cross-Council science priority in 'Environmental Technologies'. If funded, it is likely that this would include monitoring and sensing techniques, remediation methods and clean technologies, and contain elements relevant to both biodiversity and/or biotechnology transfer.

Q2. b) In England and Scotland there are ongoing programmes designed to devise and transfer technologies for the conservation of farmland and natural biodiversity in the intensively farmed landscapes of the UK. Examples include the Forum for the Application of Conservation Techniques (see <http://www.ecolots.co.uk/1024/index.htm> and Targeted Inputs for a Better Rural Environment (for details see <http://www.snh.org.uk/scottish/tibre/new1tibre.htm>). The UK government and the statutory conservation agencies assess other new technologies (such as agricultural biotechnology) for direct and indirect impacts on biodiversity. These assessments are usually mandatory and are guided by independent advisory committees such as the Advisory Committee on Releases to the Environment (ACRE). A current review of agricultural sustainability and research (DEFRA) will include an assessment of technologies on biodiversity.

Integrating fisheries management with biodiversity conservation requires attention not only to control amount, timing and location of fisheries effort, but also the equipment used. There is a good deal of current research aimed at mesh size and net design to increase the selectivity of the catch, for example that carried out by International Council for the Exploration of Sea (ICES). (<http://www.ices.dk/>). An example of such work, to which the UK contributed, is ICES Report CM 2002/B:01, a report of the ICES_FAO Working Group on Fishing Technology and Fish

Behaviour held at Sete France on 6-8 June 2002.

The Fisheries Research Services Marine Laboratory Aberdeen (<http://www.marlab.ac.uk/>) has developed and conducted research into the performance of various technical conservation measures (i.e. gear modifications) over many years. A summary of this work is available in their Capture and Conservation information leaflet (number 10 dated 15 March 2000), entitled 'Predicted Effects of Changes in Gear Design'.

Q3. a) It would not be possible or desirable to conduct a single assessment of the need for relevant technologies. Environmental impact and risk assessment is part of the development and conservation culture (and statutory requirements) in the EU and UK. This process identifies adverse and beneficial impacts and assesses whether existing technologies can be used to alleviate any adverse effects. If technologies do not exist the need for new technologies is identified, and in many cases research and development is initiated.

Q5. b) CABI is a leading member of the Global Invasive Species Programme that seeks to minimise the impact of invasive species worldwide through provision of information, development of projects to improve prevention and utilization of biocontrol for curative action. A good example is the 'Invasive Alien Species: A Toolkit of Best Prevention and Management Practices' 2001 CAB International, ISBN 0851995691. Further information on the toolkit can be found at <http://www.cabi-bioscience.ch/wwwgisp/index.html>

Q6. b) The Darwin Initiative (<http://www.darwin.gov.uk/>) is a small grants programme that seeks to help safeguard the world's biodiversity by drawing on UK expertise to promote the conservation and sustainable use of biodiversity in less developed countries. Projects funded under the Initiative are collaborative, involving either local institutions or communities in the host country to focus on a particular aspect of implementation of the CBD. Details of Darwin projects, many of which involve an element of technology transfer can be found at www.darwin.gov.uk. Further information on UK expertise can be found on the UK Clearing House Mechanism (CHM) website (<http://www.chm.org.uk/>).

The Technology Partnership Initiative (TPI) aims to link companies and organisations in developing countries with the UK environmental goods and services industries, which provide technologies and services, as well as information and advice needed to deal with environmental problems. The Joint Environmental Markets Unit (JEMU) runs the TPI. Information on both JEMU and TPI can be found at <http://www.dti.gov.uk/jemu>

CABI Bioscience (<http://www.cabi-bioscience.org/html/Biodiversity.htm>) assists other parties to strengthen their capacity and implement policies, programmes and practices for sustainable use of biological diversity through its activities in 60 countries including:

- Promotion of IPM/ICM through farmer participatory methods in crops as diverse as vegetables, cotton, coffee and sugarcane
- Assistance and training in developing ex-situ collections of micro organisms in East Africa and SE Asia

Q7. b) Royal Botanic Gardens Kew has established a number of agreements with other organisations. In particular, the 15 partnerships of the Millennium Seed Bank project are all based on legally binding Access and Benefit Sharing Agreements (ABSAs). See Appendix 2 for further details on the Millennium Seed Bank Project.

See also the UK CHM website (<http://www.chm.org.uk/>) website.

Q8. b) The UK is currently developing a strategic policy for the conservation and curation of genetic resources for food and agriculture, in both in situ and ex situ conditions. This policy will be based on the recommendations of a report, which can be accessed at <http://www.defra.gov.uk/farm/geneticresources/grfareport.pdf>. In addition, the UK has developed a web-based National Focal Point on Access and Benefit Sharing (<http://www.defra.gov.uk/science/geneticresources/default.asp>), which contains information necessary to contact institutions involved in the conservation of genetic resources.

It has not been possible to resource the inclusion the UK Overseas Territories in the development of these policies.

Q9. d) The Natural Environment Research Council (NERC) is now in the third year of a £16m thematic programme of Environmental Genomics, which includes funding for projects investigating the application of new technologies to nature conservation and ecology. Some of these projects include the development of molecular markers that can be used for taxonomic purposes. Various taxonomic institutions are involved in the development of policy on the conservation and curation of genetic resources for food and agriculture (see comments on Question 8). This policy could involve prioritisation in the use of new technology.

However, UK has lost and is continuing to lose a great deal of taxonomic expertise, especially in comparative morphology, because it has become outmoded in Universities and Public Research Institutions. There is a need for more enthusiasm and investment in this sector in the UK both for its own purposes and to help other countries. National priorities for taxonomic research were published in 1999 in the "Web of Life" report funded through the Office of Science and Technology (to the UK Systematics Forum)

http://www.nhm.ac.uk/hosted_sites/uksf/web_of_life/index.htm Developing countries have for a long time relied on comparative morphological skills from the UK and other parts of Europe to provide a service for them to document their biodiversity and to train staff within their own borders. The loss of comparative morphological expertise within the UK may therefore have greater adverse impacts on developing countries than on the UK.

However, alongside the loss of comparative morphological skills in the UK, there has been a parallel rise in expertise in molecular taxonomy, largely for academic research purposes. Developing these skills is now seen as a key priority by the UK Research Councils, but there is currently no formalised programme for transferring these technologies to developing countries.

Q10. b) The Royal Botanic Gardens Kew is involved in a range of technology transfer and co-operation activities. One very successful vehicle for the delivery of technology transfer has been the Kew International Diploma courses in Plant Conservation technique, Herbarium Techniques, Botanic Garden Management and Botanic Garden Education. To date 300 participants from 98 countries have participated in these courses.

The development of the Millennium Seed Bank (<http://www.rbgekew.org.uk/msbp/index.html>) and other facilities at Kew, the Natural History Museum and certain research institutions such as the John Innes Institute have involved development of new technologies for conservation of plant genetic resources. Microbial biodiversity collections exist at a number of UK institutions, including universities and CABI. Collections of animal germplasm exist at several institutions that have developed new technology for the maintenance of material including better storage of embryonic tissue. These collections have already been used in the UK to expand populations of

certain rare plants in the wild, notably the Lady's Slipper Orchid. Experimental reintroductions of other rare plants, including mosses are in the planning stage. Details of UK collections are available on the UK CHM website (<http://www.chm.org.uk/>) The Royal Botanic Gardens Edinburgh (RBGE) has been training people from several countries (especially China and Chile) in propagation and restoration of threatened plants in both ex and in situ conservation projects. This activity is growing at RBGE, especially in the light of the Global Strategy for Plant Conservation.

Q11. b) The UK clearing house (<http://www.chm.org.uk/>) provides web-based access to information on relevant technologies.

Q12. a) It would be unusual for UK private sector firms to be involved directly in technology co-operation with public R&D institutions in developing countries. Partnerships in this area are usually between publicly funded institutions and developing country institutions.

The training of developing country scientists in the application of new technologies for the conservation and utilization of genetic resources takes place in various institutions including universities, Kew, the John Innes Centre in Norwich and CABI (an intergovernmental organisation that obtains competitive public funding).

Information exchange on new scientific exchange and technological advances takes place worldwide via the academic journals, several of which are based in the UK. The Research Councils of the UK have training programmes in new technologies, including genomics, proteomics, metabolomics and bioinformatics, mainly aimed at the UK research community. Research workers from developing countries may also benefit from this training but at present no estimate can be made of the numbers involved. NERC supports advance course studentships for the course run jointly between Imperial College and the Natural History Museum entitled 'MSc in Advanced Methods in Taxonomy and Biodiversity'. This course recruited about 40 students in 2003, with a high proportion from developing countries.

The commercial company of the Macaulay Institute has undertaken training of Chinese scientists in nature conservation and range management. In combination with Institutes in several Central Asian countries, new systems of production, which conserve biodiversity of rangelands, have been developed. Current work in South America is developing systems with local organisations for the sustainable management of vicunas. The initiatives are being funded by EC.

There is also training provided by RBGE - they are receiving Chinese ethnic minorities (Naxi people) under their programme of conservation in Yunnan Province. RBGE and University of Edinburgh offer an MSc course in Plant Taxonomy and Biodiversity which has 16 students this year, half from overseas. Demand for the course, which receives funding from NERC and other sources, is growing steadily.

The Darwin Initiative also contributes to the training of scientists and local people in developing countries – See examples of Darwin projects at <http://www.darwin.gov.uk/projects.htm>

Q13. b) The UK participates in the Eurosite programme, which is dedicated to the transfer of land management technologies for nature conservation purposes. The programme includes contact with countries in wider Europe and the Middle East, and has a special project concerned

with technology transfer to Central and Eastern European countries.

Q14. b) The UK has established a programme of ‘champions’ for the conservation of species within the UK Biodiversity Action Plan. This includes private sector firms who finance the conservation of particular species. Conservation efforts in this programme include research into population structures, dynamics and genetics using relevant technologies.

SAFFIE (Sustainable Arable farming for an improved Environment) is being funded under Defra’s Sustainable Arable LINK programme (formerly the Sustainable Arable Production through Precision Input Optimisation (SAPPIO) LINK programme). The overall aim of the SAFFIE project is to integrate novel habitat management practices in arable crops and their margins in a way that is compatible with profitable farming. The industry contributors include agricultural levy boards, supermarkets and an agrochemicals company. Details of SAFFIE project can be found at <http://www.saffie.info/>

Q15 c). The question is too open and wide-ranging to provide a reply beyond a general statement that both are encompassed.

Some technologies (such as transgenic technology) are covered by IPRs relating to the use of certain genes and techniques.

Q16. b) Again the question is too broad. It is not possible to answer without an extensive trawl of an almost open-ended list of private and public sector bodies.

Q 17. a) Strictly speaking “NO” – in essence but there will always be a case for doing more. This is a difficult question to answer without clear definition and criteria to judge what is ‘adequate’.

Q18. c) General comment as for Q 17.

Q19. b) The UK has identified a need for training of research workers in several technologies, especially in bioinformatics. Specific training and provision of facilities in thematic research programmes funded by NERC and BBSRC are addressing this. Technology related-capacity is a dynamic issue and there will always be gaps and need for improvement.

The need for training of taxonomists has been identified in many reports - including the recent House of Lords Select Committee reports "What on Earth? The threat to the science underpinning conservation" HL Paper 118(i).

Q20. b) This is a broad question and it is not possible to give an exhaustive answer, but we are able to illustrate our answer with some specific examples:

The Macaulay Institute had developed a methodology for the measurement of grazing impacts by large herbivores on vegetation communities of European significance, which is being widely used in the uplands of Scotland (<http://www.macaulay.ac.uk/>).

The Centre for Population Biology at Imperial College London (a NERC Collaborative Centre) hosted the BIODEPTH project, which was funded under the EC Framework Programme IV, on

the importance of Biodiversity for the functioning of grassland ecosystems. This was a pan European project that had field sites in 8 European countries. The data from the project continues to impact on biodiversity across Europe.

Q21. b) There is no single national policy on this subject. Through an immensely wide range of activities, the UK seeks to develop and improve national and international policies that encourage and facilitate technology development and diffusion.

Such activities are sometimes co-ordinated and promoted by DfID, but most programmes supported by this department are orientated towards increasing yields of crops, fish and forests in developing countries.

UK government support for the Darwin Initiative (<http://www.darwin.gov.uk>) and the British Council (<http://www.britishcouncil.org/science/index.htm>) has contributed to technology cooperation. The Centre for Population Biology (CPB) has a fully funded international visitor programme which aims to encourage global research collaboration. Two CPB postdocs, one in Belize and the other in Argentina, work on biodiversity projects in close collaboration with their hosts to transfer knowledge about their work to the local communities. The Argentina based project concerns the effects of invasive exotic plants on native plant communities. Other work at CPB has included studies on the effects of intensification on biodiversity in rice production systems, sponsored by DfID.

Q22. b). The Royal Botanic Gardens Kew are involved in joint research programmes and ventures for the development of technologies relevant to the objectives of the Convention. See Appendix 1 for examples of Kew's activities.

The UK Clearing House (<http://www.chm.org.uk/>) provides web-based access to information on these joint research programmes.

The Macaulay Institute has a twinning agreement with INRA, France, which involves the conduct of research relating to the development of technologies relevant to the objectives of the Convention (<http://www.macaulay.ac.uk/>)

Q23. b) Transfer of technology and technology co-operation is a feature of a number of UK mechanisms. For example the Darwin Initiative and UK engagement in EU programmes, which are part-funded by UK institutions (and sometimes Government departments).

The UK government does not see its role as establishing particular mechanisms, but one of seeking to encourage a climate that helps make more effective use of the wide range of existing mechanisms for technology co-operation.

Q24. b) This function is provided by the UK Clearing House Mechanism (<http://www.chm.org.uk/>)

Q25. b) The Millennium Seed Bank Project is one of the success stories (see

<http://www.rbgekew.org.uk/msbp/index.html> <http://www.chm.org.uk/>).

The development and commercialisation of Green Muscle, the locust mycoinsecticide, and the establishment of Trust Funds for benefit sharing are good examples see <http://www.cabi-bioscience.org/html/biodiversity.htm>.

Appendix 1

A SELECTION OF CURRENT INITIATIVES AT RBG KEW INVOLVING TECHNOLOGICAL CO-OPERATION AND TECHNOLOGY TRANSFER

Initiative	Partners	Project description	Technological Co-operation and Technology Transfer aspects
Q.22 . Has your country established joint research programmes and joint ventures for the development of technologies relevant to the objectives of the Convention			
Plantas do Nordeste	Associação Plantas do Nordeste, a consortium of research and teaching institutes in NE Brazil, University of São Paulo, Brazilian and UK governments	Aims to generate, mobilise and update high quality information on plant species, their uses, distributions and ecological characteristics, fundamental for carrying out effective practical measures on biodiversity conservation and sustainable development. Includes a herbarium specimen data and image repatriation scheme.	<ul style="list-style-type: none"> • Collaborative field surveys and conservation monitoring • Joint production of floras, florulas, checklists and online databases • Supervision of MSc and PhD research by Kew staff. • Kew researchers supervise and teach in postgraduate training programmes in local universities.
Chinese Medicinal Plants Authentication Centre	Chinese Academy of Science, Beijing	Aims to provide rigorous authentication service for traditional Chinese medicinal herbs to address problem of adulterated and fake plants on international markets.	<ul style="list-style-type: none"> • Joint fieldwork and collection of duplicate material • Participation of Chinese staff in Kew International Diploma Courses* • Supervision and training of PhD students
East African Plant Uses Database (Kenya node for SEPASAL -Survey of Economic Plants for Arid and Semi-Arid Lands)	Kenya Resource Centre for Indigenous Knowledge (KENRIK), National Museums of Kenya (NMK)	Collaboration to validate and incorporate into SEPASAL widely scattered data on uses and use-related properties of east and north-east African plants currently held in paper files. Will result in a fully-referenced online database covering about 1500 species.	<ul style="list-style-type: none"> • Provision of hardware (including internet connection) and software; advise on installation and training in use. • Training partners in use of SEPASAL Global Editing Software and international data recording standards • Enhancing partners' abilities to use SEPASAL for their own needs through in country workshops and technical attachments

Q. 10 Technology development and transfer for the maintenance and utilisation of ex situ collections			
<p><i>The Millennium Seed Bank International Programme</i></p>	<p>A wide range of public and semi-autonomous seed banks, botanical institutions and universities supported by prior informed consent from relevant national governments.</p>	<p>Aims to collect and conserve 10% of the world's seed-bearing flora (principally from drylands) by 2010. Works by means of bilateral capacity-building relationships world-wide.</p> <p>As of 30.01.03, CBD friendly access and benefit-sharing agreements in place with partners in 14 countries (Australia, Burkina Faso, Chile, Egypt, Jordan, Kenya, Lebanon, Madagascar, Malawi, Mexico, Namibia, Saudi Arabia, South Africa, USA)</p> <p>See http://www.rbgekew.org.uk/msbp/index.html</p>	<ul style="list-style-type: none"> • In country training courses and workshops • Seed Conservation Techniques course run at the Millennium Seed Bank • Joint fieldwork • Technical and research attachments at the Millennium Seed Bank • Supervision by Kew staff of post-graduate study and research • collaborative research on seed conservation issues • Technical advice and solutions provided in order to develop partners seed banking facilities and procedures
<p>Sainsbury Orchid Conservation Project (Terrestrial Orchid Propagation and Re-establishment)</p>	<p>UK Conservation agencies (English Nature) plus wide range of botanical institutions, universities and conservation bodies worldwide</p>	<p>Development of asymbiotic and symbiotic methods of orchid propagation, and re-establishment in the wild of laboratory raised plants. Work carried out on mainly UK and European species but with successful case studies, increasing international interest.</p>	<ul style="list-style-type: none"> • In country training courses and workshops (including Mexico, Poland) and input into Orchid Conservation Techniques courses. • UK based training via Kew International Diplomas*. • Technical advice on both propagation and re-introduction techniques - approximately 10 enquiries per month. • Research placements at Kew
<p>Integrating National Parks, Education and Community Development for the British Virgin Islands</p> <p>[1 of several similar projects in UK Overseas Territories]</p>	<p>British Virgin Islands National Parks Trust</p>	<p>Focus on field inventory, threatened species management and protected area planning, including support for JR O'Neal Botanic Garden.</p>	<ul style="list-style-type: none"> • Species recovery plan workshop, red listing workshop and management plant workshop, held in country by Kew staff leading to joint production of threatened plant species list and Botanic Garden Management Plan and start of threatened species collecting programme • Participation of BVI representatives in Kew International Diploma courses and CITES training seminar*.

Q22: Joint research programmes and ventures for the development of technologies relevant to the objectives of the Convention			
Repatriation of Data and Images for the Flora of Northeastern Brazil	Univ. Feira de Santana, Centro de Pesquisas do Cacau and Instituto de Pesquisa Agropecuária, APNE and CNIP - NE Brazil	Repatriation of data and type-specimen images and protologues, and provision of access to the database and images through a website.	<ul style="list-style-type: none"> • Training of 5 repatriation officers in curation, databasing, imaging and writing scientific papers • 2 officers to participate in Kew's Herbarium Techniques International Diploma Course • Joint writing of scientific papers • Workshop on repatriation issues held at Kew
Conservation of Plant Diversity in Western Cameroon	National Herbarium of Cameroon; Earthwatch; NGOs including Bamenda Highlands Forest Project; Kilum Ijim Forest Project	Aims to survey the flora of Western Cameroon, provide information to conservation bodies and resource planners, and support and strengthen the National Herbarium of Cameroon as a centre for plant biodiversity assessment and taxonomic research. One key component is repatriation to the National Herbarium of data and images of historical Cameroon specimens at RBG Kew. Another is the development of GIS applications.	<ul style="list-style-type: none"> • Joint collecting expeditions • Joint publication of conservation checklists including red data assessments, species database and specimen databases • Training workshops on plant identification and inventory techniques • Kew course on Herbarium Techniques taught to 25 African participants at the National Herbarium by Kew and local staff. • Supplying hardware and training of Cameroonians with GIS technology and supply of GIS analysis • Joint conservation assessments within Kilum Ijim Forest Project, and production of joint papers.
Vegetation Map of Madagascar	Silo National des Graines Forestieres ANGAP Conservation International Missouri Botanic Gardens	Use of GIS technology to assess Madagascar vegetation, plants and conservation. From 2003 will be producing new vegetation map of Madagascar. See: http://www.rbgekew.org.uk/gis/projects/madagascar/index.html	<ul style="list-style-type: none"> • Results and data made available to all Madagascar NGOs and through website. This is the most used vegetation data for Madagascar and is used by many other NGOs for their conservation efforts. • Website production for SNGF • GIS training, hardware and software transfer to Madagascar.
Papuan Plant Diversity Project	Universitas Negeri Papua	Aims to restore and expand the Herbarium at Manokwari, increase self-sufficiency by establishing cadre of highly motivated botanists trained to develop and maintain the collections, build plant diversity	<ul style="list-style-type: none"> • Herbarium renovation, acquisition of material, and establishment of collections database • Specimen naming and repatriation of data at RBG Kew by UK project co-ordinator • Study visits to RBG Kew and between Manokwari and Papua

		<p>research and conservation capacity and initiate collaborative links with relevant institutions (including those in Papua New Guinea).</p>	<p>New Guinea</p> <ul style="list-style-type: none"> • Participation in international meetings • Workshops and Kew International Diploma course in Herbarium Techniques given in Papua • Joint production of field guides to palms and seed plant families
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*A suite of International Diploma Courses of four to eight weeks designed for professionals in various fields, which aim to help develop technical and specialist skills. Currently we offer the following courses: Botanic Garden Education, Botanic Garden Management, Herbarium Techniques, Plant Conservation Techniques

Appendix 2

TRANSFER OF TECHNOLOGY AND TECHNOLOGICAL CO-OPERATION UNDER THE CBD: THE MILLENNIUM SEED BANK PROJECT EXPERIENCE

Clare Tenner, January 2003.

Introduction

RBG Kew's Millennium Seed Bank Project (MSBP) project plays a key role in the development and transfer of technology world-wide for the collection, conservation and management of *ex situ* collections of seeds from wild plant species.

Combining partners understanding and management of their native plants with the skills and knowledge gained over 30 years by Kew's Seed Conservation Department is the essence of the MSBP project. Kew's research and technology development has improved a relative simple technology - seeds are basically dried and stored at low temperatures – increased understanding of the processes at work, and refined the procedures and equipment used to get optimum results.

The MSBP has developed formal partnerships, based on mutually agreed collaborative activities, between Kew and organisations in fourteen different countries (see box 1). The objective of the MSBP partnerships is to build capacity for the collection, conservation, management and utilisation of high quality *ex situ* collections, as part of national biodiversity strategies and action plans. All the partnerships include considerable elements of technology transfer - from Kew to its partners, between the partners, and from the partners to Kew.

Each partnership is based on a legally-binding Access and Benefit Sharing Agreement (ABSA). The ABSA is the means by which Kew and the partner(s) set out in writing the mutually agreed terms for access to plant material and the fair and equitable sharing of the benefits of its use. All MSBP ABSA's include a clause which states that the partners agree to work together to share fairly and equitably the non-commercial benefits that arise from the collection, study and conservation of the material (commercialisation by Kew is prohibited by the ABSAs). Elements of technology transfer and technological co-operation, in particular education and training, joint research, and publications, are stated as benefits to be shared. These elements are elaborated in the Project Synopsis, which is normally provided as an Annex to the ABSA.

MSB project technology transfer and technological cooperation activities

Seed banking is a largely knowledge-based technology - relatively little equipment or machinery needs to be installed. Furthermore, most MSBP partners were operating some form of seed bank before joining the project. The emphasis has therefore been placed on building the knowledge and skills required. These do not only cover seed collecting and banking but also a range of related skills and expertise including databasing and GIS technologies, taxonomy, herbarium techniques, ecology, horticulture and policy issues, in particular access and benefit sharing. In addition, where necessary the MSBP does help develop the facilities available to partner institutes.

Although the focus is on building capacity within partner organisations, it is planned that some initial efforts are underway to transfer the knowledge and skills gained by of the MSBP partners will in turn be transferred to local communities.

Approaches to technology transfer include:

In-country training courses delivered by Kew staff, and key resource persons in partner countries, provide practical-based seed conservation training for MSB partners and other invited participants.

A 2-week **residential course** in Seed Conservation Techniques is run every other year at the Wellcome Trust Millennium Building, which houses the MSB. This provides theoretical and practical training in seed collection, conservation and management. It is also an opportunity for partners from different countries to share experiences. MSBP partners can also participate in Kew's IUCN-endorsed eight-week course in Plant Conservation Techniques or its other International Diploma courses.

In-country workshops provide a less structured means to exchange information on key areas relevant to the project. They can address technical issues, such as collecting techniques or other, associated, needs, such as the development of ABSAs.

Joint collecting expeditions allow Kew staff to pass on their collecting skills, whilst learning from partners about local geography, ecology and flora.

Scientists from partner institutions often undertake **training attachments** working alongside staff at the Wellcome Trust Millennium Building, usually on material from their own country. This mainly focuses on the seed processing, seed viability testing and data management areas.

Opportunities for higher level **academic study** are offered to graduate scientists expected to play or already playing a significant role in the MSB partnerships. Wherever possible, registration is sought with in-country universities, although supervision is often provided by Kew scientists and a research attachment at the Wellcome Trust Millennium Building may form part of the programme. The Kenyan Seeds for Life partnership, recognising the demand for academic qualifications, has been instrumental in developing a 1-year undergraduate diploma in Plant Conservation and Utilisation at Maseno University.

Collaborative research is undertaken not only with partner institutes but a whole range of institutes world-wide and visiting researchers spend time at the state of the art laboratory facilities at the Wellcome Trust Millennium Building.

In July 2001 the Seed Conservation Department organised a 'theory to practice' **project workshop** with all partners represented and a range of other invited participants. This was an opportunity to share experience and knowledge across a range of topics relevant to the project.

Providing **technical advice and solutions**. This may be as simple as advising on the types of bags used to store collected seed during field trips, or the best jars to store seed in the bank, but has also covered the installation and use of drying facilities and the purchase of IT hardware and software. Much of the applied research carried out by the Seed Conservation Department is directed towards improving seed conservation in partner countries. For example, staff have developed flexible low-cost drying solutions for small-scale seed conservation projects. In the context of the long-term commitment to these partnerships, much time is invested in the 'after care' to such technology transfer, such as answering technical inquiries by email.

Technology Transfer Facilitation

Because technology transfer is a core element of the MSBP, its facilitation has been considered from the start. The post of Training Manager was created, providing one full time Seed Conservation Department member of staff responsible for co-ordinating all training activities. A number of staff have participated in 'train the trainer' courses to improve their delivery of training.

Training inputs are specifically designed to meet the requirements of each partner institute, based on training needs assessments carried out in the project planning stages. Training courses are based around elements of a comprehensive MSBP training manual.

The Wellcome Trust Millennium Building was designed to include 14-study bedrooms, and visitor kitchen and lounge so the Seed Conservation Department can easily host those on research and training attachments and courses. Visitors also have access to the on-site library as well as Kew's main library, and are given access to IT facilities during their stay.

Outcomes and Impact

Direct measures can be made of technology transfer and technology cooperation activities. In the first year of the project 9 overseas participants received technical training, 4 received formal training, and 6 carried out research attachments at the WTMB. In country training workshops were attended by 61 partner staff and 15 received academic training. Seed Conservation Staff carried out four visits to partner institutes. The MSB project training programme critically reviews its activities in order to continually improve the training provided to partners and demonstrate show that the training provided does lead to the intended outcomes. Immediate reaction from participants is sought after all training activities. As part of attempts to validate and evaluate the longer-term impact, MSB project partners are encouraged to evaluate training in terms of how national capacity has been strengthened.

It is harder to measure the long term outcomes and impacts of the project activities. One indicator is the number of species being collected and conserved *ex situ* by partners. The total number of new collections duplicated to the MSB in the first official year of the project (Jan 01 to March 02) was 1411. Just as important is the quality of those collections, both in terms of the types of species that are being collected, and the care taken in the collection, cleaning and processing of material and data. This is being monitored by Seed Conservation Department curation staff.

Box 1: MSB Project Partners as of 27 January 2003**MSBP Partners**

W. Australia	Department of Conservation and Land Management and The Botanic Gardens and Parks Authority
Burkina Faso	Centre National de Semences Forestières
Chile	Instituto de Investigaciones Agropecuarias
Egypt	The Desert Research Center
Jordan	The National Center for Agricultural Research and Technology Transfer
Kenya	National Museums of Kenya, Kenya Agricultural Research Institute, The Kenya Forestry Research Institute, The Forestry Department, The Kenya Wildlife Service
Lebanon	The Lebanese Agricultural Research Institute
Madagascar	Silo National des Graines Forestières
Malawi	Forestry Research Institute of Malawi, National Plant Genetic Resource Centre, National Herbarium and Botanical Gardens, National Research Council of Malawi
Mexico	National Autonomous University of Mexico
Namibia	National Plant Genetic Resources Centre
South Africa	National Botanical Institute
USA	Bureau for Land Management
USA	Lady Bird Johnson Wildflower Center
Saudi Arabia	The National Commission for Wildlife Conservation and Development

Each of the partnership projects under the Millennium Seed Bank project are based on Access and Benefit Sharing Agreements (ABSAs). The ABSA is the means by which Kew and the partner(s) set out in writing the mutually agreed terms for access to plant material and the fair and equitable sharing of benefits.

All MSB ABSA's include a clause which states that the partners agree to work together to share fairly and equitably the non-commercial benefits that arise from the collection, study and conservation of the material, and in particular to support and strengthen institutional development. Benefits in a project such as the MSB are unlikely to be financial, especially since the ABSAs all include a clause which prohibits Kew from commercialising any resources transferred to it under the ABSA.

Technology transfer, in particular education and training and shared research and publications, is always given as benefits to be shared. These elements are then elaborated in much more detail in the Project Synopsis which is normally provided as an Annex to the ABSA.