

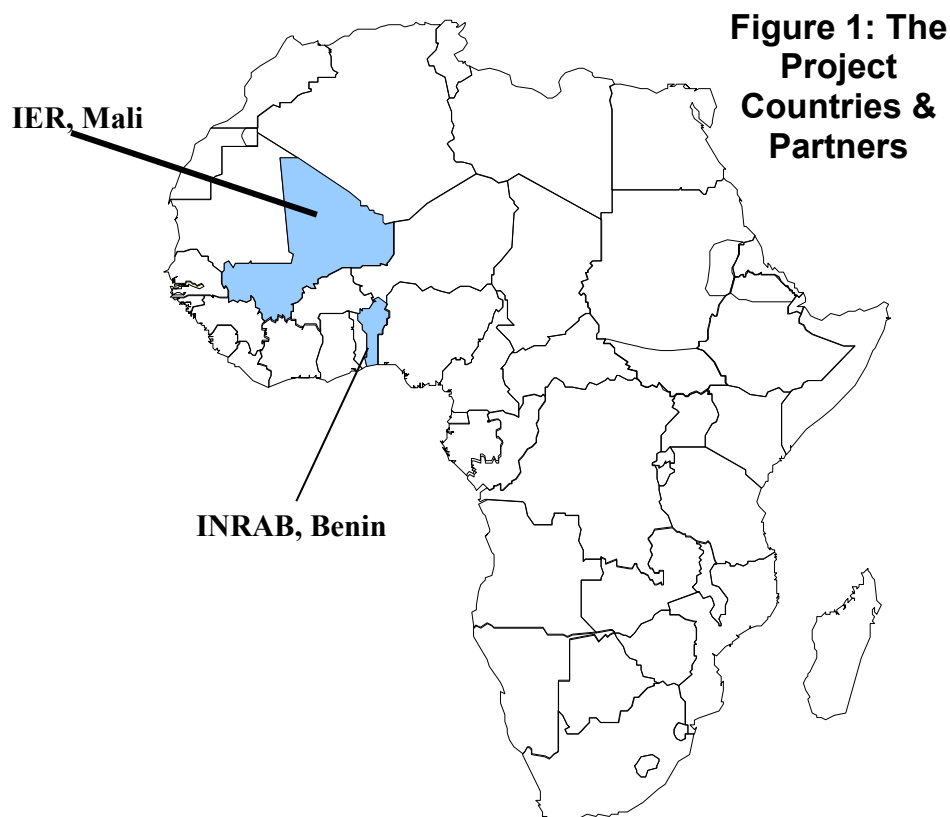
Darwin Initiative Annual Report

Darwin Project Information

Project Ref Number	15/003
Project Title	Conservation of Biodiversity in Traditional West African Vegetable Species
Country(ies)	Benin, Mali
UK Contract Holder Institution	CAZS Natural Resources, University of Wales Bangor
UK Partner Institution(s)	-
Host country Partner Institution(s)	Institut National des Recherches Agricoles du Bénin (Benin) Institut d'Economie Rurale (Mali)
Darwin Grant Value	£ 245,454
Start/End dates of Project	May 2006 – April 2009
Reporting period (1 Apr 200x to 31 Mar 200y) and annual report number (1,2,3..)	1 st April 2006 – 31 st March 2007 Annual report 1
Project Leader Name	Dr. Margaret Pasquini
Project website	http://www.cazs.bangor.ac.uk/Research/Indigenous_vegetables_Darwin.htm
Author(s), date	Dr. Pasquini, Dr. Gamby and Mrs. Assogba-Komlan 26 April 2007

1. Project Background

This Darwin Initiative (DI) project addresses the urgent need for research & awareness-raising on the conservation of 'traditional' vegetable biodiversity in two West African countries – Benin & Mali (see Figure 1).



Traditional vegetables have played an important historical role in the food systems of West Africa, but their contributions to food security and nutrition have long been neglected by the research community. Conservation of biodiversity research has tended to focus on wild species and natural/semi-natural habitats, overlooking the great diversity of plant resources used for vegetable purposes. Moreover, the vast majority of agricultural funding has been directed towards research and development of a few staple (and to a lesser extent vegetable) food crops that are usually non-native to the countries where they are consumed.

West Africa holds considerable reserves of vegetable species diversity, including species of *Amaranthus*, *Corchorus*, *Hibiscus*, *Solanum*, *Cleome*, *Curcubita*, etc., but as reported by the Consultative Group on International Research Institutions the recent years have witnessed “drastic reductions in genetic diversity” of local ecotypes and semi-wild species. The local project partners in Benin and Mali have noticed that a number of traditional vegetables once abundantly found in the wild are dwindling, through a combination of reasons e.g. over-collection or destructive harvesting practices prior to flowering, shifting cultivation, climate change and desertification, increasing population pressure leading to land clearance.

There has been little formal study of these species and their potential in Benin and Mali, and thus this DI project proposes to help remedy this situation by carrying out research (survey and inventory) of the vegetable crops and their traditional knowledge (e.g. cultivation practices, culinary practices and/or medicinal uses) in the two countries, analysis of their quantitative and qualitative potential for horticulture, and awareness-raising of their value and significance among stakeholders in the region.

2. Project Partnerships

Project partnerships: This project brings together three partners, CAZS Natural Resources (CAZS-NR) at the University of Wales Bangor and the Institut d’Economie Rurale (IER) in Mali and the Institut des Recherches Agricoles du Bénin (INRAB). In addition, in Benin, staff members from the University of Abomey-Calavi are supporting INRAB in the administration of certain parts of the project, and in Mali, the West Africa office of AVRDC – The World Vegetable Centre is hosting a back-up seed bank for the project. The three partners collaborated very closely in the development of the project proposal in the course of two visits funded through the DI Pre-Project scheme, and at the onset of the project an opening meeting was organised in Cotonou, Benin, to allow the partners to jointly work out the detailed programme of activities, and agree responsibilities. In this first year, the host country partners have been responsible for taking the lead in the survey and inventory of indigenous vegetables, and collecting seed samples for the establishment of a seed bank, autonomously organising the survey and sample collection details such as choice of location, timing, and staff to be involved. The survey methodology was jointly developed by all three institutions with the UK partner bringing in her ecological and social research background to support the formulation of appropriate questionnaires and interview guides. One strong point of the partnership has been the exchange of expertise between host country partners. The seed sample collection protocol, for example, was elaborated autonomously by the two host country partners, with one partner from the University of Abomey-Calavi, Mr. Enoch Achigan-Dako, travelling to Mali to help train the Malian enumerators. The survey data analysis is being led by the UK partner, but is tied to the work of the host country partners to match vernacular plant names to scientific names. The vegetable collection activities were organised in close collaboration with local communities who guided in visiting fields, forests and other habitats for seeds or herbaria sampling.

The partnership is supporting the host country institutions to build their capacity to meet the Convention on Biological Diversity (CBD) commitments as it concerns agricultural biodiversity, a research angle that is fairly novel for their institutions. In Mali particularly, this project has opened up a completely new dimension to the Fruit and Vegetable Programme. The staff in charge of the surveys and seed collection have benefited under this project as they have acquired new knowledge in terms of the conservation threats to local plant resources, and they have learned to identify many species with which they were not previously familiar. In Benin some work on indigenous vegetables had already started in the South prior to the DI Project, but the project has allowed the partner to extend their work to the entire country, and also to investigate the conservation angle more explicitly. In the UK the project has contributed to building the capacity of the project leader¹ in terms of proposal development and project management skills, including working to deadlines, monitoring project progress against milestones, preparing reports, and working with partners in a cross-cultural context. It has also strengthened her data analysis skills and her knowledge of the conservation issues of indigenous plant food resources.

¹ The capacity-building of the project leader who is an early career researcher, has been realised through the mentoring of Dr. Einir Young, an experienced project manager

Other Collaborations: The project has established links with the *IndigenoVeg* network (the network, comprising 14 partners, including the INRAB partner, is coordinated by CAZS-NR). The purpose of the network is to enable researchers from sub-Saharan Africa and Europe to coordinate and improve their efforts by sharing their on-going research in the fields of indigenous vegetables and urban/peri-urban agriculture. The first linkage was enabled in May 2006 by inviting the IER partner to the *IndigenoVeg* meeting organised by the INRAB partner in Benin on the themes of “*Traditional cultural practices of African indigenous vegetables (IVs)*” and “*Integrated pest and disease management strategies for IVs*”. The meeting was attended by Mrs. Aminata Dolo. Following this meeting, Mrs. Dolo (IER), Mrs. Azotondé, Mr Singbo, Mr Akplogan (INRAB), and Dr. Pasquini (CAZS-NR) jointly developed the survey methodology for the two countries. The market part of the survey was adapted from a questionnaire developed by the *IndigenoVeg* group. A second link with *IndigenoVeg* was made in late July, when Dr. Pasquini gave an overview of the DI project at the 2nd *IndigenoVeg* meeting held in Dakar, Senegal. Dr. Ole Mertz from Copenhagen was very interested in the project and shared his publications on his work in Burkina Faso on wild foods.

In Benin, the project has also involved researchers from the University of Abomey-Calavi. Dr. Alexandre Dansi has started some research on traditional leafy vegetables (funded by the International Foundation for Science), and was therefore asked to join the seed collection mission for the DI in Benin to contribute his research experience. Mr. Enoch Achigan-Dako who led the seed collection mission, is currently doing his PhD and is documenting farmers’ knowledge on cucurbit species, and establishing a core collection of cucurbits through *ex situ* and *in situ* conservation strategies. Many cucurbits species are used as leafy or fruit or seed vegetable and the contribution of Mr. Achigan-Dako to the project is valuable to strengthen partnership and to coordinate actions within the country.

In Mali, the project made contact with Dr. Modibo Cissé, the CBD focal point. Dr. Cissé was greatly interested to learn about the objectives of the Darwin project and requested to be kept updated regards progress and project reports, as he felt that the work provides very pertinent support to Mali’s efforts and commitments towards the CBD. Dr. Cissé explained that he would include information about the Darwin project in his yearly report, in December 2007. He also expressed interest in the project’s intended awareness-raising activities, scheduled for the third year, and made himself available in terms of giving advice and support at that time. Dr. Cissé explained that as part of its commitments to the CBD the Direction Nationale de Conservation de la Nature has commissioned three projects. One of these, entitled “Végétation autochtone” is related in topic to the current Darwin project, as it seeks to preserve autochthonous plants of the Sahel. The Darwin project has been in touch with Dr. Moussa Karembé from the Université du Mali which is commissioned to administer “Végétation autochtone”. Dr. Karembé visited IER to explain about the work he has been involved in and share the provisional report produced in December 2006. To date the “Végétation autochtone” project has been developing a catalogue of plant species used particularly during famine periods in the area of Nara (Koulikoro region) especially by pastoralist communities, and has been attempting to assess which of these might be declining. The project started in 2006 and is due to finish in 2007, although there is possibility of renewal. The IER project leader will keep Dr. Karembé informed on developments regards the Darwin project.

In Benin contact was made with Mr Ogouchi the CBD focal point. Mr Ogouchi, who is in charge of the Environment Direction in the Ministry of Environment showed his interest in the Darwin project and discussed how it linked in with previous work to prepare Benin’s National Biodiversity Strategy. He promised to participate to the half-day workshop planned for middle 2007 to present the Darwin Project to the stakeholders. He was asked to give a talk to the Vision on the Environment Ministry on the conservation of biodiversity in Benin. Contact was also made through an informal meeting with Dr. Louis Gnahou, vice cabinet-director of the Ministry of Agriculture. Dr. Louis Gnahou recognized the importance of safeguarding vegetable resources and the gathering of traditional knowledge related to indigenous vegetables. He emphasised the fact that traditional knowledge is being lost and if nothing is done, future generations will be unaware of the richness and value of their environment. Dr. Louis Gnahou promised his entire support to the project and suggested that a stakeholder half-day meeting be held to raise awareness and to promote overlooked indigenous vegetables.

3. Project progress

3.1 Progress in carrying out project activities

Activity 1 Surveys contributing towards the Output 1 Catalogue of IV biodiversity richness, uses and threats

The survey methodology was developed jointly by all three partners in the course of the introductory Benin – Mali – UK workshop (see activity 5). During the first day discussion the group agreed that

surveys should target three stakeholder categories: producers, sellers and consumers. The group brainstormed the topics which would be suitable for investigation with each stakeholder group. Various methods were discussed and compared (questionnaires, semi-structured interviews, focus groups) and the criteria for selecting villages were also debated (focusing particularly on sociolinguistic groups and agro-ecology). Dr. Pasquini was given the task to consolidate the discussion points into a potential strategy (in terms of stakeholders, topics, methods, number of villages and respondents). This was discussed further in the morning of the second day, and the task of defining the details of the methodology was allocated to a subgroup with representatives from all three countries. This group consisted of: 1) from INRAB Mr. Singbo, Mr. Akplogan and Mrs. Azontondé; 2) from IER Mrs. Dolo; 3) from CAZS-NR, Dr. Pasquini.

The group agreed on the following approach:

- 1) Survey 18 villages in each country employing:
 - Focus groups with a men's group and with a women's group to explore the general features of the village and livelihood issues (two focus groups per village);
 - Questionnaire surveys to investigate producers' knowledge of cultivated and wild vegetables; cultivation practices; biodiversity conservation issues; uses and preparation and consumption patterns (ten respondents).
 - Focus groups with specialists in cultivation practices (one focus group);
 - Semi-structured interviews with knowledgeable older respondents about changes in the availability of traditional vegetables over the decades, the threats, existing and possible conservation measures, and domestication practices (four interviewees).
- 2) Survey six markets in each country employing a questionnaire survey to investigate the type of traditional vegetables that are marketed, sources of the vegetables, marketing constraints, criteria for purchase by consumers, etc (15 respondents).
- 3) Survey three cities in each country employing a questionnaire survey to investigate types of vegetables used, uses, recipes, preparation techniques, consumption patterns, sources of vegetables and reasons for consumption (60 respondents, 20 approx. from three different income-level neighbourhoods).

In Mali the survey covered the six regions of Koulikoro, Kayes, Sikasso, Segou, Mopti and Gao, and was completed in Jan 07. The Malian survey team (who were also in charge of seed and sample collection) consisted of eight staff: three women Ms. Binta Diallo, Mrs. Aminata Dolo, Mrs. Ouassa Coulibaly and six men Mr. Daouda Dembele, Mr. Justin Diabate, Mr. Fousseini Diarra, Mr. Sidi Mohammed Keita, Mr. Abdramane Traore, Mr. Sidiki Traore. Training on the questionnaires, interview and focus group guides was delivered by Dr. Pasquini from CAZS-NR with support from Dr. Samba Soumare and Dr. Penda Sissoko over four days in June. A repeat visit to Mali in August allowed Dr. Pasquini to review the pilot survey results and develop a feedback sheet in French. All enumerators (with the exception of Binta Diallo and Sidi Mohammed, who were still carrying out the survey in Sikasso region, and who were given feedback over the phone) were requested to attend an ulterior training session. The enumerators discussed their experiences during the pilot survey: the difficulties they had encountered and what they had had to do to try and overcome them. Other potential solutions for handling similar situations should they arise in the future were discussed.

In Benin the survey was expanded to cover the whole country, with six villages, two markets and one city from the north (Sudanian ecological region), centre (transitional Sudano-guinean ecological region) and south (Guinean ecological region) of the country respectively. The survey was split in three phases and was completed in Mar 07. Although the surveys in Benin have been completed within the latest projected timeframe, in reality the activities ran behind the schedule that had been agreed at the opening meeting. This was because the socio-economic team's capacity was reduced by one scientist starting his Masters abroad, a second scientist being tied up on another project, and an enumerator leaving the project for a full-time job. These staff changes have led to some delays in data collection, inputting and analysis. The original survey team consisted of one woman, Mrs. Rosine Azotondé and five men Mr. Alphonse Singbo, Mr. Florentin Akplogan, Eustache Biaou, Leonard Hinnou, and Denis Olou. The enumerators were trained by Dr. Pasquini and the three INRAB researchers in early June. Following the pilot survey questionnaires, Dr. Pasquini was able to provide feedback to the team by e-mail.

Data analysis started for Mali in Nov 06. However, the need to be able to relate local names (as used by different ethnic groups) to scientific names constrained progress in this task. Matching the local names to scientific names started in Jan 07 for Mali, and in Oct 06 for Benin, and is on-going in both countries. In

Mali particularly several local species' names could not be identified because the plant was not available for collection by the enumerators at the time of the survey. In Benin the socio economic survey team and the seed collection team (cf. activity 2) are matching local and scientific names.

In the next period, the focus will be on data analysis and the completion of the species identification by repeat visits to the field to look for plant samples.

Activity 2 Seed and sample collection contributing towards the Output 2 Seed banks established

At the opening meeting, IER and INRAB partners agreed that it would be useful to develop a common seed collection protocol. Seed and sample collection training took place in Mali in July 2006, delivered by Dr Haby Sanou (IER) and Mr. Enoch Achigan-Dako (on behalf of INRAB). Dr. Sanou developed a seed collection protocol by simplifying a version provided by Mr. Achigan-Dako. The training was attended by the survey team (see activity 1).

The INRAB seed collection team consisted of Mr. Enoch Achigan-Dako, Dr. Alexandre Dansi, Mrs Arlette Adjatin, Mrs Ines Deleke Koko, Mr. Sognigbé Ndanikou (from the University of Abomey-Calavi), Mrs. Victoire Ahle, Mr. Joel Azagba, and Mr Noel Ahononga (from INRAB). The seed collection was carried out in northern Benin in September 2006, in central Benin in January 2007 and in southern Benin in March 2007 under the joint supervision of Mr. Enoch Achigan-Dako and Mrs. Francoise Assogba Komlan. In total 31 villages with 15 sociolinguistic groups in the three main ecological regions covering the entire country, have been explored for seeds and herbaria collection of vegetable species with related knowledge. The key information on the seed collection mission in Benin is provided in Annex 3. The collection in Mali from all six regions resulted in 214 seed samples and 69 herbarium samples. A backup of part of these country collections has been deposited with AVRDC West Africa office.

These seed collections are still a small portion of the plant diversity of both countries, as not all plant species were at the seed production stage at the time of the first year visit. For this reason, repeat visits will be made in the next reporting period.

Activity 3 Domestication trials contributing to Output 3 Selected highly used and threatened species domesticated

The domestication trials are not due to start until May 07.

Activity 4.1 Development of peer-reviewed publications, best practice pamphlets and radio programmes and Activity 4.2 Awareness-raising at grassroots and policy levels contributing to Output 4 Dissemination material and training for different stakeholders delivered

These activities are not due to take place until the third year. The IER partner however, was in touch with Koulikoro Rural Radio at the onset of the project to alert them to the possibility of preparing dissemination programmes at a later stage. The INRAB partners presented the project during the seed collection mission in northern Benin to local people using support of Radio Bassila. This radio station has agreed to help with future dissemination activities, when materials will be ready.

Activity 5 Capacity-building activities for partners contributing towards the Output 5 Training and country-to-country expertise exchange delivered

The introductory Benin-Mali-UK expertise exchange workshop took place in Cotonou, Benin, the 26-28 May (2 and ½ days), hosted by the INRAB partner. The meeting was attended by: 1) from INRAB Mrs. Francoise Assogba-Komlan, Dr. Patrice Adegbola, Mr. Florentin Akplogan, Mr. Prudent Anihouvi, Mr. Hugues Baimey, and Mr. Armel Mensah; 2) from the University of Abomey Calavi Mr. Enoch Achigan-Dako and Dr. Alexandre Dansi (close INRAB collaborators); 3) from IER Dr. Kadiatou Gamby, Dr. Haby Sanou, and Mrs. Aminata Dolo; 4) from CAZS-NR, Dr. Margaret Pasquini and Dr. Einir Young. The group reviewed project objectives, discussed the relative merits of different methodologies, and formulated a detailed plan of action to carry out the activities which would lead to the principal outputs detailed in the project log frame (in detail for the first two years, the third year plan to be finalised at the mid-term meeting in Aug 07).

Following the workshop, a subgroup of representatives from all three institutions jointly developed the survey methodology (see activity 1), which was then adapted to suit the conditions of the two countries. The next period will see the mid-term meeting, scheduled to be held in July 07 in Mali to allow partners to exchange information on and discuss project progress in the two countries, and to define the final year activities in more detail.

3.2 Progress towards Project Outputs

Progress towards Output 1

Significant progress has been made towards the creation of a catalogue of IV biodiversity. In Benin the catalogue is almost complete and the data are being processed. Verification visits will be organised during the second year. In Mali the catalogue of local names is complete for the whole country, however, repeat visits will be required to find samples of plants that were not available during the first survey, in order to finalise the scientific identification. Disappearing species have been identified for Mali and Benin (in Benin particularly the partners found that many species collected in the wild are threatened because they are very much in market demand, but communities do not yet perceive the need to cultivate them). This output is likely to be comfortably achieved by the end of the second year. The indicator for this output is appropriate, although the catalogue has been expanded to comprise the whole of Benin. The assumption that farmers would be willing to cooperate with enumerators held true.

Progress towards Output 2

A first batch of seed samples has been collected country-wide in Benin and Mali, stored at IER and INRAB with a backup (for those samples which were collected in large enough quantities) at AVRDC. However, because of unavailability of seed of many species at the time of the surveys, the collections represent only a small portion of the countries' biodiversity. Repeat collections will be necessary and therefore the date of Feb 07 specified by the indicator should be more appropriately Feb 08. The assumption that a high proportion of plants which had gone to seed could be found in the first year did not hold true for a combination of reasons: 1) the period in which seed is available is quite short, particularly in the dry environment of Mali and northern Benin; 2) the surveys could take quite a long time, which meant that by the time the teams reached certain regions in Mali, the right season had passed; 3) not all species produce seed at the same time, but repeat collections are difficult and expensive as the teams have to travel to remote and distant villages in both countries, 4) limited knowledge on wild species seed viability and storage behaviour. The local teams will address this delay in progress towards the output by paying repeat visits in the coming period. By the wet season the teams will have a fairly complete catalogue of species available to them, and will therefore be able to conduct quick missions to look for specific plants, considering seed availability in relation to the climatic conditions of each region and the species' particular seed production periods.

The assumption that electricity supply would remain stable did not hold true, particularly for Benin which in the last months has been experiencing electricity cuts of up to eight hours a day. This raises the problem of safe storage for the seed collections. The AVRDC station has a generator, so the collections housed there are less at risk. The partners have discussed this problem and have suggested where possible to start seed multiplication in the research stations to increase the quantities of seed for storage, and also AVRDC is planning to consult the local partners about arrangements to start sending the samples for long-term storage at its headquarters.

Progress towards Output 3

The majority of the work towards this output will take place in the coming period. The selection of the species for the domestication trials, however, was delayed in both countries for two different reasons. As explained under Activity 1 the loss of staff in Benin resulted in delays in the survey administration and typing up of the data. As the data were not available for the whole country until the end of the project year, a decision on the species for the domestication trials has been deferred. In Mali respondents were mostly concerned with the perceived decline of tree species, which they attributed to poor rainfall. Examples include *Bombax costatum* which was reported to be disappearing or disappeared by key informants in 10 of the 18 villages and *Adansonia digitata* reported to be disappearing in five villages. Relatively fewer respondents reported a decline of herbaceous species (see Table 5) in the environment (although a decline in consumption was widely reported).

This finding required face-to-face consultation between the IER and the CAZS-NR partner in March as the domestication of tree species cannot be addressed in only two years, but at the same time the project needs to address the domestication of species which will be taken up willingly by a wide group of farmers.

The discussions resulted in the agreement that under the circumstances it would be more effective to focus on *ex-situ* conservation, building up a large seed bank, and therefore reduce the scale of the

domestication trials (with trials taking place in three out of the six regions on four or five wild varieties of herbaceous species which communities expressed a desire to domesticate).

Indicator 3.1 requires a date modification to March and May 07 for Mali and Benin respectively. The domestication trials are still envisaged to start during the wet season which commences around May 07, with the establishment of nurseries. In Mali the village-based participatory domestication trials will commence around October with irrigated plots.

Progress towards Output 4

Work towards this output is not due to start until the third year.

Progress towards Output 5

The training and country-to-country expertise was delivered on target in year 1 and is expected to be delivered without problems in year 2. The assumption that aviation prices would stay stable has held true for year 1. It might not hold true in year 2, but should not significantly affect the expertise exchange workshop, but could affect repeat visits by the UK partner.

3.3 Standard Output Measures

Table 1: Project Standard Output Measures

Code No.	Description	Year 1 Total	Year 2 Total	Year 3 Total	Year 4 Total	TOTAL
6A	9 enumerators trained on surveying and seed collection techniques (6 Mali, 3 Benin)	8 Mali 3 Benin	-	-	-	11
6B	5 weeks Mali; 4 weeks Benin	3 wks Mali 1 wk Benin	2 wks Mali 2 wks Benin	1 wk Mali 1 wk Benin	-	10
8	17 weeks Mali; 15 weeks Benin	5 wks Mali 1 wk Benin	2 wks Mali 4 wks Benin	12 wks Mali 12 wks Benin	-	36
13A	One species reference collection established at IER; one joint collection at AVRDC-Mali; one duplicate collection at AVRDC-HQ for long-term conservation	1 IER 1 AVRDC-Mali	1 AVRDC-HQ	-	-	3
13B	One species reference collection enhanced at INRAB (Benin)	1 INRAB	1 INRAB 1 IER	-	-	2
17B	1 dissemination network (<i>IndigenoVeg</i>) to be enhanced by IER, Mali inclusion	1 IER staff attended workshop	-	-	-	1
20	£for seed bank equipment and computing resources	£	-	-	-	-
23	£plus £ estimated vehicle costs value plus £land resources	£ vehicle costs	Similar inputs envisaged	Similar inputs envisaged	-	

NB: The first column reports the target standard output measures reported in the application; the year columns report actual outputs; only outputs relevant to year 1 are reported.

Table 2: Publications

Type *	Detail	Publishers	Available from	Cost £
(eg journals, manual, CDs)	(title, author, year)	(name, city)	(eg contact address, website)	
The project is in its first year, and no publications have been produced yet, other than a Darwin Newsletter contribution.				

3.4 Progress towards the project purpose and outcomes

The project has made good progress towards its purpose of improving the conservation and sustainable use of biodiversity in Mali and Benin by collecting country-wide information to produce a catalogue of indigenous species used as vegetables in the two countries, and setting up short-term seed banks. Data on threatened species which will underpin the domestication trials has also been collected, but the choice of species has been delayed slightly. The second year trials are however still scheduled to go ahead as planned. The project will start work towards the third purpose of getting IVs on the agendas of IER and INRAB stakeholder boards by presenting a report of project progress at the *Comité Régional des Utilisateurs* (Regional Committee of Users) in Mali at the beginning of June 2007, to the Technical Committee at the end of June 2007 and to the Scientific Committee in December 2007. In Benin the Darwin project first year outputs will be presented at the National Scientific Workshop, an annual event organised by INRAB, involving all research partners in the country. The presentation of the project will be extended to the users' meeting known as "Comité Régional de Recherche Développement" (CRRD) which is also an annual meeting of scientists and farmers/research product users.

The assumption that Mali and Benin governments maintain the same level of or increase financial support for agricultural research and allow this to be tied in to conservation measures is for now holding true. Evidence of the government's interest in the interactions between food security and the natural environment in Mali, for example, is provided by the fact of the Direction Nationale de Conservation de la Nature commissioning the afore-mentioned "Végétation autochtone" project.

3.5 Progress towards impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

As this is the first year of the project, it is too early to report on progress towards the DI final goal. However, the project is aiming to support the first goal, through the conservation of biological diversity of indigenous vegetables. Taking the example of Mali, preliminary data analysis is revealing the complexity of the situation: on the one hand a number of the interviewees reported a decline or disappearance of certain species caused by drier climatic conditions, but also illegal deforestation, land clearance and over-grazing (many respondents were particularly concerned about the decline in tree species, such as the kapokier tree, *Bombax costatum*). On the other hand, other interviewees reported a change in dietary patterns, with traditional vegetable dishes being increasingly replaced by exotic (temperate) varieties. These interviewees had not perceived a change in the prevalence of the vegetables in the environment. However, the declining importance of these vegetables in people's diets also poses a threat: if people do not value and use a resource they are less likely to be aware of any changes in its status, and will not adopt measures to conserve and protect this resource. The project seeks to have a positive impact on the conservation of indigenous vegetables in four ways: 1) By providing country-wide information about the status and conservation needs of indigenous vegetables to the *Direction Nationale de Conservation de la Nature*, to enable this office to develop a conservation strategy; 2) By sharing the information with other researchers in the country (for example, the World Agroforestry Center which has a base in Bamako needs to be alerted to the urgent need to domesticate kapokier; 3) By raising people's awareness of the need to protect these resources, and by developing strategies to re-popularise these vegetables; 4) By setting up *ex-situ* conservation systems.

4. Monitoring, evaluation and lessons

In this first project year, project partners have been working towards outputs 1, 2, 5 and partially 3. Progress is being monitored through interim reports and species' lists, however, these are not yet ready for publication on the project website.

The indicator for output 1 is a catalogue of IV species and disappearing species for Mali and Benin, to be verified through regional and country species lists and a list of reported threatened species. As already discussed in section 3, the work of matching vernacular to scientific names is not complete (completion is scheduled for end of year 2). Table 4 in Annex 3 provides the example of the IV catalogue for the village

of Banigri in northern Benin (the whole catalogue cannot be reproduced here as there are over 530 entries for 12 villages in northern Benin). Table 5 lists the species reported as disappearing by key informants in 17 villages in Mali (species considered as disappeared are not included in the table).

The indicators for output 2 are seed collections established in IER, INRAB and AVRDC, to be verified through lists of seed samples. Table 6 contains the seed sample list for six regions in Mali and Table 7 contains the seed sample list for Benin. As discussed earlier, the collections represent a small portion of the species which are used in the two countries, and thus repeat collection missions will be necessary next year.

The indicator for output 3 which applied to this part of the project was the choice of one species per region for the domestication trials in both countries, to be finalised in January 07. This has been delayed in both countries for different reasons (see earlier explanation).

The indicator for output 5 is a Benin-Mali-UK expertise exchange and training workshop, to be verified through the workshop minutes. The minutes for the first workshop are appended. Minutes of the training sessions which took place in June and August can be provided if required.

Other reports, which are not mentioned in the logframe include an interim report of the seed collection mission in northern Benin; reports of the training visits by the UK partner in June and August; six monthly reports by the INRAB and IER partners. All these can be provided if required.

5. Actions taken in response to previous reviews (if applicable)

Not applicable as this is the first year of the project.

6. Other comments on progress not covered elsewhere

All comments on progress have been covered in other sections.

7. Sustainability

As the project is in its first year, and it is not ready yet to start communicating its results, promotion of the work has been limited. In Mali, the project leader Mme Gamby informed the *Comité des Utilisateurs* which took place in May 2006 about the onset of the new project, with the commitment to update them at the next meeting in June 2007. The partner has also discussed the project with representatives of the Syngenta Foundation, and in terms of preparing for radio dissemination, she approached Koulikoro Rural Radio. In Benin Mme Assogba-Komlan informed the Cabinet of the Agricultural Ministry about the onset of the Darwin Project who accepted to support and facilitate the delivery of awareness-raising products when available. In addition Mme Assogba-Komlan discussed with Radio Immaculée about the possibility of taking part in May 07 in the periodic programme "La Graine", a biodiversity conservation broadcasting, to talk about the DI project and the first outputs.

The exit strategy rests upon five elements. Firstly, a participatory approach to the development and management of activities in all phases of the work to ensure that partners are empowered to take the activities forward independently. For example, the details of all the activities for year 1 and 2 were discussed and agreed at the opening expertise exchange workshop by all three partners; as a result of these discussions a researcher subgroup was nominated to work out the details of the survey methodology, and at a later stage the enumerators also provided their perspectives on the appropriate approach and formulation of questions. Seed and sample collection training was carried out as a South-South exchange of expertise, with Mr. Achigan-Dako visiting the IER partner to support the training organised by Dr. Sanou. And whilst the UK partner took the lead in the enumerator training for the surveys, is taking the lead in data analysis, and is responsible for overall project management, the IER and INRAB partners have been fully in charge of the management of project activities, in terms of timing, logistical organisation, staff hiring, budget requirements, etc.

Secondly, the exit strategy rests upon yearly engagement with the IER & INRAB stakeholder meetings, so that IV research is placed on the long-term research agendas. In Mali the first relevant stakeholder meeting will be the afore-mentioned *Comité des Utilisateurs* meeting in June 2007. This is a committee of farmer representatives who every year requests the support of IER to address specific problems. The IER agenda is partly determined by this committee and at the meetings scientists also report back on the year's progress. The next relevant stakeholder meeting is the *Comité Technique* meeting at the end of June 2007 (which carries out an internal quality control of project progress). Finally, the *Comité Scientifique* (external review) will review the project report in December 2007. This is also true for Benin

where the Comité Regional de Recherche Développement, a committee of farmers and scientists, addresses specific agricultural problems on an annual basis. In 2007 the Benin partners put the DI project on the agenda of this committee.

Thirdly, the establishment of new seed banks at IER and AVRDC West Africa office, and enhancement of INRAB's seed bank provides a short-term supply of seeds for interested scientists from either of the partner organisations or other local institutions to initiate research on traditional vegetables. Partners intend to maintain the short-term seed bank by multiplying the seed, and in addition steps are being taken to send samples to AVRDC headquarters for long-term conservation (in accordance with article 15 of the CBD).

Fourthly, the local partners' capacity is being built through their involvement in all stages of the project development and management, and will be enhanced in the coming period through the delivery of grant proposal skills seminars. This will be helpful in order to try to secure further funding to continue the work after the Darwin project.

Fifthly, the project will keep the new Coordinator for the AVRDC West Africa office, Dr. Ekow Akyeamong regularly updated with on-going results. Indigenous vegetables are one of AVRDC's priority areas for research and development. The West Africa office has started its first few on-station trials, and plans to develop this area of research more strongly in the coming years, building upon the work initiated under this DI project. For these reasons, it is likely that the outcomes and impacts of this DI project will be sustained beyond the lifetime of the project itself.

8. Dissemination

Dissemination activities are planned particularly for the third year of the project. In this first year, only a few dissemination activities (or preparation to dissemination) have been carried out, and they are mentioned elsewhere in this report.

9. Project Expenditure

Table 3: Project expenditure during the reporting period (Defra Financial Year 01 April to 31 March)

Item	Budget (please indicate which document you refer to if other than your project schedule)	Expenditure	Balance
Rent, rates, heating, overheads etc			
Office costs (eg postage, telephone, stationery)			
Travel and subsistence			
Printing			
Conferences, seminars, etc			
Capital items/equipment			
Others			
Salaries (specify)			
TOTAL			

Table 3 reports project expenditure against a revised budget for 2006/07 which was approved by the Darwin Secretariat in an email dated 6 December 2006. There has been an underspend on the capital items heading, however, the Darwin Secretariat were alerted to this before the end of February, and permission was received to vire some of this onto travel and subsistence. There are no other variations in expenditure that are +/- 10% of the budget.

10. **OPTIONAL:** There are no outstanding achievements to report in this period.

Annex 1 Report of progress and achievements against Logical Framework for Financial Year: 2006/07

Project summary	Measurable Indicators	Progress and Achievements April 2006 - March 2007	Actions required/planned for next period
<p>Goal: <i>To draw on expertise relevant to biodiversity from within the United Kingdom to work with local partners in countries rich in biodiversity but constrained in resources to achieve</i></p> <p><i>The conservation of biological diversity,</i></p> <p><i>The sustainable use of its components, and</i></p> <p><i>The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</i></p>		<p>As this is the first year of the project, it is too early to report on progress towards the DI final goal. However, the project is aiming to support the first goal, through the conservation of biological diversity of indigenous vegetables.</p>	<p><i>(do not fill not applicable)</i></p>
<p>Purpose Improved conservation & sustainable use of biodiversity in Mali & Benin by cataloguing indigenous vegetable (IV) species, domesticating selected species & promoting their value to producers & consumers</p>	<ul style="list-style-type: none"> • Comprehensive list of indigenous species used as vegetables in Mali & Benin produced • Domestication trials of threatened species initiated • IV research included as a priority topic by the end of yr 3 by IER & INRAB boards 	<p>The project has made good progress towards its purpose of improving the conservation and sustainable use of biodiversity in Mali and Benin by collecting country-wide information to produce a catalogue of indigenous species used as vegetables in the two countries, and setting up short-term seed banks. Data on threatened species which will underpin the domestication trials has also been collected, but the choice of species has been delayed slightly. The second year trials are however still scheduled to go ahead as planned.</p>	<p>Finalise choice of species for domestication trials</p> <ul style="list-style-type: none"> • Select villages for participatory domestication trials and initiate trials • Carry out repeat seed and sample collections to build up the short-term seed banks • Make arrangements to send seed samples for long-term conservation
<p>Output 1. Catalogue of IV biodiversity richness, uses & threats produced.</p>	<p>Catalogue of IV biodiversity & disappearing species available for 6 regions in Mali & northern Benin by end yr 2</p>	<p>Significant progress has been made towards the creation of a catalogue of IV biodiversity. In Benin the catalogue was extended to the whole country and has been completed for the three phytogeographic regions but requires further species status checks and additional identification. In Mali the catalogue of local names is complete for the whole country, however, repeat visits will be required to find samples of plants that were not available during the first survey, in order to finalise the scientific identification. Disappearing species have been identified for Mali, and will be identified for Benin in the coming months. The indicator for this output is appropriate, although the catalogue has been expanded to comprise the whole of Benin.</p>	
<p>Activity 1. Surveys</p>		<p>In both countries, a survey was developed targeting three levels: producers/consumers in the village, city consumers and market retailers. At the village level three types of methods were used: general questionnaire surveys with producers/consumers, semi-structured interviews with old people who were knowledgeable about traditional vegetables, focus groups with traditional vegetable cultivation specialists, and focus groups with a men's group and a women's group about village characteristics. At the city level a questionnaire survey was carried out with consumers living in different income level neighbourhoods. At the market level a questionnaire survey was carried out with traditional vegetable retailers. In each country the survey targeted 18 villages, 3 cities and 6 markets. In Mali the survey</p>	

		<p>covered the six regions of Koulikoro, Kayes, Sikasso, Segou, Mopti and Gao, and was completed in Jan 07. In Benin the survey was expanded to cover the whole country, with 6 villages, 2 markets and 1 city from the north, centre and south of the country respectively. The survey was completed in Mar 07.</p> <p>Data analysis started for Mali in Nov 06. However, the need to be able to relate a local name to a scientific name constrained progress in this task. Matching the local names to scientific names started in Jan 07 for Mali, and in Oct 06 for Benin, and is completed in Benin. In Mali particularly several local species names could not be identified because the plant was not available for collection by the enumerators at the time of the survey.</p> <p>In the next period, the focus will be on data analysis and the completion of the species identification by repeat visits to the field to look for plant samples.</p>
Output 2. Seed banks established.	Seed samples collected country-wide in Mali and Benin documented & stored in fridges in IER & INRAB & backup at AVRDC by Feb 07	A first batch of seed samples has been collected country-wide in Benin and Mali, stored at IER and INRAB with a backup (for those samples which were collected in large enough quantities) at AVRDC. However, because of unavailability of seed of many species at the time of the surveys, the collections represent only a small portion of the countries' biodiversity. Repeat collections will be necessary and therefore the date of Feb 07 specified by the indicator should be more appropriately Feb 08.
Activity 2. Seed & sample collection		<p>A seed and sample collection has taken place throughout both countries. In Benin the number of species collected is 195. An Excel database of all consumed vegetables is being edited for Benin. The number of seeds resources collected: 144. Back ups of the most recent collections are being sent to AVRDC. The numbers of vegetative resources collected: 10; the number of herbaria collected: 232 (Deposited at the National Herbarium of Benin); the number of plant family collected: 50 (most represented family: Amarantaceae, Solanaceae, Asteraceae, Cucurbitaceae, Tiliaceae, Leguminoseae, Malvaceae). The collection in Mali from all six regions resulted in 214 seed samples and 69 herbarium samples. A backup of part of these collections has been deposited with AVRDC West Africa office.</p> <p>In the next period repeat seed and sample collection will be necessary, as during the first visits not all plant species were at the seed production stage.</p>
Output 3. Selected highly used and threatened species domesticated	<p>3.1 At least one species for domestication trials per region in Benin and Mali selected by Jan 07</p> <p>3.2 Results from domestication trials with different field techniques available by Jan 09</p>	<p>Selection of the species for the domestication trials has been delayed in both countries. In Benin, the socio-economic team's capacity was reduced by one scientist starting his Masters abroad, a second scientist being tied up on another project, and an enumerator leaving the project for a full-time job, and this led to a delay in the survey administration and typing up of the data. As the data were not fully available until the end of the project year, a decision on the species for the domestication trials had to be deferred. In Mali respondents mostly reported a decline in the prevalence of <u>tree</u> species used for vegetable purposes (because of changing climate), and relatively few respondents reported a decline of herbaceous species in the environment (although a decline in consumption was widely reported). This unexpected result required face-to-face consultation between the IER and CAZS-NR partner in March in order to decide what to do.</p> <p>The domestication trials are still envisaged to start in May 07.</p>
Activity 3. Domestication trials		The domestication trials are not due to start until May 07.

Output 4. Dissemination material and training for different stakeholders delivered	<p>4.1 At least one major awareness-raising workshop delivered in both countries by Nov 08</p> <p>4.2 Pamphlets on conservation needs, cultivation techniques, preparation and recipes produced for both countries by Nov 08</p> <p>4.3 In each survey village pamphlets distributed and training delivered by Mar 09</p> <p>4.4 Three ½ hour radio programmes produced and aired by Apr 09</p>	Work towards this output is not due to start until the third year.
Activity 4.1 Development of peer-reviewed publications, best practice pamphlets and radio programmes	These activities are not due to take place until the third year. The IER partner however, was in touch with Koulikoro Rural Radio at the onset of the project to alert them to the possibility of preparing dissemination programmes at a later stage.	
Activity 4.2 Awareness-raising at grassroots and policy levels	These activities are not due to take place until the third year.	
Output 5 Training & country-to-country expertise exchange delivered	5. Benin-Mali-UK-expertise exchange & training workshops carried out once a year	The training and country-to-country expertise was delivered on target in year 1 and is expected to be delivered without problems in year 2.
Activity 5 Capacity-building activities for partners	<p>The introductory Benin-Mali-UK expertise exchange workshop took place in Cotonou, Benin, the 26-28 May (2 and ½ days). The group reviewed project objectives, discuss the relative merits of different methodologies, and formulated a detailed plan of action to carry out the activities which would lead to the principal outputs detailed in the project log frame (in detail for the first two years, the third year plan to be finalised at the mid-term meeting in Aug 07).</p> <p>Following the workshop, a subgroup of representatives from all three institutions jointly developed the survey methodology (in terms of defining the target groups, and the number of survey locations and respondents) and worked out the detail of the questionnaire surveys, interview and focus group guides. The survey methodology was then slightly adapted to suit the conditions of the two countries.</p> <p>The next period will see the mid-term meeting, scheduled to be held in Aug 07 in Mali to allow partners to exchange information on and discuss project progress in the two countries, and to define the final year activities in more detail.</p>	

Annex 2 Project's full current logframe

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 Improved conservation & sustainable use of biodiversity in Mali & Benin by cataloguing indigenous vegetable (IV) species, domesticating selected species & promoting their value to producers & consumers	<ul style="list-style-type: none"> Comprehensive list of indigenous species used as vegetables in Mali & Benin produced Domestication trials of threatened species initiated IV research included as a priority topic by the end of yr 3 by IER & INRAB boards 	Research programme reports IER & INRAB board reports	Mali & Benin governments maintain the same level of or increase financial support for agricultural research & allow this to be tied in to conservation measures
Outputs 1 Catalogue of IV biodiversity richness, uses & threats produced. 2 Seed banks established. 3 Selected highly used & threatened IV species domesticated 4 Dissemination material & training for different stakeholders delivered	1 Catalogue of IV biodiversity & disappearing species available for 6 regions in Mali & northern Benin by end yr 2 2 Seed samples collected country-wide in Mali and Benin documented & stored in fridges in IER & INRAB & backup at AVRDC by Feb 07 3.1 At least one species for domestication trials per region in Benin & Mali selected by Jan 07 3.2 Results from domestication trials with different field techniques available by Jan 09 4.1 At least one major awareness-raising workshop delivered in both countries by Nov 08 4.2 Pamphlets on conservation needs, cultivation techniques, preparation & recipes produced for both countries by Nov 08 4.3 In each survey village pamphlets distributed & training delivered by Mar 09 4.4 Three ½ hour radio programmes produced & aired by Apr 09	The following information will be made available on the project web-site, which will feature the DI logo: Regional & country species lists & reported threats published Reports on cultivation practices published Uses & preparation manuals, recipe collections published List of seed samples collected & stored made available through the AVRDC website Domestication trial reports Workshop minutes & reports published (website) Radio programme material Articles published in newsletters & peer-reviewed journals	Farmers are willing to cooperate with the enumerators during the survey Plants which have gone to seed can be found for seed collection Electricity supply is stable Sufficient numbers of policy makers can attend the workshops Farmers find the training sessions sufficiently valuable to attend Radio stations are interested in broadcasting the dissemination programmes Aviation and other fuel prices do not rise unexpectedly (affecting travel costs)

<p>5 Training & country-to-country expertise exchange delivered</p>	<p>5 Benin-Mali-UK-expertise exchange & training workshops carried out once a year</p>		
<p>Activities</p> <p>1 Surveys</p> <p>2 Seed & sample collection</p> <p>3 Domestication trials</p> <p>4.1 Development of peer-reviewed publications, best practice pamphlets & radio programmes</p> <p>4.2 Awareness-raising at grassroots & policy levels</p> <p>5 Capacity-building activities for partners</p>		<p>Activity Milestones</p> <p>1 Survey enumerators trained (6 in Mali, 3 in Benin) by June 06 & questionnaires agreed; surveys to identify IV species found in six regions in Mali & three in Benin, describe cultivation practices & uses & preparation of IVs completed by Mar 07; data inputting & analysis by Jul 07; data write-up by May 08</p> <p>2 Seed bank facilities established Jun 06; seed & sample collection largely completed by Feb 07 (but repeat visits may occur later depending on seed production periods)</p> <p>3 IVs for domestication trials selected in Jan 07; domestication trials begin May 07; trials for report write-up completed by Jan 09.</p> <p>4.1 Reports/peer-reviewed publication joint write-up commences May 08; pamphlets prepared by Nov 08; pamphlets distributed by Mar 09; radio programmes prepared by Dec 08; radio programmes aired Jan-Apr.</p> <p>4.2 Sourcing further funding commences Sep 07; awareness-raising workshop for policy makers Nov 08; training sessions on the need for IV conservation, cultivation techniques, preparation techniques, recipe exchanges, delivered in each survey village by Mar 09.</p> <p>5 Introductory Benin-Mali-UK expertise exchange workshops in May 06 to finalise Detailed Work Plan. Mid-term meeting in Aug 07; final summary workshop Feb 09. Partners to be in close e-mail contact through-out.</p>	

Annex 3 Onwards – supplementary material (optional)

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ectf-ed.org.uk putting the project number in the Subject line.	√
Is your report more than 5MB? If so, please advise Darwin-Projects@ectf-ed.org.uk that the report will be send by post on CD, putting the project number in the Subject line.	X
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	X
Have you completed the Project Expenditure table?	√
Do not include claim forms or communications for Defra with this report.	