

Conservation and sustainable use of medicinal plants in Ghana



Darwin Initiative Final Report

Project: 162/8/011

Contractor: UNEP-WCMC

1999-2002

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Darwin Initiative for the Survival of Species

Final Report

1. Darwin Project Information

Project title	Conservation and cultivation of medicinal plants in Ghana
Country	Ghana
Contractor	UNEP-WCMC
Project Reference No.	162/8/011
Grant Value	£119,983
Starting/Finishing dates	April 1999- March 2002

2. Project Background/Rationale

- Location and circumstances of the project

Ghana has a strong tradition of using medicinal plants for the treatment of a wide range of diseases and disorders. This tradition continues to play an important role both culturally and economically in Ghana today. Traditional medicine provides a broad range of primary health care in rural areas and enables access to medical treatment for all. The traditional healers, herbalists, birth attendants and fetish priests have a significant political and spiritual status in villages throughout the country. Government policy has for a number of years, promoted the integration of traditional health systems with conventional health systems as indicated by the existence, within the Ministry of Health, of a Director for Traditional Medicine. The appreciation of the importance of medicinal plants at governmental level is increasing and new laws to standardise medicine and control traditional medical practitioners' activities is currently undergoing review.

Strong botanical support for the project was available from the (then) Curator of the Herbarium at the Department of Botany, University of Ghana, Mr Daniel Abbiw, (author of *Useful plants of Ghana: West African uses of wild and cultivated plants*).

Fifty acres of land was made available to the project by the support of Mr George Owusu-Afryie, Chief Parks and Gardens officer, Department of Parks and Gardens, Ministry of Local Government and Rural Development. This provided an excellent opportunity for the development of a medicinal plant garden at the Gardens. The Aburi Botanic Gardens also offered free accommodation and food throughout the duration of the project for the two UK project officers during their visits to Ghana. Ghana therefore was a clear candidate as a country for this pilot initiative.

- The problem that the project aimed to address

Medicinal plants play a vital role in the maintenance of human health throughout the world. They are of critical importance in rural communities where even relatively cheap western medicines remain unobtainable and prohibitively expensive. The medicinal plant tradition also plays an important cultural role and economic role. Knowledge of medicinal plant use is in the domain of the

specialists but their efficacy is widely trusted and based upon a long history of use.

The continuing availability of medicinal plants is particularly important to women. Women play an important role as primary health carers in the family and also have an additional need for medicinal plants in the treatment of gynaecological disorders. Women are frequently responsible for the collection of medicinal plants and are negatively impacted as plant availability diminishes by having to walk increasingly greater distances to collect these resources.

Despite the values of medicinal plants, their apparent efficacy and the lack of affordable alternatives, their continued availability is in jeopardy. Habitat destruction, over-collection and the loss of wild lands to agriculture has resulted in the increasing rarity of these resources.

Traditional medicine is largely reliant on an oral rather than a written tradition and the loss of medicinal plants means not only the gradual loss of effective remedies but also rapid erosion of traditional knowledge. It is this loss of knowledge that is particularly difficult to stop.

Action was therefore urgently required to implement measures to ensure the continued availability and use of medicinal plants. These measures included:

- propagation and cultivation of plants in home gardens to reduce the pressure on wild populations;
- controls on the trade in medicinal plants from the wild to ensure sustainable levels of harvesting;
- reduction in the loss of wild plant habitats and documenting and promoting traditional medicinal plant use.

All of these approaches should benefit from the information products that this project has provided.

- Identification of the need for this project and evidence for a demand for this work and a commitment from the local partner

In 1996 Mr. George Owusu Afriyie (Director of Aburi Botanic Garden) met with Botanic Gardens Conservation International (BGCI) and explained the need for a medicinal plant conservation project in his region. He outlined the rapid decline in medicinal plants and the increasing pressure on the Garden to provide material to traditional healers. In 1998, discussions continued between BGCI and Mr. George Owusu Afriyie and an outline for the project was developed.

In October 1997, a West Africa Regional Workshop in Biodiversity Information Management was run by UNEP-WCMC (then WCMC), hosted by the Centre for Remote Sensing and Geographic Information Services (CERSGIS) (then RSAU), University of Legon, Ghana. During the workshop, visits and discussions with local institutions demonstrated the urgent need to build local capacity in medicinal plant data management in support of *in-situ* and *ex-situ* conservation measures.

In 1999 BGCI and UNEP-WCMC agreed to collaborate for the common goals of this project.

3. Project Summary

- Purpose and objectives of the project

The overall objective was to promote the conservation and sustainable use of medicinal plants in Ghana. This was achieved in two main steps:

1. Establishment of a comprehensive medicinal plants information system and staff trained to use this effectively. The information system provides a detailed picture of issues relating to the use and importance of medicinal plants in Ghana and can be used to establish priorities in conservation, cultivation and sustainable use. Enhanced in-country capacity to manage relevant data also supports implementation of the Convention on Biological Diversity.
2. Promotion of the cultivation of medicinal plants in people's home gardens to help reduce pressure on medicinal plants of wild origin. This was achieved firstly, by the development of demonstration medicinal plant garden at the Aburi Botanic Gardens at Aburi and the University Botanic Garden, Legon. It was expected that these two gardens could eventually provide plant material for local villages to propagate and cultivate in their home gardens. Secondly, by the production of a practical and user-friendly manual on the propagation and cultivation of medicinal plants for use by local people in their home gardens.

- Original objectives

The original objectives were closely followed, with all objectives met. A slight delay in implementation of the project occurred due to the ill-health of the project leader in the first year, and delay in internal transfer of funds at the Herbarium to project staff during the second year. This led to the project over-running by one month. Approval was given by the Secretariat for this over-run.

An extra project visit was facilitated, allowing one Ghanaian colleague to spend one week at UNEP-WCMC. Diversion of funds to cover his expenses was approved in advance by the Secretariat.

- Articles under the Convention on Biological Diversity (CBD) best describing the project.

The project has a direct role in assisting Ghana to meet articles 7, 8j and 9 of the CBD, relating to data management and *ex-situ* conservation, respectively, and Article 26, the completion of national reports on actions the country has taken to meet CBD obligations.

The project has helped to build capacity in both Aburi Botanic Gardens and the Herbarium to facilitate the management of data on medicinal plants and the plant collections in their care. This includes details relating to use, geographical distribution, threats, habitat type and abundance. This provides a sound basis for the development of information products designed to influence decision-makers at both local and national levels. The information will support outreach activities promoting practical steps in the cultivation, conservation and sustainable use of medicinal plants.

- Success of the project in terms of meeting objectives.

The project succeeded well in terms of providing facilities and training as planned, development of the medicinal plant garden, and production of the manual, ethnobotanical survey and conservation report.

Additional activities were implemented. Notably the provision of computing equipment, software and training to the Aburi Botanic Gardens, development of a medicinal plant garden at the University Botanic Garden, and the production of a set of four project posters which have now been provided to all of the participating organisations. In addition, copies of all project outputs are available on the Internet at the project website

<http://www.unep-wcmc.org/species/plants/ghana>.

A copy of this website has been produced on CD-ROM.

4. Scientific, Training, and Technical Assessment

- Training and capacity building activities

Technical training on the computerisation of botanical collections was a major focus of this project. Staff members from partner institutions in Ghana, selected by their managers, were trained in the management of information using the plant collections software developed by the Royal Botanic Garden Edinburgh (RBGE) based company *BG-BASE*.

An initial training workshop was held at CERSGIS in January 2000, run by staff from RBGE and UNEP-WCMC, with subsequent follow-up visits from RBGE and UNEP-WCMC staff to Ghana in October 2000, and from UNEP-WCMC staff in February 2001 and April 2002. These enabled an assessment to be made of level of competence and the provision appropriate additional training. A further technical training visit was made by a CERSGIS staff member to UNEP-WCMC in January 2002.

Certificates of Completion for the initial training workshop were provided by the project. Staff of the Botanic Gardens received training in horticultural techniques and the establishment and management of nursery facilities. Members of the project team undertook participant rural appraisal interviews and developed their own spreadsheets for the management of diverse ethnobotanical information for the ethnobotanical survey. The collation, design and the contractual arrangements for the printing of the manual provided additional experience.

5. Project Impacts

- Evidence that project achievements have led to the accomplishment of the project purpose.
1. Data management: the Herbarium and Aburi Botanic Gardens now has the resources (hardware, software, trained staff) to enable them to continue managing data on medicinal plant herbarium specimens and living accessions respectively.

The Director of Aburi Botanic Gardens has played an active and interested role throughout, recruiting a database technician to ensure that data on the plant accessions at the Garden continue to be managed.

The previous Head of Department (Professor Odamtten) was not very involved in the project. He has now been replaced as Head of Department by Professor Enu-Kwesi who was present during the last project visit. At Professor Enu-

Kwesi's request, Harriet Gillett gave a seminar to the faculty in April 2002, stressing the value of the resources (herbarium specimens and computer facilities) in the department. Professor Enu-Kwesi expressed great interest and enthusiasm for the project and there is every reason to believe that he will provide encouragement to undergraduate and graduate students to exploit the Herbarium database for their studies. The Professor will promote the continuation of the database, thus enabling further analyses to be made.

2. Manual: Two thousand copies of the manual will be available free from Aburi Botanic Gardens for use by the target users. These will include school groups, teachers, women's groups, community groups and NGOs interested in promoting plant conservation in the rural areas. The Education Officer at Aburi Botanic Gardens will be using the manual as a basis for a teacher's pack and the project team will continue to use the manual for outreach work in the community. Aburi Botanic Gardens will monitor the use of the manual and evaluate its effectiveness in the promotion of home gardening in the rural villages in the vicinity of the Garden.
3. Ethnobotanical report: this, with all project outputs is available on the web and CD-ROM. Comments on its use and development will be monitored *via* UNEP-WCMC's information services. This report has provided valuable ethnobotanical information for use by the project team members in the future. Contacts made during the conduct of this survey are expected to provide a nucleus of community groups interested in promoting home gardening for the conservation of medicinal plants in the immediate future.
4. Medicinal plant garden: The gardens at Aburi Botanic Gardens and the University Botanic Garden are now well-established. Young seedlings and semi-mature plants have already been provided to local villages for the development of their home gardens. A trail developed at Aburi Botanic Gardens is currently being used as a teaching aid. The trail takes visitors to mature specimens of plants promoting the accurate recognition of many of the medicinal plant species identified in this project. A trail leaflet is currently being produced at Aburi Botanic Gardens to enable self-guided tours to be undertaken by some of the 20,000 visitors the Garden. Guided tours of the medicinal plant gardens provide an opportunity to highlight the threat to medicinal plants from over-collection in the wild and suggest alternative methods for the sustainable management of these resources.
5. Conservation report and maps: These are available on the web and CD-ROM. These include analyses of the computerised specimen and spatial data, illustrating medicinal plant distribution in relation to habitat/protected-areas etc.

- Extent to which project has achieved its goal

The project will directly contribute to the ability of Ghana to report on the status of medicinal plants within the country. Reports and maps produced by the project have been provided to all participating organisations as well as to the Ministry of Environment, Science and Technology. The Departments of Botany and CERSGIS plan to use and develop the project CD-ROM as a teaching tool at secondary and tertiary level. At Aburi Botanic Gardens, staff have been recruited to help maintain data entry on both living collections and ethnobotanical information gathered from the Garden's outreach work. A permanent display of the project posters is being erected at the entrance to the medicinal plant garden

- Extent to which capacity building elements of the project have improved local capacity for further biodiversity work in the host country.

An important impact of the project has been to strengthen links between Aburi Botanic Gardens, the Department of Botany and CERSGIS. The Department of Botany and CERSGIS now have the facilities and knowledge to continue with development of systems to analyse the status of plant resources in the country. The link between CERSGIS and Aburi Botanic Gardens ensures that the Garden has access to a high level of technical expertise on request. Ben Akuetteh (CERSGIS) remains as senior data analyst. Konnings Amponsah (database technician, Aburi Botanic Gardens) has had his temporary contract upgraded to a permanent contract. Patrick Ekpe, Daniel Abbiw (semi-retired) and Alex Assase continue to work at the Herbarium.

Aburi Botanic Gardens continue to benefit from a plants records management system that will enhance the capacity of the Garden to maintain and develop its entire living collection. This will provide valuable baseline data to develop new plant conservation projects and encourage both national and international researchers to work at the Garden. When completed the accessioning of the Gardens collections will enable a full inventory for the first time in its 100 years history. From this basis a Garden strategy can be developed that meets the local biodiversity needs and has the capacity to undertake further conservation activities effectively. The development of further educational material – leaflets and guides – is planned. The Garden intends to continue to promote home gardening for threatened medicinal plants through its community outreach work and its Education Department.

- Impact of the project in terms of collaboration to date between UK and local partner.

The project has allowed strong links to be made between BGCI and UNEP-WCMC based in the UK and the three Ghanaian partners. The collaboration of BGCI and Aburi Botanic Gardens is particularly important in the light of ongoing work to establish a West African Botanic Gardens Network and an African Botanic Gardens Network. BGCI hope to promote the sponsorship of the University Botanic Garden to full membership of BGCI and look forward to developing further projects in collaboration in the future.

Links between UNEP-WCMC and the University (CERSGIS and Department of Botany) should lead on to further educational products, particularly development of the CD-ROM. Links between UNEP-WCMC and Aburi Botanic Gardens are anticipated to lead to the development of further information products relevant to Garden visitors.

The project provided for a five year software support contract between RBGE and the Herbarium and Aburi Botanic Gardens.

- Social impact

The local communities participating in the project have benefited directly from the availability of medicinal plant seedlings/plants provided by the medicinal plant Garden established at Aburi Botanic Garden. The provision of free plant material acted as a catalyst in a number of cases and prompted the organisation of local project committees to organise the village initiative. Local people who are recognised for their knowledge of medicinal plants have been the mainstay of these committees. The work of the committees has provided a vehicle for much discussion and thought on the value of their knowledge and the benefit of this knowledge to the community as a whole. It is expected that the clear guidance on basic propagation and cultivation techniques provided by the manual will benefit these communities and many more well into the future.

Within the community, the establishment of home gardens appears to have provided the impetus for individuals to work together on a project for the benefit of the community as a whole. Project T-shirts provided a strong sense of project ownership for those involved.

6. Project Outputs

A project website is available at <http://www.unep-wcmc.org/species/plants/ghana> with links to all collaborating organisations.

This provides all project outputs, including conservation report, manual, ethnobotanical survey and species maps. A copy of the website is also available on CD-ROM, available from info@unep-wcmc.org, or from Harriet Gillett, Senior Programme Officer, UNEP-WCMC, 219 Huntingdon Rd, Cambridge CB3 0DL, UK or from BGCI, Fiona Dennis, Projects Officer, BGCI, Descanso House, 199 Kew Road, Richmond, Surrey TW9 3BW. Twenty copies of the CD-ROM will be provided to each project partner in Ghana. Further copies can be made in limited quantities by UNEP-WCMC. Copies of the manual are being distributed for free at the discretion of the Director of Aburi Botanic Gardens, PO Box 23, Aburi, Ghana and BGCI. (see address above).

7. Project Expenditure

The Secretariat approved funds to be moved to cover expenses for Ben Akuetteh to visit UNEP-WCMC in January 2002.

8. Project Operation and Partnerships:

Participating organisations

Initial plans for partnerships were unchanged. The three Ghanaian partners, listed below, all played active roles.

- ◆ Aburi Botanic Gardens is responsible for practical plant conservation, conservation education and community outreach activities.
- ◆ The Department of Botany teaches on conservation issues and maintains the herbarium collections.
- ◆ CERSGIS is the country centre of expertise on GIS with data layers relevant to conservation planning. All partners were consulted during the development of the project proposal.

Plans were modified to extend the database work to Aburi Botanic Gardens, and the development of the medicinal plant garden at the University Botanic Garden.

Aburi Botanic Gardens

P.O. Box 23

Aburi, Ghana

Tel:

Project liaison point: George Owusu-Afriyie (Director).

Project staff: Theophilus Agbovie; O'Rourke Crensil; William Ofosuhen-Djan; Konings Amponsah.

Project activities comprised development of a [medicinal plant garden](#) including cultivation of nursery stock for local use; development of a database of information on these plants, including provenance and plant use based on ethnobotanical research; ethnobotanical survey; development and production of a manual on establishing home medicinal plant gardens and contributing to the end project report and CD-ROM on the Conservation and sustainable use of medicinal plants.

The Herbarium, Department of Botany

University of Ghana

PO Box LG 55, Legon, Ghana

<http://www.ug.edu.gh>

Tel:

Project liaison point: Professor Enu-Kwesi (current Head), Professor Odamtten (previously Head).

Project staff: Daniel Abbiw; Patrick Ekpe; Alex Asase (Herbarium); Mary Yankson (Botanic Garden).

Project activities comprised: computerisation of the [Herbarium's](#) medicinal plant specimen sheets, including information on the location of each specimen; development of a medicinal plant garden within the [University Botanic Garden](#); contributing to a manual on establishing home medicinal plant garden; contributing to the in situ conservation components of a final report/CD-ROM mapping the distribution of medicinal plants in Ghana.

Centre for Remote Sensing and Geographic Information Systems (CERSGIS)

University of Ghana
PO Box 59, Legon, Ghana
Tel:

<http://www.ug.edu.gh/>

Project liaison point: Dr E. Amamoo-Otchere (Director).

Project staff: Benjamin Akuetteh.

Project activities comprised: hosting the initial database training session; provision of technical support to the Herbarium and Aburi Botanic Gardens; production of the end of project CD-ROM including in situ and ex situ conservation data produced by the Herbarium and Aburi Botanic Gardens, habitat maps and protected area maps.

A project funded by the Community Fund (formerly National Lottery Charities Board) was being implemented at the same time at Aburi Botanic Gardens, with complementary activities.

International and UK partners comprised BGCI, RBGE and UNEP-WCMC.

Local partnerships, community participation and the private sector

It is anticipated that local partnerships will remain active after the end of the project. The Director of Aburi Botanic Gardens is also Director of Parks and Gardens of the Ministry of Environment, Science and Technology (which is responsible for implementation of the CBD in Ghana).

As Aburi Botanic Gardens develops its medicinal plant garden, there will be scope for considerable extra community participation from local villages. There could be a role for the private sector in sponsoring development of village gardens or sponsoring further development of the garden at Aburi Botanic Gardens. The Garden is in a very strategic location. It is one of rather few places, that is a convenient day visit from the capital, on hills providing welcome relief from the heat of the Accra plains, and is a popular venue for visitors, both national and international. The Garden is very pleasant with good visitor facilities – accommodation and restaurants - and thus lends itself well to encouraging return visits.

9. Monitoring and Evaluation, Lesson learning

- **Monitoring and Evaluation**

Use of the manual and interest in the medicinal plant garden at Aburi Botanic Gardens will be assessed *via* a feedback system for visitors. A visitor's book will be established for comments. Verbal feedback will be solicited from villagers by the village co-ordinators, and reports provided back to the UK via the Director.

Access statistics will be maintained on the use of the project website, and all project enquiries *via* the website or other means will be logged at UNEP-WCMC.

Good relations were established with each of the Ghanaian partners and it is anticipated that further projects will be implemented with their co-operation. This will allow future use of the project databases at Aburi Botanic Gardens and the Herbarium to be monitored.

Following the seminar given to students by Harriet Gillett, an essay competition has been established to solicit feedback from the students on their experience at the personal level of medicinal plants. The objective of this is to raise students' interest in these plants and make them reflect on their own expertise and knowledge of the subject.

- Internal and external evaluation of the work

No external evaluation took place. All projects at UNEP-WCMC are subject to regular monthly internal review, between project manager and project supervisor (Programme Head).

- Key lessons

The key lesson relates to interest from partners at the highest level within each department. The Director of Aburi Botanic Gardens (a member and previous project partner to BGCI prior to the project) was involved, interested and supportive from the outset. He ensured funds were well spent, came up with practical imaginative suggestions and good hospitality – in terms of reception at airport, provision of drivers/accommodation etc. These issues make a major difference when visiting for a short time. His staff were well motivated, informed and interested in the project. The work progressed very smoothly.

At CERSGIS, there was a change in staff during the project – both the Director and the technical officer changed. Fortunately the new Director and technical officer proved to be as, if not more, enthusiastic as the outgoing staff. Both were highly competent technically, and well-used to working on international projects. The work progressed very smoothly.

The exception was the Department of Botany. The project had been developed following discussions with the (then) Curator of the Herbarium, Mr Daniel Abbiw. The Head of Department, during much of the project, Professor Odamtten did not fully engage in the work. Mr Abbiw provided invaluable advice on how to manage the issues arising, which was closely followed by the project leader. Following this, every effort was made to keep as much control on the work from the UK as possible. Meetings were scheduled with Professor Odamtten on each visit, but met with very limited attention. Payments to the Department were tightly controlled and one payment delayed (with approval from the Darwin Initiative) to ensure money was spent as agreed. Professor Odamtten had been replaced by Professor Enu-Kwesi as Head of Department by the last project visit. He proved very interested in the project and there is every reason to believe that he will support future implementation and continued involvement from students.

In future, it would seem preferable to put a strong emphasis on developing projects only once one has established that there is a motivated, knowledgeable, reliable person in a place of authority. The best ideas cannot flourish unless there is good in-country contact.

10. Darwin Identity:

- Efforts made to publicise the Darwin Initiative

Considerable effort has been made to publicise the Darwin Initiative. The project website was set up early on during the project, the CD-ROM includes the Darwin

Initiative logo on the cover, all reports include the logo and description of the Darwin Initiative. Fliers produced at the beginning of the project included the logo, and the four project posters include the logo and reference to the Darwin Initiative. Emphasis on the Darwin Initiative was made during the initial project celebration in Ghana in July 1999. All BGCNews articles have acknowledged Darwin Initiative and included the Darwin Initiative logo and the annual reports of BGCI and UNEP-WCMC both acknowledge the contribution of the Darwin Initiative.

- Understanding of Darwin Identity in the host country

The Director of Aburi Botanic Gardens and CERSGIS are both aware of the Darwin Initiative as they are both active on the international scene. Familiarity will be much greater following the project, particularly due to the project posters and additional public signage at Aburi Botanic Gardens.

- Identity of project

This project stood alone. It was innovative and distinct with a clear identity. It successfully complimented a concurrent Community Fund project.

11. Leverage

- Additional funds

Both Aburi Botanic Gardens and the University Botanic Garden offered the use of land for the medicinal plant gardens, representing a major in-kind donation to the project.

Aburi Botanic Gardens gave free accommodation and food throughout all UK project staff visits.

BAAC donated in kind through the provision of free flights for UK staff to visit Ghana and *vice versa*.

- Efforts made by UK project staff to strengthen the capacity of partners to secure further funds for similar work in the host country

The partners were well aware of the issues involved in raising funds from abroad. It is hoped that some of the work can continue *via* a project submission from UNEP-WCMC to UNEP for money donated by the Irish Government for conservation of biodiversity in Africa. In anticipation of a successful outcome, preliminary discussions have been held with Aburi Botanic Garden and CERSGIS regarding development of medicinal plant educational materials, based on existing project outputs.

BGCI and Aburi Botanic Gardens are in discussions to develop the project further, primarily extending the achievements in the nursery and the community work and also making use of the accessions database to look at a collections strategy and a conservation programme for the Garden. They expect to be ready to approach funding bodies by July 2002. BGCI continue to promote relations between the University and the Peace Corp volunteers to provide teaching and horticultural assistance in the University Botanic Garden.

12. Sustainability and Legacy

- Project achievements most likely to endure

The gardens are expected to be kept under cultivation and open to the public. Education programmes will be developed using the gardens as primary teaching tools. All project staff are currently anticipated to remain in post. The computers and software at the Herbarium and Aburi Botanic Gardens will remain available

for the maintenance of the institutions collections and for the development of further activities. We anticipate on-going collaboration with all three organisations. Database staff will remain in contact *via* the newsletter produced by the software company, *BG-BASE* based at RBGE.

- Application of project's conclusions and outputs

It is too early to tell how widely the outputs might apply.

- Additional funds to continue aspects of the project

It is hoped that this will be extended if the UNEP-WCMC submission to UNEP for a project on Medicinal Plants in Africa is successful. The Aburi Botanic Gardens will present the achievements of the project at the African Botanic Garden Congress in Durban, November, 2002. It is anticipated that the Commonwealth Secretariat will fund their participation. It is hoped that further project development with both Aburi Botanic Gardens and BGCI and with the African Botanic Gardens Network will attract additional funding from a number of sources. The West African Botanic Gardens Network will be developing a regional strategy which will include an element on medicinal plant conservation. The Aburi Botanic Gardens model medicinal plant garden will provide a focal point for this initiative.

13. Value for money

We consider that this project has been excellent value for money. Considerable extra activities were undertaken, and additional visits made both to and from Ghana, thanks to support from BAAC.

Author(s) / Date

Harriet Gillett (UNEP-WCMC) and Fiona Dennis (BGCI) June 2002.

14. Appendix I: Project Contribution to Articles CBD

Project Contribution to Articles under the Convention on Biological Diversity		
Article No./Title	Project %	Article Description
6. General Measures for Conservation & Sustainable Use		Develop national strategies which integrate conservation and sustainable use.
7. Identification and Monitoring	15	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities which have adverse effects; maintain and organise relevant data.
8. In-situ Conservation	5	Establish systems of protected areas with guidelines for selection and management; regulate biological resources, promote protection of habitats; manage areas adjacent to protected areas; restore degraded ecosystems and recovery of threatened species; control risks associated with organisms modified by biotechnology; control spread of alien species; ensure compatibility between sustainable use of resources and their conservation; protect traditional lifestyles and knowledge on biological resources.
9. Ex-situ Conservation	15	Adopt ex-situ measures to conserve and research components of biological diversity, preferably in country of origin; facilitate recovery of threatened species; regulate and manage collection of biological resources.
10. Sustainable Use of Components of Biological Diversity	10	Integrate conservation and sustainable use in national decisions; protect sustainable customary uses; support local populations to implement remedial actions; encourage co-operation between governments and the private sector.
11. Incentive Measures		Establish economically and socially sound incentives to conserve and promote sustainable use of biological diversity.
12. Research and Training	15	Establish programmes for scientific and technical education in identification, conservation and sustainable use of biodiversity components; promote research contributing to the conservation and sustainable use of biological diversity, particularly in developing countries (in accordance with SBSTTA recommendations).
13. Public Education and Awareness	10	Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; co-operate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimising Adverse Impacts		Introduce EIAs of appropriate projects and allow public participation; take into account environmental consequences of policies; exchange information on

		impacts beyond State boundaries and work to reduce hazards; promote emergency responses to hazards; examine mechanisms for re-dress of international damage.
15. Access to Genetic Resources		Whilst governments control access to their genetic resources they should also facilitate access of environmentally sound uses on mutually agreed terms; scientific research based on a country's genetic resources should ensure sharing in a fair and equitable way of results and benefits.
16. Access to and Transfer of Technology	25	Countries shall ensure access to technologies relevant to conservation and sustainable use of biodiversity under fair and most favourable terms to the source countries (subject to patents and intellectual property rights) and ensure the private sector facilitates such assess and joint development of technologies.
17. Exchange of Information	5	Countries shall facilitate information exchange and repatriation including technical scientific and socio-economic research, information on training and surveying programmes and local knowledge
19. Bio-safety Protocol		Countries shall take legislative, administrative or policy measures to provide for the effective participation in biotechnological research activities and to ensure all practicable measures to promote and advance priority access on a fair and equitable basis, especially where they provide the genetic resources for such research.
Total %	100%	Check % = total 100

15. Appendix II Outputs

Code	Total to date (reduce box)	Detail (←expand box)
Training Outputs		
1b	Number of PhD qualifications obtained	
2b	Number of Masters qualifications	
3b	Number of other qualifications obtained	
4a	Number of undergraduate students receiving training	
4b	Number of training weeks provided to undergraduate students	
4c	Number of postgraduate students receiving training (not 1-3 above)	
4d	Number of training weeks for postgraduate students	
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(i.e. not categories 1-4 above)	
6a	Number of people receiving other forms of short-term education/training (i.e. not categories 1-5 above)	
6b	Number of training weeks not leading to formal qualification	12 people attended the initial training session. Follow up training was held at each organisation.
7	Number of types of training materials produced for use by host country(s)	one manual on cultivation of medicinal plants
Research Outputs		
8	Number of weeks spent by UK project staff on project work in host country(s)	14
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (s)	
10	Number of formal documents produced to assist work related to species identification, classification and recording.	2. ethnobotanical survey, conservation report
11a	Number of papers published or accepted for publication in peer reviewed journals	
11b	Number of papers published or accepted for publication elsewhere	
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	2. One database at the Herbarium, the other at Aburi Botanic Gardens
12B	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	
13a	Number of species reference collections established and handed over to host country(s)	
13b	Number of species reference collections enhanced	
Dissemination Outputs		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work in host country	1. Seminar given to Faculty of Science in April 2002
14c	Numbers of conferences/seminars/workshops	1. BGCI's World Botanic

Code	Total to date (reduce box)	Detail (←expand box)
	attended at which finding from Darwin project work have been presented/disseminated in the host country	Garden Congress, Asheville, USA 2000
15a	Number of national press releases or publicity articles in host country(s)	
15b	Number of local press releases or publicity articles in host country(s)	2.
15c	Number of national press releases or publicity articles in UK	
15d	Number of local press releases or publicity articles in UK	
16a	Number of issues of newsletters produced in the host country(s)	
16b	Estimated circulation of each newsletter in the host country(s)	
16c	Estimated circulation of each newsletter in the UK	
17a	Number of dissemination networks established in host country	
17c	Number of dissemination networks enhanced/extended in host country	
18a	Number of national TV programmes/features in host country(s)	2.
18b	Number of national TV programme/features in the UK	
18c	Number of local TV programme/features in host country	
18d	Number of local TV programme features in the UK	
19a	Number of national radio interviews/features in host country(s)	
19b	Number of national radio interviews/features in the UK	
19c	Number of local radio interviews/features in host country (s)	
19d	Number of local radio interviews/features in the UK	
Physical Outputs		
20	Estimated value (£s) of physical assets handed over to host country(s)	£9,000
21	Number of permanent educational/training/research facilities or organisation established	
22	Number of permanent field plots established	2. Medicinal plant gardens established at Aburi Botanic Gardens and University Botanic Garden
23	Value of additional resources raised for project	

16. Appendix III: Publications

Type * (e.g. journals, manual, CDs)	Detail (TITLE, AUTHOR, YEAR)	Publishers (NAME, CITY)	Available from (e.g. contact address, website)	Cost £
CD-ROM*	<i>Conservation and cultivation of medicinal plants in Ghana.</i> Ed. H.Gillett. 2002	UNEP-WCMC	Harriet Gillett UNEP-WCMC 219 Huntingdon Rd Cambridge CB3 0DL Info@unep-wcmc.org	£10
Manual*	<i>Manual for the propagation and cultivation of medicinal plant of Ghana.</i> Ed. F. Dennis. 2002	Aburi Botanic Gardens	Fiona Dennis BGCI Descanso House 199 Kew Rd Richmond Surrey TW9 3BW frd@bgci.rbgekew.org.uk	Free plus P&P

17. Appendix IV: Darwin Contacts

To assist us with future evaluation work and feedback on your report , please provide contact details below.

Project Title	Conservation and cultivation of medicinal plants in Ghana
Ref. No.	162/8/011
UK Leader Details	
Name	Harriet Gillett
Role within Darwin Project	Project Leader
Address	UNEP-WCMC, 219 Huntingdon Rd, Cambridge CB3 0DL, UK
Phone	
Fax	
Email	
Other UK Contact (if relevant)	
Name	Fiona Dennis
Role within Darwin Project	Production of manual, ethnobotanical survey and advisor on gardens development
Address	Descanso House 199 Kew Road, Richmond Surrey TW8 3BW, UK
Phone	
Fax	
Email	
Partner 1	
Name	George Owusu-Afriyie
Organisation	Aburi Botanic Gardens

Role within Darwin Project	Leader of work undertaken at Aburi Botanic Gardens
Address	P.O. Box 23 Aburi Ghana
Fax	
Email	
Partner 2 (if relevant)	
Name	Professor Enu-Kwesi
Organisation	Department of Botany
Role within Darwin Project	Leader of work undertaken at Department of Botany
Address	University of Ghana PO Box LG 55, Legon, Ghana
Fax	
Email	
Partner 3 (if relevant)	
Name	Dr. Amamoo-Otchere
Organisation	CERSGIS
Role within Darwin Project	Leader of work undertaken by CERSGIS
Address	University of Ghana PO Box 59, Legon, Ghana
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Email	