



Submit by 21 January 2005

DARWIN INITIATIVE APPLICATION FOR GRANT ROUND 13 COMPETITION:STAGE 2

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

1. Name and address of organisation

Name: University of Liverpool	Address: Senate House, Abercromby Square, Liverpool L69 3BX
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2. Project title (not exceeding 10 words)

Tool-kits for the sustainable management of Ghana's riverine biodiversity

3. Project dates, duration and total Darwin Initiative Grant requested

Proposed start date: May 2005		Duration of project: 36 months			
Darwin funding requested	Total (£)188816	2005/06 (£)65779	2006/07 (£)63856	2007/08 (£)59181	2008/09 £

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

Ghana is committed to the application of the Ecosystem Approach (EA) for the delivery of the CBD, and is a lead player in the area of wetland management in Africa. Despite this, there remain major impediments in achieving sustainable wetland management. Priority needs are taxonomic capacity building, assessment of status of aquatic biodiversity, enhanced environmental awareness throughout society, the development of practical management tools for rivers and increased engagement of stakeholders in decision making. These will be addressed in this project by regional and local staff training, reporting on the current status of aquatic communities, the production of educational and taxonomic resources for a range of users, the development of a set of nested indicators of ecosystem health adapted for use at various levels, and the production of a policy document outlining the means of applying the EA in the management of Ghana's rivers.

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

Details	Project Leader	Other UK personnel (working more than 50% of their time on project)	Main project partner or co-ordinator in host country
Surname	Maltby		Gordon
Forename (s)	Edward		Chris
Post held	Director		Director
Institution	University of Liverpool		University of Ghana
Department	SWIMMER		Centre for African Wetlands (CAW)
Telephone			
Fax			
Email			

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

The Darwin Southeast Asian Wetland Restoration Initiative (2003-2006): Round 11, (12034) Vietnam
The Darwin Madagascar Wetland Biodiversity Project (1998-2000): Round 6, (7113) Madagascar
The Darwin *Melaleuca* Wetlands Project (1995-1998): Round 3, (4197) Vietnam and Thailand (all submitted by Prof Maltby via Royal Holloway Institute for Environmental Research - RHIER)

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

Aims (50 words) The Institute for Sustainable Water, Integrated Management and Ecosystem Research (SWIMMER) is a new interdisciplinary centre at Liverpool to support cutting edge research and provide guidance on sustainable water and ecosystem management

Activities (50 words) SWIMMER has assumed the ongoing portfolio of projects presently based at RHIER and is promoting research, training and advisory activities with the wider biodiversity expertise based at Liverpool.

Achievements (50 words) SWIMMER is developing a wide partnership and network of collaborators worldwide. It will move into a newly refurbished facility within the University in late summer 2005 which will provide a strong focus for research personnel from different disciplines and countries.

8. Please list the overseas partners that will be involved in their project and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development. What steps have been taken to ensure the benefits of the project will continue despite any staff changes in these organisations? Please provide written evidence of partnerships.

Centre for African Wetlands (CAW): Local co-ordinator; co-hosted pre-project visit and contributed to the proposal development. They have also secured co-funding. They will contribute knowledge on local species, will organise fieldwork and training courses and host a project office. The project will make use of its existing national and regional networks.

University of Ghana: Zoology Department and the Volta Basin Research Project (VBRP): Co-hosted project visit. They will also assist with field sampling and laboratory work and they will contribute knowledge on local species.

Council for Scientific and Industrial Research (CSIR): Contributed to project development. They will provide assistance with macroinvertebrate taxonomy and ecology, macroinvertebrate field sampling and water quality samples analyses. They will also contribute knowledge on local species.

Ghana Wildlife Society (GWS): Contributed to project development. They will provide assistance with the production of dissemination materials and they will also contribute knowledge on local species. The project will also use its network of local clubs to test and disseminate certain outputs.

Letters of Support from CAW, University of Ghana, CSIR and GWS have been obtained

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

Local communities were visited during the pre-project visit, when selecting the sampling sites along the rivers Odaw, Kakum and Volta. Discussions with local people demonstrated that their livelihoods depend largely on the riverine resources and that there is a lack of environmental awareness especially on issues such as biodiversity conservation. Collaboration with the Ghana Wildlife Society was also established and this will contribute to the more effective consultation of the local communities as wildlife clubs are spread throughout the country with greater concentration in the southern areas where the selected sampling sites are located. GWS has already extensive experience on community based projects and has delivered in the past with great success nature conservation education in communities and schools. GWS works also closely with the Ghana Wildlife Division (Government department) that controls all the nature reserves. Prof. Oteng Yeboah (Chairman, Subsidiary Body on Scientific, Technical and Technological Advice SBSTTA) will be an important collaborator. Okyeame and David Kpele of Conservation International, Ghana will also be contacted on the possibility of bringing extra funds. Mr J.S. Amakye of the Water Research Institute (WRI), Mr. James Saman (University of Ghana) and Dr. Martin Odae (CSIR) were also contacted as experts on macroinvertebrates and molluscs and agreed to contribute with their knowledge of the local biodiversity.

PROJECT DETAILS

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

This is a new initiative. Only 6 Darwin Initiative projects have been carried out in the past in Ghana and none of them investigated riverine biodiversity. Generally there are very few Darwin funded projects dealing with river macroinvertebrates and none of them links riverine biodiversity with the application of the EA for the delivery of Ghana's obligations to the CBD. Previous Darwin projects carried out in Ghana and dealing with river macrophytes will be used to supplement this project's investigation. In this way, experience previously gained through Darwin funding will become of use and research will be taken further.

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

Ghana ratified the Convention of Biological Diversity in August 1994. Studies conducted to obtain baseline information on the status of biodiversity in the country revealed a lack of expertise and taxonomic resources on lotic fauna in general and macroinvertebrates in particular. By strengthening the taxonomic capacity of researchers, enhancing environmental awareness throughout society, developing practical management tools for rivers, assessing the current status of riverine biodiversity and increasing the engagement of stakeholders in environmental decision making, the project shall support the Government's implementation of Articles 7 (20%), 12 (40%), 13 (30%) and 18 (10%) of the Convention of Biological Diversity, with particular emphasis on Ecosystems Approach (50%), Inland Waters Biodiversity (25%) and Public Education and Awareness (25%) themes. The CBD national focal point is Prof Oteng-Yeboah who has given his full support for the project.

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

In general, knowledge of stream biology in the tropics is patchy and taxonomy is of particular concern (Jackson and Sweeney, J. of the N. American Benth. Soc., 1995, 14, 5-11). Previous studies by Dr. Gordon (co-ordinator in Ghana) have shown that this is true for lotic invertebrates in Ghana (Thorne, Williams and Gordon, 2000, J. of Freshwater Ecology, 15, 209-217). Ghana also lacks the financial resources to carry out systematic water quality analysis, which would be required to monitor the health of its aquatic ecosystems. Biological monitoring is less dependent on expensive equipment and can provide information for management. This project will be used to develop simple field guides which could be used by school children and community groups to collect valuable information, as well as helping the public to learn about the environment. A policy document will also assist the sustainable management of Ghana's rivers.

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

The effective management of lotic habitats is very important since they support local livelihoods and are associated with disease (e.g. Onchocerciasis). Assessing the current status of the ecosystem health of the area will allow more informed environmental management decisions to be made. By engaging local communities and other stakeholders and raising the environmental awareness at various levels (from school children to water managers), public participation in decision making will be enhanced. Increasing the taxonomic capacity of local institutions will promote more frequent future monitoring of the aquatic ecosystems and more effective sustainable management of the resources with the aim of protecting the biodiversity and benefiting local livelihoods.

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

Regional capacity will be built by the training of Ghanaian scientists and additional training of scientists from Burkina Faso, Nigeria, Cote d'Ivoire, Togo and Benin in freshwater taxonomy. A range of educational and taxonomic resources applicable at different levels (from schools to water managers) together with local stakeholders training workshops will enhance the public awareness of aquatic systems and biodiversity. A report on the current status of aquatic communities in Ghana will be produced and will be followed by scientific publications in peer-reviewed journals. The SBSTTA has recommended the development of a web-based source book of tools and methodologies for implementing the EA, to which this work will contribute with case studies and methods. A selection of the project outputs will be reproduced for the Ghana Education Service and Universities with the aim of mainstreaming the environmental understanding.

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

The produced materials will continue to be disseminated through strong existing networks of stakeholders and scientists established nationally and regionally by CAW and GWS. The project also has the support of the National Focal Point in Ghana for the CBD. CAW has committed to use the outcomes of the project in an ongoing programme of training workshops. The results of the project will also have a long lasting impact through the web-based source book for implementing the EA. Additional materials will be produced for the Ghana Education Service and Universities in order to continue raising the environmental awareness of the public and providing environmental education from school to university level. The fact that a core of professionals from different countries will be trained in similar methods will help harmonise efforts within the region, especially in the case of trans-boundary basins.

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

The CAW, the Limnology unit of the VBRP as well as the Graduate Environmental Science Programme of the University of Ghana are all currently being managed by the host co-ordinator, Dr Chris Gordon. Moreover, the CAW, which receives core funding from the Dutch Government, is well placed to continue the work in terms of its infrastructure and is the main focal point for wetland research in the region. The VBRP has a good track record of environmental monitoring, while the Environmental Science Programme ensures a constant supply of good and committed students. The key exit strategy will be the utilisation of the existing infrastructure and the provision of a strategic management plan that will provide a clear framework on how the outputs of the project will help Ghana to deliver its CBD and national policies obligations.

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

With permission from the Darwin secretariat, the Darwin logo will be used on all material and documents. The aims and objectives of the project will be clearly referenced to those of the Darwin Initiative in project meetings, training workshops and reports. The logo will appear on any vehicle purchased with Darwin project funds for fieldwork. The Darwin Initiative funding will be acknowledged on all publications and news releases. The dedicated web-site will be linked to all partner home pages with the Darwin logo.

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

Six project staff in the 2nd month and twenty in the 16th month will be trained by UK staff and host coordinator on aquatic ecology, taxonomy and assessment of freshwater ecosystems. Twenty regional scientists from Burkina Faso, Nigeria, Cote d'Ivoire, Togo and Benin will be trained in each of years 2 and 3. Local stakeholders will be trained in 16th month on the field test use of the prototype assessment tool. Local stakeholders will be trained in the use of the final assessment tool on month 36. Delegates at the training workshops will be evaluated through a series of practical exercises, covering sampling and identification of macroinvertebrates and also use of univariate and multivariate methods of data analysis. On completion of the project, the local staff will remain in the employ of the partners, where they will be able to contribute to the ongoing development of wetland science in West Africa.

LOGICAL FRAMEWORK

19. Please enter the details of your project onto the matrix using the note at Annex B of the Guidance Note. This should not have substantially changed from the Logical Framework submitted with your Stage 1 application. Please highlight any changes.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Goal: To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but poor in resources to achieve <ul style="list-style-type: none"> • the conservation of biological diversity, • the sustainable use of its components, and • the fair and equitable sharing of benefits arising out of the utilisation of genetic resources 			
Purpose The sustainable management of Ghana's riverine wetlands in accordance with the principles of the Ecosystem Approach	Improved quality of riverine wetlands. Enhanced taxonomic capacity in Ghana and other W African countries. Integration of freshwater management into CBD implementation.	Ghana's reporting to CBD. Institutional reports. Reports of training courses. Uptake of taxonomic materials.	Ghana maintains engagement with CBD. Trained staff remains in post.
Outputs 1. Training workshops held for staff.	Six project staff trained in year 1. Twenty project staff trained in year 2. Twenty regional scientists trained in each of years 2 and 3.	Attendance records. Results of assessments. Course reports. CAW's records of correspondence and resource use.	CAW's existing regional networks continue. Sufficient participants for regional workshop recruited (travel expenses will be paid by CAW)
2. Range of educational and taxonomic resources produced.	Material will be reviewed by expert group, partners and others (e.g. Ghana Education Service). Distribution through existing networks (e.g. GWS).	Material published and distributed to key stakeholders and partners. Copies sent to Darwin Initiative.	Partners remain committed to production of outputs. Stakeholders willing to receive resources.
3. A nested set of indicators of ecosystem health produced.	Stakeholders trained in use of tools. Tools field tested by stakeholders.	Attendance records for training courses. Results of field testing distributed to national/regional stakeholders/scientists/CBD focal point	Sufficient stakeholders recruited for testing and dissemination.
4. A report on current status of aquatic communities in Ghana	Manual peer reviewed. Publication by CAW agreed	Published reviews. Copies sent to Darwin Initiative.	N/A
5. Policy document on the application of the EA in the management of Ghana's rivers	Document peer reviewed. Publication by CAW agreed. Disseminated to Ghana's CBD focal point.	Published reviews. Copies sent to Darwin Initiative. Minutes of meeting with focal point sent to Darwin Initiative.	Focal point available for meeting.

Activities	Activity Milestones (Summary of Project Implementation Timetable)
Training of project staff	Workshop 1 (month 2) for 6 staff covering EA, macroinvertebrate, macrophyte and fish sampling and identification, physico-chemical techniques. Workshop 2 (month 16) for 20 staff preparing project staff for stakeholder training (20 staff)
Training of regional scientists	Workshops 1 & 2 (months 16 & 28) for 20 regional scientists from 6 countries
Training of stakeholders	Workshop 1 (month 16) on use of tool-kit. Workshop 2 (month 36) for dissemination.
Development of tool-kit	Prototype tool-kit (months 8-16). Final Tool-kit (months 8-33)
Testing of prototype tool-kit	Testing by stakeholders (months 17-27)
Production of educational and taxonomic resources	Production of materials for community groups, schools and water managers, including web-based keys, picture keys, school work sheets, posters and leaflets (months 30-36)
Production of report	Report accepted for publication by CAW (month 36)
Production of policy document	Document peer reviewed and CAW acceptance for publication (month 36)

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

Project implementation timetable		
Date	Financial year	Key milestones
	Apr-Mar 2005/6 Apr-Mar 2006/7 Apr-Mar 2007/8	
05/2005	Apr-Mar 2005/6	Start of project Project staff to be trained is selected. UK experts that will run the training are finalised. The equipment and facilities are prepared. Press releases in UK and Ghana.
06/2005	Apr-Mar 2005/6	1 st training workshop for six project staff on aquatic ecology, taxonomy and assessment of freshwater ecosystems and the application of EA by UK experts.
06/2005	Apr-Mar 2005/6	Study sites confirmed and access permission finalised. Sampling methods to be used decided. The sites will be GPS referenced and displayed on the project website. Field sampling of macroinvertebrates, macrophytes, fish and physicochemical parameters begins. The sampling will be seasonal (i.e. 1 st in June '05, 2 nd in Sep '05, 3 rd in Dec '05 and 4 th in March '06).
07/2005	Apr-Mar 2005/6	Specimen identification follows the sampling (i.e. 1 st in July '05, 2 nd in Oct '05, 3 rd in Jan '06 and 4 th in Apr '06)
12/2005	Apr-Mar 2005/6	The design of the prototype tool-kit for the assessment of the freshwater ecosystem health that will assist Ghana in the delivery of the EA begins. The selected environmental indicators will be associated to the principles of the EA in order to provide an assessment method that will facilitate biodiversity conservation and promote sustainable livelihoods for the local communities.
03/2006	Apr-Mar 2005/6	Data analysis following the completion of the field sampling using univariate and multivariate methods of analysis. The results will be fed in the tool-kit development process and they will also lead to peer-reviewed publications on the current status of aquatic communities in Ghana.

08/2006	Apr-Mar 2006/7	Second training workshop by UK experts for 20 project staff trained for the testing of the prototype tool-kit.
08/2006	Apr-Mar 2006/7	First training workshop for 20 regional scientists from 6 W. African countries on aquatic ecology and the application of EA. Training by local project staff
08/2006	Apr-Mar 2006/7	Training workshop for 20 stakeholders for the testing of the prototype tool-kit. Training by local project staff.
09/2006	Apr-Mar 2006/7	Testing of the prototype tool-kit by the selected and trained stakeholders
08/2007	Apr-Mar 2007/8	Completion of the stakeholders testing of the prototype tool-kit. Results and comments will feedback to the scientific team that developed the tool-kit
08/2007	Apr-Mar 2007/8	The final tool-kit is developed using the results of the stakeholders testing
08/2007	Apr-Mar 2007/8	Second training workshop for 20 regional scientists from 6 W. African countries on aquatic ecology and the application of EA. Training by local project staff
10/2007	Apr-Mar 2007/8	Educational and taxonomic resources are being developed by integrating the scientific knowledge of the UK experts with the local knowledge
10/2007	Apr-Mar 2007/8	A policy document is produced outlining the application of the EA in the management of Ghana's rivers
03-04/2008	Apr-Mar 2007/8	Training workshop for 20 stakeholders for the dissemination of the final tool-kit and the educational and taxonomic material. Training by UK experts and local project staff.

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

PROJECT OUTPUTS		
Year/Month	Standard output number (see standard output list)	Description (include numbers of people involved, publications produced, days/weeks etc.)
2005/May	10(6); 15A(1); 15B(1); 15C(1); 15D(1).	UK experts group that will run the training of the project staff is finalised. The equipment, facilities, field manuals and guides to assist training are prepared. National and local press releases in UK and Ghana.
2005/June-2006/May	6A(6); 6B(1); 7(6); 8(7); 11A(2)	6 Ghanaian project staff will be trained in a workshop (1 week duration) by UK experts on aquatic ecology and EA. Seasonal sampling will be carried out for one year (until Mar 2006). Specimen identification will follow the sampling each month (until Apr 2006). Data analysis (Spring 2006). Publication of results in peer reviewed journals.
2006/August-2007/August	6A(80); 6B(4); 7(60); 8(10); 10(20); 12A(1); 13A(2)	The prototype tool-kit is produced. 20 Ghanaian project staff are trained (3 days) on the testing of the tool-kit by UK experts. 40 regional scientists from 6 countries (10+10 days) are trained on aquatic ecology by the local staff. 20 stakeholders are trained (4 days) on the testing of the tool-kit by the local staff.
2008/January-2008/April	6A(20); 6B(1); 7(20); 8(1); 9(2); 12B(1); 14A(1); 17A(1);23	The final tool-kit is produced after being tested by the stakeholders. Educational and taxonomic resources that will be used for dissemination are produced by the local staff under the scientific supervision of UK experts. 20 stakeholders are trained (4 days) for the dissemination of the final tool-kit and the educational material. Final report on the current status of aquatic communities in Ghana is produced. A policy document on the application of the EA for the management of Ghana's rivers is produced. Financial contributions until Apr 2008 will amount to £53680

MONITORING AND EVALUATION

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

The project will be managed and monitored on a day-to-day basis by the Project Team Coordinator Dr Conor Linstead of SWIMMER and team members and financial staff, with regular liaison with Prof Chris Gordon of CAW and his staff. The quality of scientific outputs will be ensured by the publication of results of the project in appropriate international peer-reviewed journals and their presentation at international conferences. The Scientific Evaluation Committee of CAW, which includes Prof. T Crisman (Wetland Centre, University of Florida) and Dr C Finlayson (IWMI) will also assist in assessing the quality of outputs. The rest of the outputs i.e. web-based keys, reference collections, posters, leaflets, databases and the policy document will be reviewed by a panel of local and international experts before release. The content of the Training Workshops will be reviewed by local and UK experts before they are finalised. The effectiveness of the workshop will be assessed by the use of questionnaires. Bi-annual reports will be produced detailing progress and outputs. These will be submitted to the project partners and the Darwin Initiative.