

# Darwin Initiative – Final Report

## Darwin project information

<b>Project Reference</b>	162/11/014
<b>Project Title</b>	Biodiversity and Colombian Coffee Farmers: Capacity Building for Added Value
<b>Host country</b>	Colombia
<b>UK Contract Holder Institution</b>	CABI BIOSCIENCE
<b>UK Partner Institution(s)</b>	CABI
<b>Host Country Partner Institution(s)</b>	CENICAFE
<b>Darwin Grant Value</b>	£134,677
<b>Start/End dates of Project</b>	April 2002 to March 2005
<b>Project Leader Name</b>	PS Baker
<b>Project Website</b>	<a href="http://www.cenicafe.org/modules.php?name=Iniciativa_Darwin&amp;p_op=15&amp;lite">http://www.cenicafe.org/modules.php?name=Iniciativa_Darwin&amp;p_op=15&amp;lite</a>
<b>Report Author(s) and date</b>	PS Baker Nov 2009

## 1 The Project in One Hundred Words

### Problem

Colombia: famous for coffee – little-known for megadiversity.

But, criticised for intensive sun coffee – “*biological desert*” says Smithsonian.

So how to promote coffee to protect/enhance biodiversity?

### Results

Biodiverse coffee-market: very small.

Fastest selling: Rainforest Alliance® – insists on shade-coffee; but increasingly damp Colombian climate doesn't suit shade (diseases).

Farmers: ‘we'd expect a high re-shade premium’.

But market premium is low, proposition unviable.

And critics wrong: Colombian sun-coffee matrix is biodiverse.

### Conclusions

Colombia should act: protect/build sun-coffee biodiversity countrywide; move decisively on climate change – adapt, mitigate, diversify.

Farmers value biodiversity, will collaborate.

Coffee's a stuff will not endure – the matrix is everything.



## 2 Project support to the Convention on Biological Diversity (CBD)

The project has contributed to the following articles of the CBD:

**Art. 6** *General measures for conservation and sustainable use* – the project has suggested a broad strategy that aims to promote biodiversity of the coffee lands in ways that farmers are most likely to adopt and that will not affect yields.

**Art. 7** *Identification and monitoring* – the project identified 100 species of bird present in commercial unshaded and partially shade coffee including 11 migrants, as well as a large number of plant species including those of medicinal value.

**Art. 8d** *Promoting the protection of ecosystems, natural habitats and the maintenance of viable populations of species with land users.* Through extensionist training and the manual we have increased awareness of biodiversity issues. Through the Colombian Coffee Federation (FNC), which above all is a growers association, we have proposed policy options to protect the long term viability of the coffee zone.

**Art. 10c** *Protecting and encouraging customary use of biological resources in accordance with traditional cultural practices by collating farmer knowledge.* We have extensively consulted and documented responses of farmers who have told us their concerns about biodiversity and the environment. In future they are willing to act to conserve biodiversity by offering their labour, as long as this does not materially affect their income.

**Art. 12** *Research and training* – the project carried out research on: a) the biodiversity of mainstream coffee farms; b) the knowledge, concepts and preoccupations of coffee farmers on environmental and biodiversity issues.

On training, we conducted workshops, one-to-one training and the production of a 312 page manual on sustainable coffee production with emphasis on biodiversity, suitable for extensionists. Also produced was a 192 page textbook on coffee and climate in the Andes, given the remarkable interest shown in climate change during the course of this project.

**Art 17.** *Exchange of information* – much of the information from the project is available on the [www.cenicafe.org](http://www.cenicafe.org) website and in the extension manual.

**2010 biodiversity target** – in the intensive coffee lands of Colombia we found greater biodiversity of birds than expected and hence believe that these can act as a refuge to birds

flying between principal sites for wintering or reproduction. The coffee lands as a whole support more biodiversity than expected, since they are part of a diverse agricultural matrix.

**CBD Theme** – the project was coherent with the Agricultural Biodiversity Theme

**The cross-cutting issue** covered in the project was predominantly that of economics, trade and incentive measures. Through the development of the project the issues of i) an ecosystem approach, and ii) climate change and biological diversity themes also arose. The final aim of the project was to try to integrate these approaches towards a common future policy for coffee in Colombia, compatible with maintaining a good level of biodiversity over the broader coffee zone. In particular, we have taken into account the need noted at COP 9, to take further action to integrate biodiversity into climate change adaptation and mitigation while also noting the potential impacts of climate change activities on efforts towards the conservation and sustainable use of biodiversity. We conclude that the current piece-meal way that coffee is certified by a number of different certification agencies, may not be in the best long-term interests of biodiversity of the coffee lands in Colombia.

**Colombia's CHM focal point:** there was contact with the Alexander von Humboldt Institute, one of their staff attended one of our workshops. We highlighted some of their detailed socio-economic analysis in our Sustainable Coffee Manual.

The project did not support any other biodiversity conventions.

### 3 Project Partnerships

The project initiated as a bi-partite one between CABI and Cenicafé as the research institute of the Colombian Coffee Federation (FNC). Most of the work was carried out with this institute, and strong contacts were also made with the extension committees of the FNC who carry out regular training activities with farmers throughout Colombia. With their collaboration we developed the project manual 'Guía Para la Caficultura Sostenible en Colombia' as a source-book of information for their work with farmers. A number of other contacts were made including the Specialty Coffee Association of America, the Common Codes for Coffee Community project (whom we introduced to the Federation and who are now working closely with them and certifying some of their coffee), the World Bank (Daniele Giovannucci), Rainforest Alliance, von Humboldt Institute and Salva Natura (El Salvador). Representatives from these institutions attended a workshop on coffee and biodiversity held in Colombia.

By the end of the project therefore we had contact with a wide range of stakeholders involved in the area of sustainable Colombian coffee, many of which are on-going.

No MoU was established, but CABI and the Colombian Coffee Federation maintain close links, the Director of Cenicafé is liaison officer for CABI, and Colombia is a member country of CABI. The work of this project flowed on naturally from previous projects on integrated pest management funded by DFID and the Common Fund for Commodities and hence from the start the needs of the host country were well known to CABI and the activities were closely aligned with the needs of Colombian coffee.

There was a good bond of collaboration during this project. The main problems encountered were:

- a) a determination to continue the work beyond the finishing date by project staff at Cenicafé which contributed to the delay in finishing the project;
- b) the departure of the project leader from Cenicafé towards the end of the project;
- c) a period of illness by the CABI project counterpart.

All these have made the closing of the project considerably delayed, which we greatly regret. An advantage however has been that this has given more time to build a concept of how to sustainably protect and improve biodiversity and coffee in Colombia in the light of the rapidly changing scenarios of the specialty market and fluctuating prices. The growing realization of

the limitations of sustainable coffee as well as the full extent of climate change, which will greatly change the coffee landscape, has recently caused us to re-shape the conclusions and recommendations of the project, which we feel may greatly increase the legacy of the project.

**UK or regional institutional contacts:** Initial interactions with Natural History Museum's Alex Monroe were made, because of a previous Darwin coffee biodiversity project in El Salvador, but it became clear that the approach, activities and outputs of that project was markedly different to the present one, so closer contact was not pursued.

## 4 Project Achievements

### 4.1 Impact: achievement of positive impact on biodiversity, sustainable use or equitable sharing of biodiversity benefits

The project was not designed to have a direct impact on biodiversity in the short term, i.e. during the life of the project. Instead, the purpose was to build capacity and knowledge so that value can be added to coffee through development of marketable attributes compatible with biodiversity attributes.

Initially we thought that we could support the development of new high-biodiverse coffee products of interest to specific roasters, but as detailed in a separate report (An Analysis of the Market Potential of Biodiverse Colombian Coffee) the market for these coffees was found to be small and unattractive for most farmers. We further came to realize that expending great effort to promote only small patches of high diversity is of dubious long-term value for preservation of biodiversity.

Instead, we believe the main impact will be in:

- improving institutional capacity to support future efforts to counter the threats to the region's biodiversity;
- improving Colombia's coffee image – we can confidently assert that the majority of Colombian coffee (unshaded or sun-coffee) is not a 'biological desert' as some have called it and hence efforts to link Colombian coffee to aspects of biodiversity can be justified and has hard data for support.

A clear indicator of impact is that environmental concerns are well articulated in the Coffee Federation's five year plan (2008-2012). In that plan, there are 8 'value proposals' for the coffee farmer, of which № 6 is as follows:

6. Lead initiatives that generate a positive impact on the environment
  - a) Protect and promote the productive value of biodiversity in the coffee zones;
  - b) Promote the protection and sustainability of forests and water courses;
  - c) Develop and implement a strategy for climate change mitigation;
  - d) Participate actively in markets for carbon and environmental services;
  - e) Establish alliances with public and private entities to develop initiatives for protection of the environment.

A range of proposals and environmental initiatives are under development (including a proposal to the Global Environment Facility) led by Cenicafé's Dr Nestor Riaño, who stated that he will be using the farmer participatory methods used in the Darwin project to further elicit their willingness to participate in future projects to protect their environment. This may involve planting of trees in such a way that it will not affect coffee production.

We cannot claim a primary responsibility for the above proposals, but we feel that the Darwin Initiative project has played a very useful part in laying the ground work for such ventures and helped to shape opinion throughout the FNC.

A key intent of the project was to impact not only upon the research institute involved (Cenicafé) but the extensionists who carry the results of research into the field to improve the lot of coffee farmers. We believe that we have had a significant impact on how extensionists understand biodiversity, how it is changing and how farmers relate to it. And we believe that the sustainable coffee production manual and the book on climate in the coffee region that we published are useful and semi-permanent ways to advance environmental issues in the region.

In the aftermath of the project we are still engaged with Cenicafé to further the cause of protection of biodiversity of the coffee lands. It has become increasingly apparent that the effects of climate change are already starting to affect coffee production. From current models it is now clear that some of the farmers now dedicated to coffee growing will have to abandon it in the next 20 to 50 years. Indeed, if the current extreme wet phase becomes a more regular feature (rainfall in 2008 was 50% or more above average in many coffee zones of Colombia), then abandonment will accelerate. We are especially concerned that this will mean a growth in pasture, which will have seriously negative biodiversity consequences.

#### **4.2 Outcomes: achievement of the project purpose and outcomes**

The project's first main purpose was: *'to protect biodiversity in coffee growing regions of Colombia by improving farmer knowledge'*. Through the training of extensionists, participatory work with farmers and the production of the manual, we believe, though cannot prove, that the project has had a positive impact in this respect.

The project's second purpose: *'enhanced economic viability of coffee produced under agro-forestry and shade conditions'* was not met. This because we found that the eco-climatic conditions are not favourable in much of the region for re-shading coffee – indeed the climate is becoming less amenable to this way of growing coffee in Colombia.

The project's third purpose: *'enhanced understanding by roasters and traders'* is as yet unfulfilled and requires careful thought – are roasters misleading consumers by selling bird-friendly coffee as opposed to sun coffee? It is very questionable whether it is better to concentrate on a few highly diverse patches than to moderately improve a broader swath of coffee and associated crops and vegetation, to create a complex agricultural matrix. Certainly we think that in the case of Colombia, especially with accelerating climate change, the latter is the better option and the results of this project support this assertion.

This matter is covered in more detail in a separate report (An Analysis of the Market Potential of Biodiverse Colombian Coffee) which reviews the current state of the sustainable coffee market, concluding that there is little scope for Colombian coffee to develop new high biodiverse 'niche' coffee brands and thus will have little overall impact on national biodiversity.

The great truth that has become evident during the life of this project, and which has given us considerable pause for thought, is that climate change will greatly change this coffee zone, to the point that coffee could eventually become only a minor component of the agricultural matrix. The species mix that we have recorded will change as invaders inevitably come in from warmer, lower altitudinal zones. Already the central coffee zone has been in the grips of rain storms that have continued almost daily for the past two years – although this cannot be directly attributed to climate change, it is at least consistent with it. This phenomenon has led to a decline in coffee production (2009 saw the lowest amount in 30 years) and increased incidence of coffee diseases.

What we are currently trying to do therefore, is to help Cenicafé and the Colombian Coffee Federation come to grips with this new reality. Currently we believe that major policy decisions need to be taken about:

- Determining zones of coffee production over the next 20 to 50 years (e.g. zoning into categories such as green for 'business as usual'; yellow 'adapt'; red 'diversify');
- Determining if there are new coffee zones that could be exploited without negative environmental consequences;

- Building biodiversity throughout the whole zone, e.g. by new tree planting especially fruit and timber trees that will withstand hotter temperatures and more extremes of climate;
- Developing adaptation projects to climate change;
- Determining what diversification crops can be grown instead of coffee.

The fundamental challenge is to determine how to maintain, well into the future, the complex, diverse agricultural matrix that is the Colombian coffee zone, supporting a diversity of animals, plants, human communities and ecological services for the good of the nation. A principal challenge will be to find crops as benign as coffee with which to replace it in a changing climate.

## 4.3 Outputs (and activities)

### 4.3.1 Outputs achieved

**Researchers and extensionists trained** – yes, through workshops, one-to-one sessions, work-plans executed.

**Farmer attitudes to biodiversity codified** – yes, the final technical report (*Informe Técnico* in preparation) clearly identifies farmers perceptions.

**A regional policy developed** – yes, a draft has been prepared.

**Produced materials for marketing and farmers** – no, because the findings did not warrant the promotion of biodiverse coffees as such. It is a long term project to develop the marketing of the biodiverse aspects of the coffee region as a whole, to add value to the Juan Valdez Colombia brand, and this should be done on the back of projects to build and protect biodiversity and increase rural knowledge at both the school and farmer levels. We are confident however that we have played a useful role in providing evidence to rebut the notion that Colombian unshaded coffee is a 'biological desert' (Smithsonian Migratory Bird Center).

**Extensive database created** – yes biodiversity data are contained in the Cenicafé database: Aves de la Zona Cafetera de Colombia: further enquiries to JE Botero, Cenicafé.

**Links to roasters & traders** – through the workshops, new contacts were made, especially the Common Codes for the Coffee Community project. One attendee, Jaime Raúl Duque subsequently developed a full cupping laboratory in Quindío, and has regular interaction with specialty coffee roasters.

**Forest patches identified and studied** – yes, as part of detailed studies of 80 farms in two municipalities (see 4.5).

**Participatory rural appraisal** – yes, as part of detailed farm studies (4.5).

**Biodiversity training manual** – published, 1500 copies distributed.

**Database and digital photo/video library** – done (not video) now on Cenicafé website.

**Stakeholder workshop** – three workshops held.

**Training and promotion activities** – training yes, promotion no.

**Commercial awareness activities** – some commercial awareness, but a proper effort needs to be carefully developed as outlined in the marketing document.

### 4.3.2 Problems encountered

The fundamental problem encountered, as covered in the separate marketing study, was that the overall potential for adding value to coffee produced under high biodiversity was deemed weak because the market for high biodiversity-based coffee products was found to be too small, and inappropriate for Colombian climatic conditions.

Logistical problems: project collaborator Hernando Duque and his team left Cenicafé to take up the post of Technical Director in the Extension Department of the Federation's Caldas branch. This was a promotion that he could not afford to turn down. This delayed completion of some of the work but Duque's new post affords him increased opportunities to put the lessons of the project into practice and he maintains a close interest in the subject.



## 4.4 Project standard measures and publications

Performance against standard measures is shown in Annex 4, and all project publications are listed in Annex 5. Additional publications are planned, including a final *Informe Técnico* as well as a closing dissemination meeting if Cenicafé's funds suffice.

## 4.5 Technical and Scientific achievements and co-operation

### 4.5.1 Coffee farm biodiversity study

We studied the mostly unshaded coffee habitat in the central coffee zone which produces most of the country's coffee, to determine the true extent of biodiversity present in natural vegetation remnants, as well as the mix of crops around. We assessed avian diversity as a measure of general biodiversity, especially as birds have become emblematic for biodiverse coffee.

**Staff:** Gloria Lentijo, Jorge Eduardo Botero

**Project methodology for bird surveys:** we randomly selected 40 smallholder farms and 40 larger intensive farms in two municipalities (municipios of Palestina and Manizales) in the Department of Caldas, in the central coffee zone (Eje Cafetero) of Colombia. They lie between 1300 and 1700 m above sea level, covering biomes classified as tropical lower montane and premontane rain forest (according to the Holdridge classification).

Observers walked around each farm in transects. In all they made 177 visits and over 2,000 observations. All birds that were seen were recorded, except those in flight, as well as the habitat in which they were situated, e.g. coffee, garden, uncultivated, intensive coffee, semi-shaded coffee, shaded coffee, other crops, bamboo grove (*Bambusa guadua*). An inventory of common plant species was also taken.



The heart of the Eje Cafetero: Above: vereda of Manizales; Below: vereda of Palestina

**Results:** although most farms studied had coffee with little or no shade, all farms were a mosaic of habitats, see Table 1.

**Table 1. Number of the 80 farms with each category of habitat in the municipalities of Manizales & Palestina**

Municipality	Habitat							
	Uncultivated	Bamboo	Garden	Intensive coffee	Light shaded coffee	Shaded coffee	Hedgrow	Other crops
Manizales	24	33	26	15	19	6	9	1
Palestina	29	32	39	34	6	0	15	9

The birds, classified according to their basic guild (e.g. forest, woodland, open country) were quite widely dispersed over the various farm habitats (Table 2).

**Table 2. Total number of bird species observed per farm habitat, according to their guild classification.**

Bird guild category	Farm habitat								
	Uncultivated	Bamboo	Garden	Sun coffee	Light shade	Shade coffee	Hedges	Other crops	Buildings
Species of open areas	25	20	25	31	25	22	9	8	21
Woodland species	20	16	13	24	20	13	5	4	4
Forest generalists	8	6	2	7	9	5	3	1	0
Species of bushes/thickets	16	9	5	13	9	7	5	1	4

A total of 100 species of bird were recorded over the 80 coffee farms. They comprised 30 families, the commonest of which were Tyrannidae (16%), Thraupinae (14%), Parulidae (11%), Emberizinae (8%), Trochilidae (6%). None of the species counted were considered endangered and no very rare forest species typical of Andean montane forest were recorded.

Nevertheless, certain species were considered to be of especial interest, including those that are endemic, generalist forest species, migratory, rare or highly vulnerable. 43 of the 100 species fitted these criteria, the commonest of which are *Tangara gyrola*, *Crypturellus soui*, *Phaethornis guy* y *Grallaria guatemalensis*. Most of these 43 are considered quite rare species, including *Heliomaster longirostris*, *Myiarchus cephalotes* and *Hemithraupis guira*. Eleven transcontinental migrant species were recorded in low numbers (Table 3).

A concomitant study of common plants present recorded 119 species, many in borders, gardens and uncultivated land. Use of herbs for medicinal uses was common among families living on the farms.

**Table 3. Presence (1) and absence (0) & total/habitat for migratory species registered in Manizales & Palestina**

Migratory bird species	Habitat								
	Uncultivated	Bamboo	Garden	Sun coffee	Light shade	Shade coffee	Hedge	Other crops	Buildings
<i>Catharus ustulatus</i>	1	0	0	0	0	0	0	0	0
<i>Contopus</i> sp.	1	0	0	1	1	1	0	0	0
<i>Dendroica fusca</i>	1	0	1	1	1	1	0	0	0
<i>Dendroica aestiva</i>	0	0	1	1	1	0	0	0	0
<i>Mniotilta varia</i>	1	1	0	0	0	0	0	0	0
<i>Oporornis philadelphia</i>	1	0	0	0	0	0	0	0	0
<i>Piranga rubra</i>	1	0	0	0	0	0	0	0	0
<i>Setophaga ruticilla</i>	1	1	0	0	1	0	0	0	0
<i>Tyrannus tyrannus</i>	0	0	1	1	0	1	0	0	0
<i>Vireo olivaceus</i>	0	0	0	0	1	0	0	0	0
<i>Wilsonia canadensis</i>	0	1	0	0	1	0	0	0	0
Total species	7	3	3	4	6	3	0	0	0



**Conclusions:** unshaded 'sun' coffee in Colombia is not a 'biological desert', as some have claimed. Not surprisingly, many of the birds found were those that are often encountered in altered habitats and there were no very rare birds – none from the CITES list. However, amongst the 100 species, a proportion of rare birds were recorded, and some that are transcontinental migrants. These latter are of extra significance because it was originally the apparent decline of migratory bird species that helped to launch the intensive study of biodiversity and shade coffee in the 1990s<sup>1</sup>. The rare forest species that would have originally inhabited these slopes when forest covered them were absent however, replaced by a mix of generalist forest species and those more often found in open habitats.

Some guilds of birds were rather poorly represented, for example frugivorous birds. Remarkably perhaps, the smaller and generally less intensive farms did not have a greater diversity of birds.

#### 4.5.2 Farmer perceptions about biodiversity and the environment

**Staff:** Mauricio Salazar, Hernando Duque in collaboration with extensionists from the relevant areas studied.

**Methods:** we took two different approaches to gathering data to understand farmers' perceptions about biodiversity. The first was through individual encounters with farmers using the technique of the semi-structured interview, where a range of topics were raised, including questions of a socio-economic nature, farming systems and natural areas that were not farmed. To this end we interviewed 80 farmers of seven 'veredas' (roughly equivalent to a parish); 40 each in the municipalities of Manizales and Palestina. Each group of 40 included contrasting socioeconomic and production systems.

The second method of gathering data was through group meetings, using participatory methods (rapid rural appraisal and participatory rural appraisal). Various techniques were employed, including matrices for scoring and prioritization, transect diagrams, thematic maps and problem trees. These were carried out in veredas of the municipalities of Pereira and Marsella (Risarcaldá) with the participation of a total of 414 coffee farmers.

Group diagnostics: in this collaborative activity with the FNC extension service, five veredas were selected in the Pereira municipality and two veredas from the municipality of Marsella.

Techniques employed: to obtain information from the group meetings, informal methods derived from participatory diagnostics such as rapid rural appraisal, participatory rural appraisal and ZOPP were used, involving hierarchical matrices, tendency diagrams, resource maps, transect diagrams, brainstorming and prioritization of post-its.

During the meetings we asked farmers to identify the most important natural resources in the vereda and we also elicited from them the most important factors they consider affecting these resources. The farmers described to us the benefits they perceive from these natural resources, and through this we established their principal environmental problems.

Finally, we obtained information from small working groups about 10 themes in order to construct trend graphs about: coffee production, price of coffee, crops other than coffee, soil erosion, natural areas (ravines, Guadua bamboo and other woodlands), number of water sources, quality of water, presence of birds and mammals, presence of insects.

The participants discussed how these variables had changed in their veredas, after introductory comments from the oldest coffee farmers present, summing up the origin of the vereda (where it started, where it expanded to) and describing the countryside in the past 50 or so years.

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<sup>1</sup> Rice, R. A., and J. R. Ward. 1997. Coffee, conservation, and commerce in the Western Hemisphere. Smithsonian Migratory Bird Center and Natural Resources Defense Council, Washington, D.C.

**Results:**

*Age of farmer:* 90% were older than 40 years of age, with 45% over 60.

*Formal education:* 40% had 5 or fewer years of education, 31% had more than 11 years.

*Farm size:* 21% under 2 ha, 33% from 2 to 5 ha, 23% 5 to 10ha and 33% more than 10 ha.

*Woodland or forest fragments:* the majority of farms (68%) had less than 0.5ha of woodland, which are associated with water sources and 90% of which is bamboo.

*Use of fragments:* In 89% of the farms visited the fragments are designated for the dual functions of preservation of water sources and provision of wood especially bamboo.

Commercial exploitation of these fragments is practiced by only 4% of coffee farmers. 40% use the fragment exclusively for conservation of water sources situated in the farms. Another 45% use the woods for various purposes, including water conservation, wood for use on the farm and for selling.

*Farmer perceptions about biodiversity and natural resources:* 65% of farmers affirmed their understanding of the term 'biodiversity'. But when questioned further about the meaning of the word, it was clear that about 72% did not have a clear concept of what it really meant.

Once farmers were made clear about the meaning of biodiversity, they were asked to qualify, on a scale of high, medium or low, the level of biodiversity in their department, municipality and vereda. In their opinion species richness was higher at the departmental and municipal level, than in their own farm or vereda. 54% and 45% considered that biodiversity was high and medium respectively, whereas only 11% and 12% of coffee farmers felt that their own farm or vereda respectively displayed high biodiversity. 68% of farmers considered biodiversity to be 'medium' and 20% categorized it as 'low'. All farmers had some basic concepts of the relationship between plants and animals, such as for food, pollination, refuge etc.

*Importance:* 70% of the farmers felt it was very important to conserve plant and animal species and uncultivated areas such as canyons, scrubland and woodland. The remaining 30% categorized it merely as 'important'.

*Perceptions:* a large group of farmers (43%) felt that biodiversity manifested itself over the whole of their farms, whereas others (24%) felt that it pertained to woodland, in ravines and streams (15%), to coffee plots (11%), to gardens (4%) or to water sources (3%). The greater part of those interviewed (85%) opined that biodiversity provided benefits such as quality of life (53%), food (22%), biocontrol (15%) and pollination (10%).

For 29% of those interviewed, aspects of biodiversity are also detrimental, including pests and diseases, weeds that compete for light and nutrients and risk to health (snakes). Nevertheless the majority felt that with due management, the risks of these could be minimized.

*Knowledge:* the coffee farmers identified without difficulty the plants and animals that had declined in their farms over the years. Thus 73% considered that mammals were the group that had most declined, whereas only 27% felt that birds had declined. Reasons for decline offered by farmers included: hunting (76%), deforestation (19%) and monocultures (5%).

Among plants, the farmers identified shade trees (63%), weeds (29%) and food plants (8%) as categories that had most declined. Causes of the decline were identified as intensification of coffee in the case of shade trees and food plants (71%), and herbicides for weeds (29%).

On the other hand, 55% of farmers also identified species of birds that had increased in abundance over recent years and suggested reasons, such as increased food crops (e.g. maize), climate change and migrations. 45% felt that certain species of weed had increased in abundance, due principally to the use of herbicides and climate change that had changed the balance of species present.

*Environmental problems:* 97% of farmers identified environmental problems at the level of their farm and 100% at vereda (parish) level. The main problems specified were untreated waste waters (43%), chemicals (30%), erosion (14%) and rubbish (12%).

Overall, 78% considered that biodiversity in their farms was diminishing. They identified the factors contributing to the decline as deforestation (38%), contamination (25%), hunting (25%) and increased farming activity (12%).

For the majority of farmers (67%) the decline in biodiversity is very serious, for 22% 'serious', while 11% gave it moderate importance. 71% of farmers recognized that they had contributed to the problem in three main ways: the use of agrochemicals, the business of agriculture itself and the post harvest processing of coffee. There was a clear positive association between number of years of schooling and the level of blame that they were willing to accept.

*Actions:* in spite of understanding the impact of their coffee-growing activities, the vast majority (96%) believe that they are protecting the environment by the way they use agrochemicals, protect uncultivated areas on their farms, handle the waste products of the farm and carry out soil conservation.

65% of the farmers actively conserve biodiversity by carrying out activities such as: tree planting (38%), preservation of water sources (26%), protection of wild animals (21%) and by foregoing applications of chemicals (15%).

A full 90% of coffee farmers consider that they could undertake actions to conserve biodiversity in the future through retaining the natural areas of their farms (54%), making less use of agrochemicals (31%) and tree planting (15%).

The majority of farmers interviewed (81%) said they carried out some activities to encourage the presence of fauna on their land. This included 68% who left behind some crop residues in their fields, 22% who built feeders (mostly for birds and squirrels) and 10% who planted species to specifically attract animals such as birds.

94% of coffee farmers said they would be prepared to collaborate to protect the environment by providing their own labour for projects on their farm or in their vereda, and by offering advice to other farmers. However, none of them (0%) was prepared to provide money, through donations, taxes or other payments to this end.

#### **Environmental management aspects on the farms:**

**Energy sources:** nearly all (97%) of the firewood used comes from the farm itself, the rest is purchased from other farms. The quantity of wood consumed per week averages 235kg/farm. It is more than 220kg/farm/week on farms larger than 10 ha, and for those of 2 ha or less it is about 145kg/week. Few farmers (1.5%) use their bamboo groves as an energy source.

**Use of forest fragments:** 45% of coffee farmers dedicate their fragments of natural vegetation to conservation, 4% exploit it in some way and 51% do a mix of both of these. Almost all farmers (97%) regard conservation as the most important use of the fragment, especially to protect sources of water that are fundamental to the functioning of the farm. The principal products obtained from the fragments are water (73.5%) and bamboo (26.5%).

**Farmers' perceptions of the economic benefits of biodiversity:** 68% of coffee farmers see biodiversity (i.e. anything other than their main crop, coffee) as a source of earnings, the rest (32%) see no economic advantage. For those that did see economic return from biodiversity, the following are the (non-exclusive) categories of income: food (mostly for family consumption, but also some sales of fruit), 63%; wood (especially bamboo), 55%; tourism, 11%; protection (for water sources and against erosion), 45%; others, 16%.

#### **Management of coffee production systems**

**Shade levels:** on farms in Palestina, 95% of coffee was grown without any shade trees; of the 5% that had shade, most of it was banana. In Manizales however only 18% was shadeless. The greater part of farms had light shade (67%) with only 15% having dense shade – i.e. that which would be required for shade certification. Banana too was the dominant shade type in Manizales (82%) but with *Inga* spp. (15%) and walnut (3%) used as well.

**Weed management:** for the two study zones, the control of weeds is mostly manual. In Palestina hand-pumped application of herbicides is carried out by 25% of farmers, with 47% using manual (machete) weeding and 18% a combination of the two. Manizales farmers use mostly manual methods (75%) with 25% using both machete and herbicides. 10% of farmers in Palestina use the FNC's recommended integrated weed management.

**Soil conservation techniques:** 95% of farmers use contour planting methods and 22% use planted barriers (often lemon grass) to control rainwater run-off. 19% have constructed run-off trenches and 15% have established cover plants (the FNC calls them 'plantas nobles' (noble plants)).

**Use of insecticides:** most farmers (83%) apply chemical insecticides to control coffee berry borer. 65% of applications are generalized, over the whole field, whereas 35% make focal applications. Criteria for application are a) the infestation level – 50%; b) the position of the insect in the berry (application is advised when most of the insects are in a superficial position in the berry) – 34%; c) flowering registers (for timing the subsequent application roughly 100 days after flowering) – 60%; d) direct observation – 50%. 70% of farmers evaluated the efficacy of their applications.

**Management of effluents:** 88% of farms have a septic tank and a fat trapping system for sewage, though a few (7%) use latrines and 5% dispose of sewage directly into water courses.

**Management of coffee pulp:** 85% of sampled farms have tanks for management of pulp whereas 15% manage in only in heaps.

**Mucilage:** 35% of farms manage mucilage from coffee processing in pits, 24% have silage cesspits (soak-aways), 20% use earthworm composting and 21% apply it directly to their fields.

### **Overview of farmers' perceptions about biodiversity and the environment**

- In general there is a lack of understanding about the term 'biodiversity', but farmers have coherent knowledge about nature and the environment;
- Coffee farmers have information about the abundance and diversity of living things at many levels: the international scale, their country and department, but their knowledge comes from their farm and vereda;
- Farmers have a close affinity for environmental themes and give them great importance;
- Their knowledge of local flora and fauna could be much more widely used and studied by researchers than has been the case up to now;
- Farmers' educational level contributes to their understanding of environmental themes, facilitating clarity of concepts;
- Farmers understand both the negative impacts on the environment caused by agricultural activities and the need to minimize them;
- At the same time they do not feel solely responsible for their effects on the environment and generally feel that this is the role of some agency outside the community;
- Experiences such as having suffered the effects of erosion, contaminated water, lack of water, have increased worries about environmental themes amongst coffee farmers;
- They identify mammals as the fastest disappearing category of animals;
- Their main motivation to conserve woodland is to protect water sources;
- Farmers are prepared to offer their labour to conserve biodiversity, inasmuch as it gives them a direct payback (e.g. protection of water source). However, they are not inclined to pay for it in cash;

- The conservation of biodiversity as a means to obtain a premium for their coffee is a favourable concept to farmers, as long as this does not compromise the productivity of their farm and there are no substantial increases in work and time to bring this about.

*Main identified environmental problems in the vereda:* common to all groups contacted is lack of water, caused by deforestation of the mountainsides, which in their estimation has reduced water flow. An additional problem is the contamination of these waters by untreated sewage and waste from coffee processing as well as by chemical residues. All these factors have, in the judgment of the farmers, conspired to reduce the availability of clean drinking water.

Hence there exists a major preoccupation amongst farmers about the supply and quality of water. The water sources that are located on farmers' properties are sometimes neglected and little attention is given to conserving them. Farmers tend to think that the FNC or the government should be undertaking such activities.

The general conclusions that we make from farmers' perceptions are:

- They have a good grasp of the general nature of the problems they face, but have some conceptual difficulties;
- They show some difficulty with managing more abstract concepts;
- They are good at identifying effects, but not always the causes;
- They have difficulties understanding life-cycles of some species;
- They feel that they are a part of their environment, and this makes it difficult to objectively analyse their relationship to their environment;
- The initiative to take action about environmental problems should be external, for instance government, companies, etc. and in general they do not identify themselves as taking an enterprising role to overcome their difficulties;
- They assign low economic value to non-marketable goods (e.g. water sources) that are environmental services.

#### 4.5.3 Survey of sustainable coffee production in Colombia

**Staff:** Mauricio Salazar, Hernando Duque

**Methodology:** a survey was undertaken to understand farmers' current sustainable practices and to ascertain to what extent they might be willing to accept new norms and standards, that are required by some coffee certifiers to gain a premium on the farm-gate price of coffee, and what level of premium might be regarded as acceptable. The survey was thus a form of diagnostic, a first step towards helping us understand the viability of future schemes that might a) protect the environment (and hence biodiversity) and b) be rewarded by the market. Coffee farmers were interviewed in 72 municipalities in eight Departments of Colombia: Caldas, Quindío, Risaralda, Antioquia, Cauca, Santander, Huila and Valle de Cauca.

Techniques employed: data about farmers was collected by use of semi-structured interviews, which were carried out on an individual basis by extensionists from the departmental committees of the FNC.

**Results and discussion:** The most adopted methods were

- Contour planting (adopted by 93% of farmers);
- A no-burn policy for crop residues (88%);
- IPM against the coffee berry borer (82%);
- 'Noble weed' ground cover and integrated weed management (75%): most farmers encourage slow growing plants between tree rows, rather than adopting a zero weed, bare-earth policy.

The majority (63%) of those farmers who have not adopted integrated weed management use a combination of methods, whilst a minority (33%) use only mechanical methods. Only 4% use herbicides exclusively.

In general therefore, farmers have adopted a fairly sustainable approach to weed management, one of the principal control activities of coffee farming.

Water use: 60% of farmers have adopted a conventional (i.e. high water use) coffee processing method. Nevertheless 90% of these claim that they are actively looking at converting to ecological processing (low water use with mechanical removal of mucilage). 32% of farmers had already converted to the ecological method, and another 8% were in the process of changing over.

Coffee waste disposal: the method most used by farmers to decompose pulp is in pits (76%), silage heap (12%, with periodic manual turn over); worm compost (4%), and 'no management' 8%. The treatment of mucilage from processing is carried out in pits (52%), worm culture (3%), but a full 43% carry out no treatment, by which we assume this is washed away into streams and rivers.

The findings of 4.5.2 give somewhat different results for waste water management, and given that water pollution emerged as a major farmer-identified problem, there is room for further study of this issue. (Note: the author believes this is a global problem of coffee production that is frequently under-reported).

**Key finding:** farmers already use many sustainable practices, which is a very good basis upon which to improve further and is also a positive attribute of Colombian coffee which could potentially be more actively promoted.

### **Readiness of coffee farmers to comply with standards required by coffee certification schemes, in return for a premium**

To assess the willingness of coffee farmers to follow certain norms and practices associated with biodiversity-enhancing coffee schemes, farmers were closely questioned about some specific requirements of such schemes: a) Establishment of protection zones with a minimum of 3 m between coffee and any water course; b) Prohibition to spray within 10 m of any water course; c) Restoration of natural habitat in the farm (e.g. woodland, bog); d) Identification and protection of vulnerable animal and plant species (those at risk of extinction), implying the making of registers of such species; e) Planting shade trees in coffee farms, at a density of 70 trees/ha of at least 12 native species and maintain a shade level of at least 40%; f) converting to organic production; g) providing medical care to employees and their families and h) carry out registers of energy consumed.

The responses of coffee farmers showed that a large majority (89%) of farmers are prepared to carry out all the above proposed requirements. However, two specific requirements: to convert to organic farming (65%) and grow shade trees (76%) were rather less attractive to farmers, because they felt it would compromise the productivity of their farms.

Other activities, such as medical care to employees (82%) and registers of energy consumed (86%) produced some objections from farmers owing to the perceived complexity of implementation.

*Level of premiums expected:* for the implementation of such practices, farmers seek a mean increase in price of 64% (Col\$27,000) per Arroba of coffee (= 12.5kg parchment coffee). In more detail, 52% of farmers would expect between \$3,000 and \$20,000 per Arroba of coffee, 17% between \$21,000 and \$30,000, 12% between \$31,000 and \$40,000 with the rest (19%) wanting more than \$40,000/Arroba, which is roughly equivalent to US\$0.70 per lb, which is a 50 to 70% premium at the sale price when the survey was undertaken.

According to these results of premium expectation, most farmers evidently expect an unrealistically high reward, since the actual reward of most schemes falls into the bottom 20% of demands.

The farmers are mostly concerned that adoption of new practices will affect their productivity, either by increasing costs, or by reducing yields, and that these additional burdens will be greater than any recompense from a premium.

**Conclusions:** from all the project information and other sources therefore we come to the following conclusions and recommendations that might help to improve the level of biodiversity as well as the image of Colombian coffee, that may have been damaged by the accusations of being little more than a 'biological desert'.

1. A major initiative to motivate the majority of coffee farmers over such an extensive area (i.e. about half a million hectares) to return their land to shade coffee is very unrealistic since it is very unlikely to result in increased economic returns to farmers.

2. Farmers are potential allies in attempts to improve biodiversity. They may be willing to help in practical ways, especially to provide their labour, if they can see that it will not materially affect their coffee production and that it may result in improved numbers of animals and plants.

3. Projects that progressively aim to improve biodiversity, e.g. by planting a range of fruit tree species adjacent to houses or on uncultivated ground may improve diversity of the fruit-eating guild of birds that inhabit tree canopies, as well as providing additional nutritional food sources for farm workers

4. Birds are appreciated by members of all communities and can serve as emblems of biodiversity in general. Initiatives to provide teacher packs, videos, teacher training etc. about these charismatic animals would complement project-based efforts to boost diversity.

5. If other efforts to establish and protect forest reserves, or extend and join up any existing corridors were also pursued, such an integrated approach could be the best long term strategy to gradually raise biodiversity without any loss in coffee yield.

6. Current levels of diversity found in coffee, allied to concerted attempts to improve biodiversity through projects and education, could be the basis for a positive marketing message for Colombian coffee; i.e. a more generic approach to the problem rather than a specific farm certification focus. This fits with the history of marketing in Colombia which has focused on branding the coffee through the Juan Valdez<sup>®</sup> marque. One day perhaps we will discover that the eponymous farmer has a family member who is an ornithologist – perhaps one who monitors the migrants' progress on their long journey northwards.

**Key recommendation:** review education at schools, colleges and extension services on the benefits of biodiversity. Clearly all should see some benefit from biodiversity, this is a question of perception, that if carefully managed should raise awareness within rural communities.

The above study could be seen as a baseline upon which to build knowledge of farmers through education projects. To adequately manage change caused by climate change, new standards, mitigation, adaptation etc., they will need higher levels of understanding. Also to fully promote Colombian coffee as environmentally friendly implies that the farmers who produced it are knowledgeable and improving.

**Peer review:** to date some of the work has been subject to peer review in journal articles. We are planning an article on sun coffee and migratory birds for a peer-reviewed journal.

#### 4.6 Capacity building

Capacity building was a major feature of this project. Extensionists, farmers and researchers all received training through workshops, a manual and text book as well as one-to-one



training. We feel we have helped to expose the complex issues surrounding biodiversity, the coffee business and the need for a large-scale approach to protecting biodiversity.

CABI's own understanding of the complex issues surrounding coffee, biodiversity and commercialization has also greatly increased.

#### 4.7 Sustainability and Legacy

*Enduring achievements:* the legacy of the project is this:

1. The diversity recorded in intensive sun-coffee is much higher than critics have claimed. This gives Colombia a much stronger position to claim its biodiversity credentials over the full breadth of its coffee zones. The Colombian coffee lands are a rich agricultural matrix that must be maintained even as coffee declines in importance due to climate change.
2. The farmers are aware of many environmental problems and are willing to work towards improving them, this is an untapped resource that will be needed in the future as the region has to adapt to increasing change.
3. We have provided the training and methods to assess farmer knowledge and a preliminary baseline of their current perceptions. We have identified areas that need improvement, and issues that need to be dealt with, including new actions and knowledge that will be required by farmers and extensionists to adapt to future conditions.

*Project staff and resources:* Cenicafé maintains an active group studying biodiversity and others, such as Dr Nestor Riaño are developing proposals to look at ways to protect the region from climate change whilst earning income through mitigation deals.

*Partners in touch:* CABI maintains active contact with Cenicafé, we are developing a project with GTZ and HR Neumann Stiftung that we expect will continue the link.

## 5 Lessons learned, dissemination and communication

### Lessons learned – the science:

- The whole topic of biodiverse coffees rests on shaky ground. A major original motive for promoting shade coffees was the belief that US migrant birds were declining because of inadequate neotropical wintering sites – recent research by Valiela & Martinetto (2007)<sup>2</sup> suggests that it is US residents that are declining, not migrants.
- The relevance of promoting small patches of shade coffee is questionable, there are no clear studies that show these maintain adequate breeding populations, they could, according to a forensic analysis by Komar (2006)<sup>3</sup>, be population sinks or 'death traps'.
- The climatic conditions in much of Colombian coffee do not suit shade coffee – conditions are too cloudy and humid, and climate models suggest that this trend will increase.
- The present study shows that the original claims by the Smithsonian Migratory Bird Center, that Colombian unshaded coffee is a 'virtual biological desert' are incorrect.

*Conclusion:* it is risky to base commercial ventures on preliminary science.

### Lessons learned – the economics:

- The market for coffees with a special biodiversity attribute is small; it has not developed as hoped for ten years ago. The overall market for such coffees depends more on the quality of the coffee than the specific attribute itself (Kilian et al 2006)<sup>4</sup>.
- Initial premiums for such coffees can be high, as demand outpaces supply, but eventually a much lower equilibrium premium pertains as demand stimulates new supply.

<sup>2</sup> Valiela I, Martinetto P, (2007). *BioScience* 57: 360-370.

<sup>3</sup> Komar O, (2006). *Bird Conservation International* 16: 1-23.

<sup>4</sup> Kilian B, Jones C, Pratt L, Villalobos A, (2006). *J. Business Research* 59: 322-330.

- The present study showed that Colombian farmers would expect a substantially higher premium than is presently on offer, hence it is unlikely that enough farmers would develop more biodiverse conditions to make any appreciable difference to survival of any species.

#### **Lessons learned – project design and purpose:**

- It is difficult for a small project to tackle the complex interaction of a) rapidly changing market conditions with b) a coffee production system in almost continuous crisis. It was mostly a question of scale; the size of Colombian coffee and the scale of events unwinding in the coffee industry are of a greater magnitude than a small study can manage. But the extended length of this project enabled us to see a cycle of market changes and this has led us to more fully comprehend the complexities of this subject .

#### **Lessons learned – overall:**

- The Colombian coffee lands are a relatively diverse and economically important zone for stable rural communities, wild-life and ecoservices, rather similar perhaps to the English countryside of the past. What must be done is to protect the rich agricultural matrix, rather than any one specific crop, or any one specific attribute of that crop.
- It became clear during the course of this project that climate change will most likely cause coffee to disappear from the lower zone over the next 20 to 50 years. It is already happening, with now 1,230,000 ha of pasture compared to 865,000 of coffee in the central coffee zone. Hence commercial ventures to erect small patches of shade coffee, however many, are unlikely to materially affect the long term bio-stability of the zone.
- What is needed is a much broader scale and proactive approach to protecting the currently adequately high general biodiversity and concomitant ecological services of the Colombian coffee lands.

Hence the title of this project should have been something like:

*“Brand Colombia: promoting ecologically sustainable Colombian coffee through area-wide actions to protect the long-term ecosystem services afforded by the diverse agricultural matrix of the coffee-lands.”*

This means that it is the diversity of the coffee matrix that must be retained, rather than just coffee itself. The recent global economic events have emboldened us to suggest that the invisible hand of the market can heretofore have only a minor role to play, from now on biodiversity protection should be firmly led by public agencies.

#### **Dissemination and communication**

Information about national coffee biodiversity, Colombia’s environmental problems, farmers’ perceptions about the environment have been disseminated through workshops and the production of the Sustainable Coffee Manual and a book about the climate of the Colombian coffee region. Information about the project is also available on at [http://www.cenicafe.org/modules.php?name=Iniciativa\\_Darwin&p\\_op=15&lite](http://www.cenicafe.org/modules.php?name=Iniciativa_Darwin&p_op=15&lite).

We are still in active communication with Cenicafé and the specialty coffee industry through the Specialty Coffee Association of America. We expect to produce a comprehensive technical report of the project in Spanish that will also look at the long-term future of the coffee lands of Colombia and what might be done next.

## **5.1 Darwin identity**

The Darwin Initiative logo and name were used throughout; on the project vehicle, printed matter (manual, book, presentations). Extensionists and farmers were made aware of the

project, but we expect that the Darwin Initiative *per se* has little long-lasting meaning to these field-oriented non-academic personnel. To an extent, the work of the Darwin project has formed part of Cenicafé's coffee biodiversity programme, hence it is more a question of supporting the work of the Cenicafé team as it develops its programme on coffee biodiversity.

A problem of Caldas-based Cenicafé is its isolation from the Coffee Federation's marketing and PR teams in Bogotá. We feel that there are substantial opportunities to boost the excellent work of Cenicafé scientists nationally and internationally, that would reflect well on the Federation, its supporters and the nation. At the Specialty Coffee Association of America's international annual trade fairs for instance, although biodiversity is frequently mentioned and displayed, there is little if any direct reference to Cenicafé as a world-class coffee research centre, one that could contribute much to the cause of global sustainable coffee.

## 6 Monitoring and evaluation

**Main changes in design:** There were no main changes.

**Activities in support for the logframe based M&E system:** project progress was monitored and evaluated against the logframe of planned activities presented in the Appendix and against the outputs listed in the original application.

**Visits and reports** – regular monitoring trips (six in three years, plus two subsequent visits paid for by non-DI funds).

A good deal of monitoring and evaluation was built into the project in the form of baseline data collection. Project staff conducted a pilot farmer assessment (n=50), analysed this (and produced a report) and then went on to a wider assessment (n=400, approx.) producing a full analysis of this in report form. Follow-up tests on improvement are not warranted because farmers were not then subjected to a biodiversity coffee scheme (because this was deemed uneconomic).

The project developed a field manual and tested concepts with extensionists who now use it as a source book. Project collaborator Duque reported this (May 2009) as a major success, the book has become the standard reference work of extensionists for sustainable coffee in Colombia and it turned out that it was published at a timely moment of rapid expansion of sustainable coffee schemes in the country.

Because of the importance of climate change, Cenicafé dedicated a small amount (c. £1000) to production of a basic textbook on climate of the coffee zone, written by Alvaro Jaramillo and published with the DI logo – 800 copies were produced which have all been disseminated. Jaramillo reports that many more have been requested and that a second edition is contemplated. This was a major success that revealed an unexpected level of interest.

**Achieving value for money:** in terms of the quality of the manual, and numbers of copies produced (n=1500) as well as the climate text book (n=800), these ensured a wide dissemination of outputs.

**Were indicators useful:** yes, these served as useful reminders of targets.

**Was the M&E system practical and helpful?** Yes, it gave a useful and concise structure to the project.

**Internal/external evaluation:** there has been no third party evaluation.

**Of note** is that Dr JE Botero and researchers of the Biology of Conservation Programme (Cenicafé) were recognized in 2006 by the award of the Fundación Alejandro Ángel Escobar National Science Prize, Area: Environment and Development. The citation was for research

on conservation of biodiversity in the Colombian coffee lands. This is the premier science award in Colombia.

**Seeking the views of clients/customers:** since the project has not produced a new coffee to market, because economically and environmentally it is not justifiable, there is no impact on this part of the project.

CABI is however in contact with a large number of specialty stakeholders through the Specialty Coffee Association of America, Fairtrade and organic entities (through events such as the World Coffee Conference) where we continue to promote a critical attitude to the subject of biodiverse coffee.

## 6.1 Actions taken in response to annual report reviews

As far as we are aware we have responded to all reviewers' comments. Comments have been reviewed with partners only.

## 7 Finance and administration

### 7.1 Project expenditure

<i>Item</i>	<i>2002-03</i>		<i>2003-04</i>		<i>2004-05</i>	
	<i>Budget</i>	<i>Actual</i>	<i>Budget</i>	<i>Actual</i>	<i>Budget</i>	<i>Actual</i>
<b>Salaries</b>						
<i>Baker</i>						
<i>Van Mele</i>						
<i>Lea</i>						
<i>Duque</i>						
<i>Botero</i>						
<i>Salazar</i>						
<i>p/t field assistant</i>						
<i>Ortiz</i>						
<i>Rent rates heating, lighting,</i>						
<i>Office costs</i>						
<i>Travel &amp; subsistence</i>						
<i>Capital items</i>						
<i>Printing</i>						
<i>Conferences workshops</i>						
<b>Total</b>						

## **7.2 Additional funds or in-kind contributions secured**

No extra funds were secured.

## **7.3 Value of DI funding**

The funding of this project has enabled a full evaluation of Colombian sun-coffee bird biodiversity, which has been the subject of much criticism from a number of sources. The results give support to the view that the Colombian coffee-lands, although highly altered, are a rich source of biodiversity, much in the same way as is the English countryside. Like the latter, it shares many of the problems of supporting rural community livelihoods, intensive farming and competing land use.

The project has also enabled the construction of a good picture of Colombian coffee farmers, who are clearly concerned about the declines in biodiversity and who want to help reverse it.

These are important things that a proactive regional or national movement could tap into for the benefit of all Colombians.

For CABI it has enabled us to maintain long term contacts with a major coffee country and develop our understanding, especially in terms of coffee biodiversity and the long-term future of coffee in the Andean region. It has helped us to develop deeper contacts with the US specialty coffee industry. In April 2009 we were requested to give a key-note presentation to their first coffee symposium, and we will contribute to the 3<sup>rd</sup> World Coffee Conference in Guatemala in 2010 on the questions surrounding the long-term sustainability of global coffee production.

## Annex 1 Report of progress and achievements against final project logframe for the life of the project

Project summary	Measurable Indicators	Progress and Achievements	Actions required/planned for next period
<p><b>Goal:</b> 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</p> <ul style="list-style-type: none"> <li>• The conservation of biological diversity,</li> <li>• The sustainable use of its components, and</li> <li>• The fair and equitable sharing of the benefits arising out of the utilisation of genetic resources</li> </ul>		<p>Researchers &amp; extensionists trained in concepts and importance of biodiversity and its threats as well as farmer assessment techniques</p> <p>Manual and text book on sustainable coffee and climate change in Colombia widely distributed and well received</p> <p>Databases of biodiversity established</p> <p>Farmer surveys of perceptions, problems &amp; propensities carried out</p> <p>Current relative richness of Colombian coffee biodiversity established and threats to same examined and highlighted.</p>	
<p><b>Purpose</b></p> <p>To protect biodiversity in coffee growing regions of Colombia by improving farmer knowledge.</p> <p>Enhanced economic viability of coffee produced under agro-forestry and shade conditions.</p>	<p>Extensive database of local knowledge and training needs</p> <p>New contacts with commercial coffee companies</p>	<p>Database, manual and reports widely available in Colombia</p> <p>Some new contacts with Specialty Coffee Association of America and Rainforest Alliance. But, no new commercial venture – project evidence strongly suggested that coffee products specifically marketed under a biodiverse label are not viable for all but a few Colombian farmers</p>	

Enhanced understanding by roasters and traders.	Exposition of Colombia's biodiversity knowledge and commitment	Generic exposition of coffee diversity only at US trade fair.	
<b>Output</b>			
Researchers & extensionists trained	Training courses	Reports of courses – for inclusion in final CD compilation once work on the project in Colombia has terminated (mid 2010)	
Farmer attitudes to biodiversity codified	Rural appraisals	Report of farmer knowledge, problems, gaps prepared (in Spanish). The study revealed many new, interesting and potentially important concerns of farmers as well as their understanding of biodiversity, their willingness to act and their likely criteria for action	
A regional policy developed	Policy document	Policy document prepared (still in draft form, awaiting approval of new head of Cenicafé) with supporting review ( <i>Colombian Coffee, Biodiversity and the Market</i> , Baker PS, 2009)	
Produced materials for marketing and farmers	Field manual elaborated	Field manual published, 1,500 copies distributed.	
	Posters/TV slots, video	Videos & posters not done for marketing, since project found that current schemes are not viable for most Colombian coffee farmers. Report ( <i>Colombian Coffee, Biodiversity &amp; the Market</i> ) was completed that explains this.	
Extensive database created	Database constructed	Database created at Cenicafé, who now have very extensive data on the biodiversity of the Colombian coffee zone. The data revealed an unexpectedly rich diversity of birds associated with coffee, this with other data collected by Cenicafé comprises an increasingly convincing record of Colombian coffee biodiversity which is at odds with the public perception that it is species-poor.	
Links to roasters & traders	Promotion at trade fair	Generic promotion at SCAA trade fair only – there was no attempt to promote	



Forest patches identified and studied	Areas mapped out	<p>coffees from any individual farms or projects because project results suggested that the potential market for these coffees would be very small and funds expended by the project or the FNC (Colombian Coffee Federation) would be most unlikely to be recouped or have any material effect on future biodiversity of the coffee lands.</p> <p>True forest patches were scarce. We objectively assessed biodiversity by categorizing all elements of the agricultural matrix on 80 randomly selected coffee farms in two localities. From this, a report of avian biodiversity and vegetation types was prepared (available in Spanish). This revealed a rich matrix of crops with only small patches of natural vegetation that nevertheless supported a relatively high level of biodiversity that represents an important resource that needs to be protected and which could, if properly promoted, add to the general value and image of Colombian coffee in general.</p>
<b>Activity:</b> Participatory rural appraisal		Report completed (available in Spanish) – as well as methods and results disseminated in the manual.
<b>Activity:</b> Biodiversity training manual		Manual ( <i>Guía para la Caficultura Sostenible en Colombia</i> . Baker P, Duque O., H. (2007)) published 1,500 copies disseminated (free to extensionists), covered biodiversity in the context of sustainable coffee production. Produced to a high standard by Cenicafé and was very well received
<b>Activity:</b> Database and digital photo/video library		Database of birds ' <i>Aves de las Zonas Cafeteras de Colombia</i> ' available from Cenicafé. Includes photo material of coffee habitats as well as many of the bird species. No video library was created – this was deemed currently unnecessary because of the lack of potential for commercial promotion.
<b>Activity:</b> Forest patches identified and studied		Study of avian biodiversity in 80 farms. All vegetation types categorized. Report completed (in Spanish). Implications of this are covered in a separate report ( <i>Colombian Coffee, Biodiversity and the Market</i> , Baker PS, 2009 English)
<b>Activity:</b> Stakeholder workshop		Three workshops carried out, well attended and well received.
<b>Activity:</b> Training and promotion activities		Training of principal scientists and extensionists carried out on biodiversity issues, farmer assessment, commercial aspects of sustainable coffee with national and international scientists and coffee experts, about 50 people trained in total.

<b>Activity:</b> Commercial awareness activities	Few commercial activities (trade fair only) because long term potential of high biodiversity coffee patches, as currently envisaged (i.e. small-scale, farm-by-farm commercialization) is poor due to low price premiums and likely negligible overall effect on sustaining Colombian coffee biodiversity. Covered in detail in a report: <i>Colombian Coffee, Biodiversity and the Market</i> , Baker PS, 2009.
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## Annex 2 Project's final logframe, including criteria and indicators

<i>Project summary</i>	<i>Measurable indicators</i>	<i>Means of verification</i>	<i>Important assumptions</i>
<i>Goal</i>			
<i>To assist countries rich in biodiversity but poor in resources with the conservation of biological diversity and implementation of the Biodiversity Convention</i>		<b>A range of printed and digital media relating to conservation and sustainable use of biodiversity in coffee growing areas of Colombia</b>	<b>The Colombian Coffee Federation and CENICAFE continue in operation</b> <b>Civil unrest does not grow to the extent that field activities are judged to be dangerous</b>
<i>Purpose</i>			

<p>To protect biodiversity in coffee growing regions of Colombia by improving farmer knowledge. Enhanced economic viability of coffee produced under agro-forestry and shade conditions.</p> <p>Enhanced understanding by roasters and traders.</p>	<p>Extensive database of local knowledge and training needs</p> <p>New contacts with commercial coffee companies</p> <p>Exposition of Colombia's biodiversity knowledge and commitment</p>	<p>Database, manual and reports widely available</p> <p>Survey evidence of farmers producing coffee for specialty/bird-friendly markets</p> <p>Project representation at international coffee event(s)</p>	<p>Farmers in project areas continue to produce coffee</p> <p>Continued interest by consumers in biodiversity aspects of coffee</p> <p>Events continue to be held and well-attended</p>
<p><i>Outputs</i></p>			
<p>Researchers and Extensionists trained Farmer attitudes to biodiversity codified A regional policy developed Produced materials for marketing and farmers Extensive database created Links to roasters &amp; traders Forest patches identified and studied</p>	<p>Training course Rural appraisals Policy document Field manual elaborated Posters/TV slots, video Database constructed Promotion at trade fair Areas mapped out</p>	<p>Report of training course Report and database of farmer knowledge &amp; gaps Report Published field manual Copies of videos, posters etc. CD version of database Database of new contacts Conference proceedings Report of reserve potential</p>	<p>CENICAFE continues to function effectively</p> <p>Extensionists continue to be employed and have time to commit to biodiversity</p>
<p><i>Activities</i></p>			

<p> <b>Participatory rural appraisal</b>  <b>Biodiversity training manual</b>  <b>Database and digital photo/video library</b>  <b>Forest patches identified and studied</b>  <b>Stakeholder workshop</b>  <b>Training and promotion activities</b>  <b>Commercial awareness activities</b> </p>	<p> <b>Inputs:</b>  <b>Overall budget:</b>  <b>£191,825</b>  <b>Of which £ 62,576 counterpart funding</b> </p>	<p> <b>Invoices and receipts of project expenses</b> </p>	<p> <b>CABI and CENICAFE continue to function effectively and international travel is unhampered</b> </p>
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## Annex 3 Project contribution to Articles under the 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 that integrate conservation and sustainable use.
7. Identification and Monitoring	10	Identify and monitor components of biological diversity, particularly those requiring urgent conservation; identify processes and activities that have adverse effects; maintain and organise relevant data.
8. In-situ Conservation		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		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		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	70	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		Promote understanding of the importance of measures to conserve biological diversity and propagate these measures through the media; cooperate with other states and organisations in developing awareness programmes.
14. Impact Assessment and Minimizing 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		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 access and joint development of technologies.
17. Exchange of Information		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

Article No./Title	Project %	Article Description
		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.
Other Contribution	20	Smaller contributions (eg of 5%) or less should be summed and included here.
Total %	100%	Check % = total 100

## Annex 4 Standard Measures

Code	Description	Totals (plus additional detail as required)
<b>Training Measures</b>		
1a	Number of people to submit PhD thesis	
1b	Number of PhD qualifications obtained	
2	Number of Masters qualifications obtained	1 Mauricio Salazar "Diagnostics of environmental sustainability of coffee production in Colombia"  (Diagnostico de la sostenibilidad ambiental de la producción de café en Colombia MSc in sustainable development and environment, University of Manizales)
3	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( ie not categories 1-4 above)	
6a	Number of people receiving other forms of short-term education/training (ie not categories 1-5 above)	50
6b	Number of training weeks not leading to formal qualification	8
7	Number of types of training materials produced for use by host country(s)	One manual One textbook
<b>Research Measures</b>		
8	Number of weeks spent by UK project staff on project work in host country(s)	8
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	



Code	Description	Totals (plus additional detail as required)
	recording.	
11a	Number of papers published or accepted for publication in peer reviewed journals	6+
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	1 – DI page on <a href="http://www.Cenicafe.org">www.Cenicafe.org</a>
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	1 – Aves de las Zonas Cafeteras de Colombia (Cenicafé database)
13a	Number of species reference collections established and handed over to host country(s)	
13b	Number of species reference collections enhanced and handed over to host country(s)	
<b>Dissemination Measures</b>		
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	3
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	5
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)	
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	
17b	Number of dissemination networks enhanced or extended	
18a	Number of national TV programmes/features in host country(s)	
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	

## Annex 5 Publications

Type *	Detail (title, author, year)	Publishers (name, city)	Available from (eg contact address, website)	Cost £
Manual	Guía para la caficultura sostenible en Colombia. Baker P, Duque O., H. (2007)	Cenicafé, Chinchiná	Cenicafé, Apartado 2427, Chinchiná, Caldas, Colombia	10 - free to extensionists & key researchers
Book	Clima Andino y Café en Colombia. Jaramillo A (2007)	Cenicafé, Chinchiná	Cenicafé, Apartado 2427, Chinchiná, Caldas, Colombia	8
Article journal	Adiciones de la lista de aves del municipio de Manizales JE. Botero, G Lentijo, AM. López, O Castellanos, C Aristizábal, N Franco, D Arbeláez	Boletín SAO Vol.XV (No. 02) - Dec. 2005	<a href="http://www.sao.org.co/">http://www.sao.org.co/</a>	free
Article journal	Botero JE, Lentijo G, Estudio de las aves con las comunidades cafeteras. <b>Biocarta (Colombia) No. 4:1-4. 2004</b>	Cenicafé, Chinchiná	Cenicafé, Apartado 2427, Chinchiná, Caldas, Colombia	free
Article journal	Lentijo G, Botero JE Caracterización de la avifauna en dos municipios de la zona cafetera del departamento de Caldas	Cenicafé, Chinchiná	<a href="http://darwin.defra.gov.uk/documents/11014/1787/11-014%20HY3%20annex.pdf">darwin.defra.gov.uk/documents/11014/1787/11-014%20HY3%20annex.pdf</a>	free
Presentation	Botero JE Cerulean Warblers in Coffee producing regions of Colombia	USDA forest service	<a href="http://www.srs.fs.usda.gov/egc/events/Summit2_2007/14_Botero.pdf">http://www.srs.fs.usda.gov/egc/events/Summit2_2007/14_Botero.pdf</a>	free
Article journal	Baker P, Botero JE, Lentijo G. Bird Diversity on Coffee Farms in Central Colombia	Association for Science & Information on Coffee	<a href="http://www.asic-cafe.org/index.php">http://www.asic-cafe.org/index.php</a>	free
Article journal	G Lentijo, D Arbeláez, Ó Castellanos, NG Franco, AM López, JE Botero (2008). Enfoques participativos en investigación como una herramienta de conservación de las aves en zonas	Ornitología Neotropical 19 (suppl.) 567-574.	The Neotropical Ornithological Society	free

	cafeteras de Colombia.			
Article journal	SM Durán GM Lentijo, AM López, JE Botero (2009) Nuevos registros de la distribución y uso de hábitat del Tororoi Dorsiescamado (Grallaria guatimalensis) en Colombia.	Ornitología Neotropical 20: in press	The Neotropical Ornithological Society	free

## Annex 6 Darwin Contacts

<b>Ref No</b>	162/11/014
<b>Project Title</b>	Biodiversity and Colombian Coffee Farmers: Capacity Building for Added Value
<b>UK Leader Details</b>	
Name	PS Baker
Role within Darwin Project	Coordinator
Address	CABI Bakeham Lane, Egham
Phone	
Fax	
Email	
<b>Partner 1</b>	
Name	Hernando Duque; Mauricio Salazar
Organisation	Cenicafé
Role within Darwin Project	Farmer studies
Address	Comité Departamental de Cafeteros de Caldas Recinto Jaime Restrepo Mejía, K11 vía al Magdalena. Manizales
Fax	
Email	
<b>Partner 2 (if relevant)</b>	
Name	Jorge Botero, Gloria Lentijo
Organisation	Cenicafé
Role within Darwin Project	Bird diversity studies
Address	Cenicafé, Apartado 2427, Chinchiná, Caldas, Colombia
Fax	
Email	