

- Other responsibilities as assigned by the supervisor

**Qualifications:**

- At least ten years of direct experience with policy work at the highest levels, preferably with issues relevant to sustainability (environment, social issues)
- Intimate familiarity with the mechanics of the policy environment of the European Union
- Experience and familiarity with companies and corporate social responsibility issues
- Powerful and credible presenter at meetings (such as hearings)
- Fluent in English and preferably (an)other European language(s)
- Ability to work effectively in an independent way
- Willingness and ability to travel 20% of the time

LEARNING AND KNOWLEDGE SPECIALIST

540. The learning and knowledge specialist will be responsible for activities within the project's Outcome 6, and will report directly to AG senior management.

541. *Terms of Reference for (Coffee) Learning and Knowledge Manager*

**Responsibilities:**

- In collaboration with the Coffee Manager, help plan and carry out monitoring of project-level impact as defined by log-frame indicators, and trouble shoot with regard to necessary or desirable project-level adaptive management actions to maximize impacts and cost-efficiency in project execution
- Establish a monitoring system for the coffee certification program, using respected and scientifically valid standards. Monitoring system will collect data on impacts of the coffee certification program. In collaboration with AG colleagues, SAN colleagues and external experts where necessary, the Learning and Knowledge Manager will lead the following :
  - Definition of monitoring methodology
  - Definition of monitoring area and units, such as coffee farms
  - Formulation of monitoring plans and indicators
  - Assemble and if necessary train monitoring teams who will perform data gathering
  - Measure baseline values of indicator species and other types of indicators
  - Organize periodic measurement of progress on the indicators
  - Ensure organization of data storage and processing systems
- The Learning and Knowledge Manager will ensure monitoring of on-farm impacts in all project countries, and landscape-wide in two project countries (El Salvador and Colombia)
- Through initial strategic planning workshops determine landscape-wide threats and determine how the certification system and/or the GEF project can best address these threats through targeted project activities
- Ensure that monitoring system documents impacts of the Rainforest Alliance coffee certification system on the environment and biodiversity, on workers and their families, on surrounding communities, on the wider coffee landscapes, and on the benefits of the farmers by being certified by Rainforest Alliance
- In collaboration with RA colleagues, identify and distil lessons learned on impacts of coffee certification, best management techniques, certification standards, biodiversity conservation measures, etc.

- Analyze data from monitoring system and coordinate internal discussion to determine where in the RA certification system there are needs or even possibilities for improvements. This includes audit methodologies and practices, standards, administrative procedures, auditor-, SAN- or RA staff capacity, and others
- In collaboration with AG colleagues, design and implement an adaptive management system to guarantee continuous improvement of AG systems
- Organize knowledge gathering that will provide best possible evidence of the benefits for farmers of being RA certified
- Write case studies on impact. Produce technical articles for a variety of audiences on lessons learned, and social, environmental, and economic impacts of RA coffee certification. This material will provide inputs to Rainforest Alliance's public relations and media work.
- Conduct workshops and events to share knowledge on lessons learned and impacts achieved through the GEF project and in the RA coffee certification program
- Participate in specialized events and conferences with the aim of increasing the knowledge and recognition of the Rainforest Alliance certification system as a superb tool to promote environmental, social, and economic sustainability in the coffee/agricultural sector
- Network with experts and institutions with whom RA has an interest in technical information exchange and dialogue
- Engage respected conservation organizations and sustainable development organizations in the RA certification program with the aim of obtaining their approval, support, and active endorsement of the benefits of RA certification
- Outreach to NGO partners, coffee sector stakeholders, other certification systems, decision makers, and media, on issues that relates to the technical credibility and impacts of the RA certification program
- Support marketing-, media-, policy, and other program staff by providing evidence and documentation in the technical credibility and impacts of the certification program
- Coordinate closely with similar knowledge management efforts made in other RA divisions to promote exchange and avoid duplication of efforts
- Where relevant and where needed, promote the application of the monitoring methodologies, adaptive management mechanisms, and learning, and knowledge generation in other AG certification programs, and wider in other RA divisions.
- Gradually assume a greater corporate role in ensuring the highest standards throughout Rainforest Alliance with regard to monitoring, adaptive management, and learning.
- Other responsibilities as assigned by the supervisor

**Qualifications:**

- The candidate will have a solid technical/scientific background and hold a M.Sc or PhD in a relevant natural scientific area, such as biology, agronomy, forestry, ecology, or the like
- Excellent understanding of ecosystem functions and biodiversity conservation issues related to tropical agro-forestry systems.
- High technical credibility and personal integrity
- Demonstrated ability to write on technical issues for technical and scientific journals
- Ability to interact and dialogue with top-level experts and scientists world-wide on issues related to certification, biodiversity conservation, sustainability issues in agriculture in general and sustainable coffee issues in particular
- Extensive knowledge of and experience with biodiversity monitoring and data collection methods
- Insight in institutional capacity building and principles of learning organizations
- Good communication skills
- Full command of English in speech and writing. Good working knowledge of Spanish

## MAJOR CONSULTANCY SUB-CONTRACTS

542. The project will hire consultants for specialized work on an ad-hoc basis when the desired outcome does not warrant a permanent project staff. Full terms of reference will be elaborated once the precise character and extent of the work has been determined. Some anticipated consultancy subcontracts are:

- Biodiversity specialists. Generally the Learning and Knowledge manager will be the in-house specialist on scientific biodiversity issues, but particularly in the set-up and operation of the biodiversity impact monitoring system, it is anticipated that additional expertise will be needed.
- Policy experts will be called upon to elaborate specific studies and tools to help the project team achieve impact at policy levels in producer countries. Policy work in consumer countries (mainly the EU) will be covered by the Policy Specialist (see TORs above)
- Electronic data bases and information management tools will be sub-contracted to qualified specialists, who are both familiar with the technical programming aspects, as well as with the working processes of the different units that have to use the software systems (such as marketing and client relations management).

## PART IV: Stakeholder Involvement Plan

543. The executing agencies of this project have conducted regular meetings with government representatives from several ministries, state and municipalities, producers, cooperatives, coffee associations, private sector partners, NGO's and representatives of other initiatives to present the project and get feedback and involvement from these stakeholders.

544. During the course of the project planning phase, the local NGO partners have worked with the Project Coordination Unit to deepen these relationships as they pertain to the coffee sector in each country, and to explore the scope for collaboration with existing and planned coffee-related activities, while seeking to avoid any duplication of effort.

### Summary of consultations and stakeholder participation during PDF-B project preparation

#### Consultations with coffee companies:

545. As part of the PDF B planning process, more than 20 potential certified coffee buyers and 50 current buyers in the United States, Canada, UK, Europe, Japan and Australia were interviewed either by telephone or during one-on-one interviews. Companies were surveyed about their motivation to buy certified sustainable coffee, how they market their certified products, and how the project could best help them in this effort, key origins for certified coffee purchases, and growth projections for certified coffee. The results were compiled in a summary market assessment outlining key strategies for engaging the market and achieving coffee sales growth objectives. From this a list of target partners who best meet the priority profile was developed for each geographic region. Direct conversations were held with the target partners to determine interest and commitment, and a final group of twelve companies agreed to formal partnerships with the project.

#### Consultation with Policy and Civil Society Organizations:

546. As identified in the table below, there are a number of policy and civil society organizations that have been identified for their ability to support project objectives. During the PDF-B implementation staff presented the project to the majority of these organizations and discussed collaboration opportunities.

**Consultation with national governments:**

547. At the initiation of the PDF B process, project staff traveled to each country to present the proposed intervention to government environment ministries and receive feedback. Local members of the Sustainable Agriculture Network participated in each meeting, providing the opportunity to build or strengthen the relationship between these local actors.

**Consultation with national coffee organizations**

548. During the initial field visits to meet with government ministries, meetings were also held with local coffee organizations. Further follow up meetings were held between the local associations and the local SAN partner to discuss the project.

**Table J: Summary of stakeholders and potential involvement in project implementation**

Stakeholder	Role	Relevance for project	Participation in project Potential impact
<b>INTERNATIONAL LEVEL</b>			
<b>Coffee companies</b>			
Kraft Europe and US	Coffee roaster, launching certified Kenco, Gevalia, and Jaques Vabre in Europe, and Yuban and All Life brands in the US	Global leader in purchases of certified coffee. Plans long term commitment to purchases. Coffee company partner	Projected to continue to be largest buyer of certified coffee. Also supports producer development projects, monitors international policy, provides direct financial support to coffee certification program
Caribou	U.S. based coffee roaster, owns chain of coffee shops	Increasing purchases of certified coffee. Consumer awareness in the U.S. Direct support to farmers in their supply chain for achieving certification. Coffee company partner	Consumer awareness, increased hectares certified
UCC Ueshima	Largest wholesale coffee roaster in Japan. Works with two of the largest participating importers in Rainforest Alliance's coffee program and has developed dozens of certified products which are available through mail order, by the cup at cafes around the country, in restaurants, thousands of convenience stores and other retail outlets such as Family Mart.	Increasing purchases of certified coffee, Coffee company partner	Consumer awareness, coffee purchases, expanded demand from others in their supply chain.
Java City	Wholesale coffee roaster	Coffee company partner	Coffee purchases, expanded

			demand from others in their supply chain.
Boyd's	Wholesale coffee roaster	Coffee company partner	Coffee purchases, expanded demand from others in their supply chain.
Lavazza	Major Italian coffee roaster, launching certified Tierra! brand in Europe	Buys coffee from Colombia, Peru and Honduras. Coffee company partner	Consumer awareness, coffee purchases. Market leader in Europe/Italy
Proctor & Gamble	Millstone's certified Rainforest Reserve, is sold in over 3,700 stores in the US, including Walmart SuperCenters, Safeway, Kroger, Albertsons, Stater Bros and Save Mart.	Coffee company partner	Market leader in U.S., consumer awareness
Drie Mollen	<b>Drie Mollen</b> is a multi-national company headquartered in the Netherlands and is ranked among the six largest coffee roasters in Europe, with operating units in the Netherlands, France, Germany, Spain, Switzerland  <b>Gala Coffee &amp; Tea</b> , a subsidiary of the Drie Mollen group, launched certified Lyons Original. Found in Tesco, Sainsbury, Asda, Morrisons/Safeway, Waitrose and Somerfield, in over 2500 stores throughout the UK.	Coffee company partner	Market leader in Europe, consumer awareness, coffee purchases
Dietrichs/Gloria Jean's	Gloria Jean's Coffee, a subsidiary of Diedrich Coffee, offers certified coffee in 147 mall kiosks and shops across the US	Coffee company partner	Consumer awareness, coffee purchases
Colruyt	One of Belgium's largest retail chains. Offers Certified coffee in its 250 supermarkets in Belgium and France.	Coffee company partner	Leader in Belgium, consumer awareness
Family Mart	Japanese retailer with 7000 convenience stores	Coffee company partner	Consumer awareness in Japan
Royal Cup	Wholesale coffee roaster	Coffee company partner	Coffee purchases, high end consumers
<b>Policy institutions</b>			
ISEAL Alliance	Setting credibility standards, monitoring and advising on policy issues	The "trade association" for NGO social and environmental standard setters. The only group	Provides quarterly policy analysis to member organizations. Monitors threats to independent, third

		monitoring policy in the name of all international NGO standards setting and certification groups	party NGO social and environmental standards setting and labeling.
CSR Europe	Policy monitoring and advisory	Leading policy group with corporate members, including Kraft and Starbucks.	Policy monitoring and advice for project
European Environmental Bureau	Coordinating and lobbying body for green groups	Policy monitoring, advice and lobbying	Policy monitoring and advice for project
<b>Civil Society Organizations</b>			
KRAV	Leading Swedish organic organization	Provide local credibility and support for project	Local stakeholder outreach, policy monitoring, conduct chain of custody auditing
Grolink	Swedish technical assistance agency	Provide local credibility and support for project	Local representative for media, stakeholders
Royal Society for the Protection of Birds	Wildlife protection group	Provide local credibility and support for project	Promote biodiversity-friendly coffee to members, government, and other stakeholders.
BirdLife International	Wildlife protection group	Provide local credibility and support for project	Promote biodiversity-friendly coffee to members, government, and other stakeholders.
WWF International, WWF Switzerland WWF UK	Leading international wildlife and environment groups	Provide local credibility and support for project	Promote biodiversity-friendly coffee to members, government, and other stakeholders.
International Institute for Sustainable Development and UNCTAD	Joint managers of the Sustainable Coffee Partnership	Tool development, policy, strategy, research, M&E	Share coffee impact research, monitor and share policy information
Sustainable Agriculture Initiative	Industry group	Standards development, trade and food policy, support	Monitor and share policy information
<b>NATIONAL LEVELS</b>			
<b>Brazil</b>			
Ministry of Agriculture	Formulation and coordination of the execution and follow-up of policies which promote food security, promotion of the development of agro-productive circuits and agro/food systems.	Maximum authority for agricultural planning and projects.	Member of Steering Committee Recipient of technical assistance to incorporate BD friendly approach in its programs.
Secretaria de agricultura e Secretaria de Medio Ambiente - Municipio de Venda Nova do Imigrante – Espirito Santo	Responsible for Environmental Policy and Legislation management and enforcement in Espirito Santo State.	Provides support to PRONOVA, a cooperative of 300 farmer located in an important region for the Project.	Partner in project implementation. Coordination unit with other national projects
EMBRAPA - Brazilian Agricultural Research Corporation	The Brazilian Agricultural Research Corporation's mission is to provide	Embrapa develops special programs and projects concerning areas such as	Potential partner in project execution activities

	feasible solutions for the sustainable development of Brazilian agribusiness through knowledge and technology generation and transfer.	food safety, family agriculture, natural resources, advanced technology and agribusiness, and acts as a partner in several others.	
CETCAF – (Center for the Development of Achietá Coffee)	Cetcaf supports coffee production on small family properties.	Farmers do not have the ability to compete and generate income with their low-quality, high-cost production. The result is unemployment leading to a rural exodus.	Potential partner for project activities execution
INCAPER – Capichaba Institute of Research, Technical Assistance and Rural Extension	INCAPER is the responsible for technical assistance to coffee producers and other crops of Estado do Espírito Santo	Lessons learned from technical support initiatives undertaken in pursue of sustainable agriculture.	Potential partner for the data collection and analysis for the Monitoring and Evaluation plan.
SOS Foundation Mata Atlántica	One of the principal NGOs working on conservation projects in Mata Atlántica	Biodiversity conservation experiences and lessons learned for the project implementation	Potential partner for the data collection and analysis for the Monitoring and Evaluation plan.
<b>Colombia</b>			
Ministry of Environment, Housing and Land Use	Responsible for Policy and Legislation management and enforcement in the country	GEF Focal Point Green Markets Office	Supports Sustainable Certification practices
COOPERATIVA DE CAFETEROS DE SANTANDER	Sectorial – Coffee buyer for the Federación Nacional de Cafeteros in the Santander Region	Offers financing options to associates.	Receives y buys coffee of the region. Capable of managing resources for investments in coffee activities.
The Colombian Coffee Federation (FNC)	Entirely owned and controlled by Colombia's coffee farmers, (cafeteros) of whom there are over 500,000.	Principal Organization in the coffee sector at national level.	Partner in project implementation.
CENICAFE National Center for Coffee Research	Research on a wide variety of topics from genetic studies to determine new species to industrialization of coffee to satisfy consumer demand.	Research on Clean Technologies, sustainable practices and Biodiversity in coffee farms.	Promotes clean Technologies for coffee processing and manages information on BD in coffee. Important organization for monitoring and evaluation system.
Unidad Administrativa del Sistema de Parques Nacionales Naturales	Government Entity responsible for the administration of National Natural Parks	Management of protected areas near coffee regions. Experience in other conservation projects in buffer zones.	Partner in project implementation. Coordination unit with other BD conservation projects
Instituto Alexander von Humboldt	Biodiversity Research Institute	Andes Colombia GEF Project executor, with a component on rural landscapes in coffee regions.	Potential partner for the data collection and analysis for the Monitoring and Evaluation plan.

<b>El Salvador</b>			
MARN Ministry of Environment and Natural Resources	Coordination of activities for the promotion, conservation, defense, restoration and improvement of the environment; promotion of land use planning; implementation of control measures to prevent possible environmental damage	Focal Point for GEF	Partner in project implementation. Coordination unit with other national projects
Ministry of Agriculture and Livestock	Formulation and coordination of the execution and follow-up of policies which promote food security, promotion of the development of agro-productive circuits and agro/food systems.	Principal authority for agricultural planning and projects.	Coordination unit with other national projects related to sustainable agriculture and conservation of biodiversity.
CSC El Salvador Coffee Council	Official forum for discussion between public and private sectors	Linkage private-public sectors	Facilitates private-public alliances for sustainable coffee practices
APECAFE El Salvador Small Producers Association	Represents 11 cooperatives of small producers in the country	In the area of interest there are successful examples from which lessons could be learnt. Some of them apply BD friendly approaches and export to fairtrade markets.	Coordination of project activities in selected project regions
PROCAFE El Salvador Foundation for Coffee Research	Provide the coffee sector with services and technology solutions for sustainable coffee production	Principal Organization in the coffee sector at national level.	Potential partner in training activities, dissemination of results and monitoring & evaluation
UCAFES El Salvador Coffee Cooperatives Union	Private. Offers technical assistance, business development support and other consultancies	Lessons learned from training and initiatives undertaken in pursue of sustainability in farms.	Successful cooperatives as partners in certification programs from which lessons could be learnt.
<b>Guatemala</b>			
CONAP Protected Areas National Council	Government entity. Direction and coordination of Guatemalan Protected Areas System	Focal Point for GEF. Coordination and management of protected areas	Partner in project implementation. Coordination unit with other national projects
ANACAFE National Coffee Association	Integrated by producers and traders in the coffee sector in coordination with public authorities.	Principal Organization in the coffee sector at national level.	Coordination of project activities in selected project regions
AGEXPRONT Guatemala Non Traditional Products Exporters' Association	Private non-profit entity, with the goal to promote and develop the exports of non-traditional products of Guatemala	The relevance is related with the market component of the project	Coordination of project activities in selected project regions, particularly in the markets and exports side.
FEDECOCAGUA	Dedicated to support small	Represents interests of	Coordination of project



Guatemala Federation of Coffee Producers Cooperatives	producers	coffee sector, particularly small producers.	activities in selected project regions
<b>Honduras</b>			
SERNA Natural Resources and Environment Secretariat	Coordination of activities for the promotion, conservation, defense, restoration and improvement of the environment; promotion of land use planning; implementation of control measures to prevent possible environmental damage	Focal Point for GEF	Partner in project implementation. Coordination unit with other national projects
ANACAFE Nacional Coffee Association	Private Organization. Integrated by producers in the coffee sector and coordinates coffee productive circuit	Represents interests of coffee sector in general.	Coordination of project activities in selected project regions
IHCAFE Honduran Coffee Institute	Provides Technical Support to coffee farmers. Private Institution.	Principal Organization in the coffee sector at national level in regards to technical assistance	Potential partner in training activities, dissemination of results and monitoring & evaluation
AHROCAFE Honduran Coffee Producers Association	Private Organization. Represents members from all different sectors in coffee. Oldest Organization.	Represents interests of coffee sector in general.	Coordination of project activities in selected project regions
CNC Coffee National Council	Public Organization. Responsible for national policies related to coffee	Involvement of governmental institution in regards to coffee initiatives	
<b>Peru</b>			
National Coffee Council (Junta Nacional del Café)	Integrated by private farmers in the coffee sector for coordination of coffee productive circuit	Principal Organization in the coffee sector at national level.	Partner in project implementation. Coordination unit with other national projects
CONAM Environment National Council	Coordination of activities for the promotion, conservation, defense, restoration and improvement of the environment; promotion of land use planning; implementation of control measures to prevent possible environmental damage	Focal Point for GEF	Partner in project implementation. Coordination unit with other national projects
Peru Coffee Chamber	Initiatives and activities related to coffee exports	The relevance is related with the market component of the project, particularly exports sector.	Lessons learned from exports to sustainable markets
Ministry of Agriculture	Formulation and coordination of the execution and follow-up of	Maximum authority for agricultural planning and projects.	Coordination unit with other national projects related to sustainable

	policies which promote food security, promotion of the development of agro-productive circuits and agro/food systems.		agriculture and conservation of biodiversity.
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### Project Stakeholder Involvement Strategy

549. **Coffee Industry Involvement Strategy:** Corporate partners are coffee buying companies – roasters, wholesalers, and retailers - that have expressed an intention to expand their involvement with RA certification through participation in the project. These companies will deepen their commitment to sustainability as a result of their participation, providing increased training about sustainable coffee to company staff, promoting certified sustainable coffee to consumers, helping producers in their supply chain to achieve certification, and, ultimately, purchasing more certified coffee.

550. The project will begin with an initial core group of twelve dedicated partner companies. As other companies increase their involvement in the project and express a commitment to expand their growth, new companies can be added to the list. Due to the nature of the marketing intervention, the project will be in frequent contact with potential new corporate partners. The initial partner companies will be Kraft Foods, UCC Ueshima, Caribou Coffee, Boyds, Lavazza, Procter and Gamble, Drie Mollen, Colruyt, Dietrich's/Gloria Jeans, Family Mart, Royal Cup. Letters from these companies, confirming their commitment as partners in this project, as well as co-financing contributions, will be delivered at CEO endorsement.

551. Within the project, corporate partners will work in collaboration with the project to develop approaches, activities and products to help the companies increase their purchases and sales of certified coffee. Many of the proposed project interventions on the market and consumer demand side were developed based on stakeholder consultation during the PDF B phase. Corporate partners will then help pilot the activities within their own companies and test the newly developed products and systems to optimize them for wide application within the coffee sector. This approach implies a win-win situation where the project gets a chance to try out approaches and receive valuable feedback from friendly company allies, and the companies get a chance to participate at the forefront in activities which will help them achieve maximum benefits from their involvement in certified sustainable coffee. The larger the benefit for coffee companies, the higher the demand for sustainably produced products.

552. A key part of the products and systems developed will be a private sector capacity building strategy to mainstream sustainability issues internally within companies. As with other project deliverables, a pilot capacity building program will be tried out with project partners, and then rolled out to cover larger amounts of new coffee companies interested in engaging in sustainable coffee.

553. Because each company has a different organizational structure and culture, and different marketing requirements, the project will work with individually with each partner on an annual basis to determine the package of activities to implement, and exactly how to implement each activity. During the project inception phase, the projects will be invited to participate in the detailed planning of project activities that will be executed in collaboration with partner companies. A joint exercise will map which companies will participate in each project activity, and what the partner company can offer the project in terms of providing inputs to the project process. The planning exercise will determine what is required to develop products which will satisfy the needs of coffee companies to scale up their coffee purchases, how to develop necessary products and how to test them

in collaboration with corporate partners. Finally, the project will determine a roll-out strategy to reach the largest amount of new coffee companies.

554. In addition to their role as partners in piloting project activities, corporate partners will also have an important role as advisors to the project. Representatives for the Coffee Sector Advisory Group will also be selected from the partners (see section on project Implementation/Execution Arrangements). A bi-annual marketing survey and plan will form an additional feedback mechanism for corporate stakeholders.

555. **Policy Organizations:** Several organizations provide regular monitoring of the international regulatory environment for standards setting and certification. The International Social and Environmental Accreditation and Labeling (ISEAL) Alliance is a membership organization made up of NGO led standards setting and certification schemes, and provides regular policy monitoring for its members. The project can benefit from these regular policy updates. In addition, a small number of the corporate partners monitor policy and will provide feedback, and advice to the project.

556. **Civil Society Organizations:** Civil society organizations, such as international environmental organizations, can help support the project through outreach to their members and other key stakeholders about the importance of certified sustainable coffee. Some organizations monitor policy, have key stakeholder contacts, or have a mission of promoting sustainable agriculture. The project will explore collaborations and information sharing with this group of stakeholders.

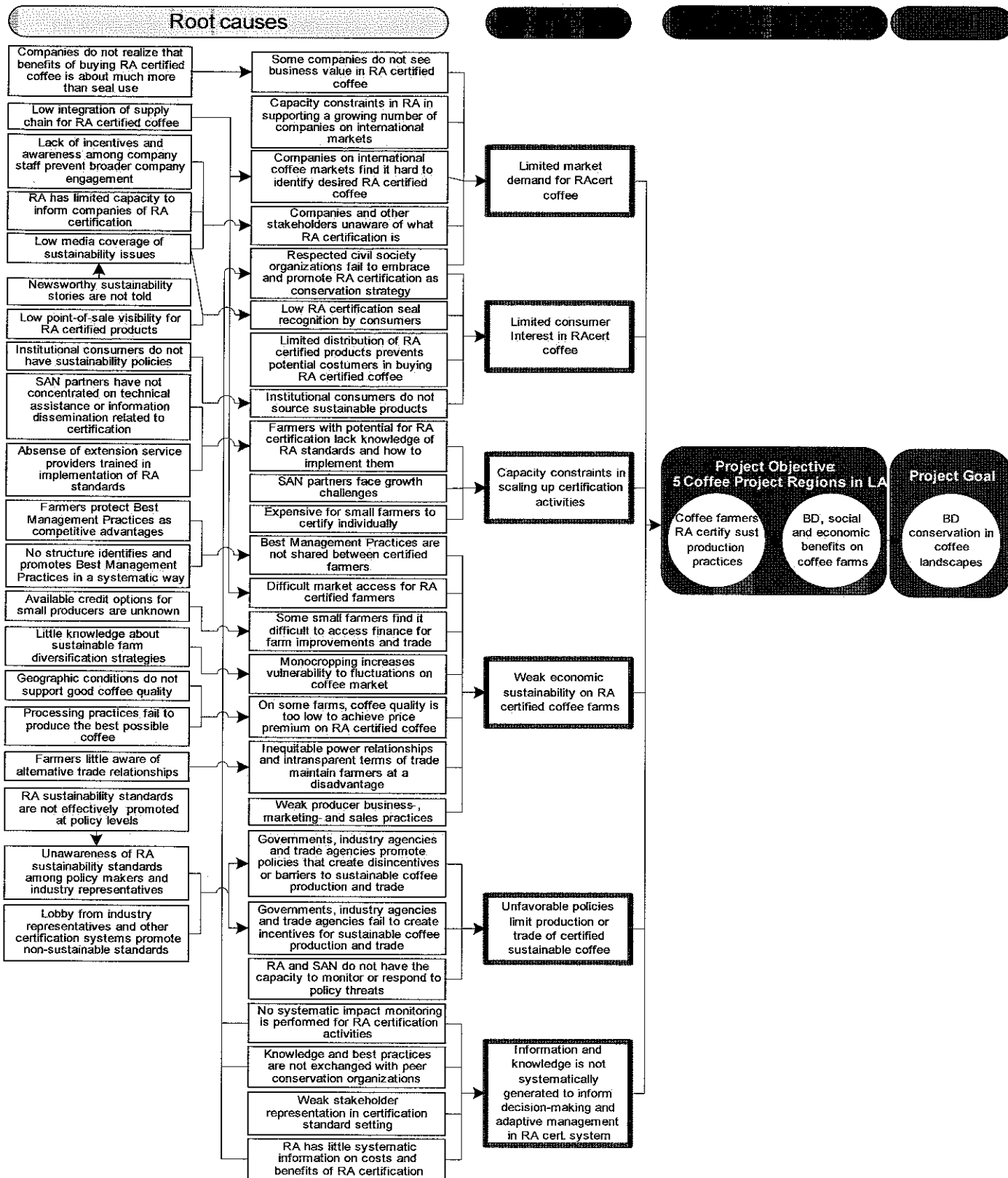
557. **National government authorities in project countries:** National government agencies will play an integral role in the project. The national coordinator will engage with the appropriate agencies, keeping them abreast of project developments and soliciting feedback. Governments will be engaged in local policy initiatives in support of sustainable coffee production efforts. Given that the project crosses so many sectors – environment, agriculture, SMME development – government actors can play a key role in enabling dialog and information sharing across sectors.

558. **National coffee organizations in project countries:** National coffee organizations are key production side stakeholders, and will play an active role in project activities. These activities range from educating their members about certification, receiving technical training in the standards, jointly promoting local certified farmers through cupping events, to providing technical assistance to member producers. Many of the project country coffee associations already play an active role in the certification program, and will be able to increase their role during the project.

559. **Local institutions and stakeholders:** Local institutions will play a key part of the project implementation. In each country, project activities will be coordinated through a local NGO member of the Sustainable Agriculture Network. These local conservation organizations have local members, local boards of directors, and years of experience working with local stakeholders.

# Part (Annex) V : Barrier and Root Causes Analysis

## Barriers and Root Causes Facing Rainforest Alliance Certified Coffee Production and Sales



## Part (Annex) VI: Coffee Industry and Sustainability

### Overview

Like most commodity environments, the coffee sector is reliably unstable and unpredictable. The many actors in the global coffee sector have tried to address “sustainability” since long before that term came into popular use. In 1962, in an effort to address the boom and bust cycles which prevailed in the coffee sector, the International Coffee Organization (ICO) was formed. Today, its members include 95% of the coffee producing country governments and 60% of the coffee consuming nation governments. For nearly three decades, the ICO had some success with market interventions until the system collapsed in 1989.

Currently, the ICO is working with its members to promote an awareness of the need for a sustainable coffee economy by making stakeholders in the coffee sector aware of the extreme economic conditions for producers, and proposing measures in areas such as quality, promotion and diversification to restore greater balance to the world coffee market. Indeed, one of the objectives of the International Coffee Agreement 2001 was to encourage ICO members to develop a sustainable coffee economy, resulting from the United Nations Conference on Environment and Development, which requires sustainability to be considered in the context of economic, social and environmental aspects.

These and other measures are a result of farm-gate prices having dropped to historic lows in recent years, pressuring the coffee sector to act. Early in the process, however, there was little consensus on what should be done and who should be responsible for doing it. Through an impressive stream of meetings, experiments and negotiations, especially during the past five years, some common ground is being reached. There is growing agreement, for example, that the three pillars of sustainability should be addressed as an integrated whole, that solutions will be built on conventional market forces, and that there must be more transparency, equity and information flow along the supply chain.

The following “Principles for Sustainable Development,” drawn from existing initiatives within the coffee sector, provide a broad foundation for the development of an integrated approach within the coffee sector:

#### *Principles for Sustainable Development in Coffee Trade<sup>1</sup>*

- Principle 1: Producers should be paid a price/wage that covers production, living and environmental costs within a competitive framework and which displays a measured degree of stability.
- Principle 2: Employment relationships should be maintained in accordance with core ILO conventions and local law.
- Principle 3: Production practices should be environmentally sustainable.
- Principle 4: Producers should have enhanced access to credit and opportunities for diversification.
- Principle 5: Producers should have enhanced access to trade information and trade channels.

### The Role of NGOs

For much of the past decade, NGOs have driven much of the discussion. Oxfam published its influential “Coffee Rescue Plan” in March 2002 as part of its “Make Trade Fair Campaign” at a time when global coffee production (117 million bags) exceeded global coffee consumption (109 million bags) by an amount nearly equal to the total production of Central America. Oxfam and other NGOs also called for managing supply, reducing volatility, improving coffee quality, maintaining coffee prices within “price bands,” and eliminating agriculture subsidies. Coffee industry representatives generally agreed with these remedies, but finding ways to move them towards implementation of these ideas proved difficult.

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<sup>1</sup> Principles for sustainable development drawn from, *inter alia*, the UN Global Compact’s 9 principles, Fair Trade Labelling Organizations International Fair Trade Generic Criteria and the Conservation Principles for Coffee Production, Utz Kapeh Foundation criteria.

Oxfam and others also called for the destruction of low-grade coffee stocks accumulating in warehouses around the world, but industry and governments could not agree on that proposal. The coffee manufacturing industry noted that the remedy most within its control and area of responsibility was increasing demand, a proposal that some NGOs declared as self-serving. The only actor along the supply chain profiting from the low farm-gate prices – the retail sector – remained silent and bore little criticism.

Long before the recent (and now receding) price crisis, however, environmental NGOs had been promoting the biodiversity benefits of traditional, tree-shaded coffee production and agreeing on farm management standards. After many conferences and field projects in the 1990s, environmental groups met in the year 2000 to agree on “consensus standards for conservation coffee,” which were published by the Consumers’ Choice Council. These standards closely reflected the Rainforest Alliance/Sustainable Agriculture Network’s (SAN) principles, which had already been in use on hundreds of farms in Latin America for a decade.

Additionally, several NGOs, most notably the Smithsonian Migratory Bird Center, Conservation International and Rainforest Alliance/SAN have steadfastly continued to promote the concept of biodiversity friendly coffee, both at the farm level and in the marketplace, prompting the NAFTA Commission on Environmental Cooperation to publish a summarizing report on biodiversity and shade coffee in September 2001.

In recent years, the like-minded but fractured initiatives focusing on the environmental opportunities of coffee and those pursuing the economic and equity aspects have begun to merge under the “sustainability” umbrella. Even Oxfam and the fairtrade movement, long focused on farm-gate prices, have begun to talk of sustainability. And at any coffee conference this year, the word “sustainable” will be in many of the presentations and banners.

### **The Role of Industry**

Industry, perhaps out of necessity, has also embraced the concept of sustainability. The food industry created the Sustainable Agriculture Initiative (SAI), an initiative dedicated to researching best farm management practices. While the SAI includes other food sectors includes the leading coffee companies but also other food sectors.

Starbucks, Neumann Kaffee Gruppe and other companies developed their own “verification systems” to guide farms toward sustainability and reward complying producers. At the request of Nestle, SAN technicians developed a system to evaluate social, environmental, production and quality practices in an integrated way on farms supplying the high-end niche company Nespresso.

Perhaps the most significant industry initiative is the “Common Code for the Coffee Community (CCCC)<sup>2</sup>,” created by the German government development agency, GTZ, and the German coffee association with support from some global coffee companies. Over the past three years, the CCCC has grown into an important forum for the discussion of coffee sustainability issues, as a multi-stakeholder initiative, bringing in the large industry players often absent from other platforms.

The CCCC has also developed a code of good farm practices, and is now trying to find agreement on how coffee traders and companies will participate. The industry representatives argue that NGO-led certification programs are too slow, narrow and cumbersome to deal with mainstream coffee, noting that all the NGO programs together account for less than 5% of global production.

At this point, following the years of discussion on sustainability, industry’s contributions are driven by 1) the desire to shape the guidelines for sustainability and 2) the need to be seen by the market as a leader in offering

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<sup>2</sup> For more information on the Common Code for the Coffee Community see [www.sustainable-coffee.net](http://www.sustainable-coffee.net)

sustainable products. As the quantity of sustainable products increase in the marketplace, companies aren't willing to be left behind.

### **The Role of Multilateral Agencies**

The multilateral development agencies, as well, have been very active in the coffee sector, holding joint conferences in coffee-producing countries. The World Bank, IDB, USAID and other donors have their own agendas, but have increasingly worked toward a common understanding. At a joint conference in Nicaragua in December 2004, the participants, including global coffee companies, farmers and leading NGOs identified the most-often-proposed lines of action as follows:

Increase Consumption – promote coffee drinking in both producing and traditional market countries. Increased consumption is based in part on improving quality and increasing consumer understanding, awareness and interest through certification seals.

### Improve Producer Support

- Risk management – inform producers of techniques, such as hedging and purchase options, to manage their risks.
- Market information – facilitate transparency of information to producers, especially on markets, prices, and crop and yield forecasting.
- Extension services – improve coffee-related agricultural extension services, including sustainable practices and yield management.
- Upgrading quality – support producers in moving toward gourmet or specialty grade coffees that are increasingly in demand.
- Certification – support certification of sustainable farm practices.
- Diversification – promote partial or total diversification of coffee farms into other crops and income-generating activities.
- Business training – provide improved business skills, awareness of appropriate business practices and training opportunities.
- Vertical integration – encourage producers to add value to their product through milling and other methods.
- Roaster relations – encourage long-term, trust-based relations between roasters and producers.
- Financing – provide improved access to credit for producers as well as debt restructuring at the producer and national levels.

### Macroeconomic Policy Fixes

- Quality standards – institute quality resolutions to remove low-quality beans from the market.
- Stabilization funds – create long-term stabilization funds to minimize price volatility.
- Quotas – impose export quotas on coffee producing countries.
- Tax policy – reduce the tax burden on coffee farmers.
- Crisis relief – provide relief services for displaced farmers and workers.
- Reduce trade barriers – lower European and US trade barriers on non-coffee products (there are few tariffs or barriers on green coffee).

Most of the participants in the sustainable coffee discussions are pushing one or more of the actions listed above.

### **The Future of Sustainable Coffee**

Though the amount of sustainably-grown coffee available in the marketplace is still considerably small, the number of voices hoping to be heard on the issue has grown. Recognized and proven programs devoted to the production of sustainable coffee will find their efforts and products increase as the amount of responsibly-grown

coffee increases, as it most certainly will. The market for high-quality, sustainably-grown coffee will continue to increase as farmers, companies and consumers continue to recognize the benefits.



## Part (Annex) VII: Coffee Sector and Rainforest Alliance Marketing

### The Certification Seal

The Rainforest Alliance, a conservation organization, has been a pioneer in harnessing the power of the private sector. This includes learning about and influencing markets. The Rainforest Alliance programs are not “market-driven” – they are mission-driven, but they are also sensitive to the changes in consumer attitudes and interests and closely aware of commodity market drivers.

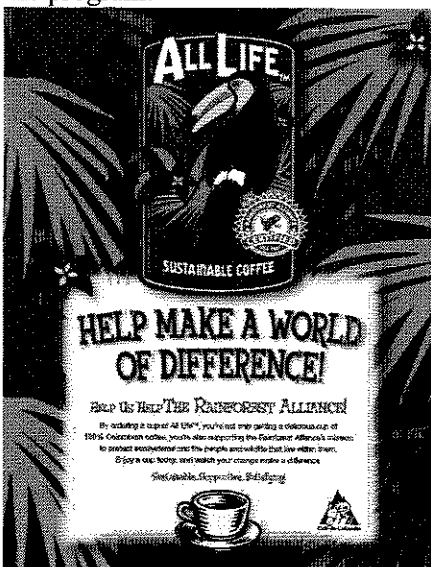
An important element of the Rainforest Alliance and SAN mission is to change consumer behavior – to transform the current culture of consumerism into a popular culture of sustainability. The certification seal is the most important tool for achieving that goal.



The first priority for any certification program is to guard the credibility of the seal. Earning credibility requires arduous work, careful planning, clear objectives, transparent operations, a willingness to receive and act on criticisms, a record of achievement, consistency, persistence, and honesty. Credibility is difficult to gain and easy to lose, and is the most important asset in developing public awareness and demand for the certified products.

The long-term success of ecolabeling programs such as Rainforest Alliance Certified will depend in part on whether or not consumers buy the labeled goods, thus rewarding certified producers and those companies trading the certified products. The Rainforest Alliance, as the owner of the certification seal and as the secretariat of the Sustainable Agriculture Network (SAN), recognizes its responsibility to generate consumer demand, but – unlike, say, the fairtrade movement – the Alliance has built other rewards and drivers into the system all along the supply chain.

Farmers, for example, find that meeting the standards and installing a program of continuous improvement brings many tangible and moral benefits beyond the promise of higher prices. Companies find that the certification program is a valuable Corporate Social Responsibility (CSR) platform, reduces risks, improves the corporate image, increases employee morale and aids business planning. Even so, coffee companies also want public recognition for their efforts and increased sales, and these benefits largely depend on consumer uptake of the program.



Many NGOs believe that the success of certification programs is built on consumer demand, but that belief is not supported by the evidence. The growth in markets for recycled paper, fairtrade products and FSC wood were developed by companies, governments and activist groups in the face of a jaded, price-conscious and largely uninterested public. Recognizing this – and in the interest of cost-effectiveness – the Rainforest Alliance concentrates its marketing efforts on the behind-the-scenes sectors of the supply chain, allowing companies with their expertise, famous brands and substantial marketing budgets to carry the message to the end consumers. This is not to say that reaching the public is unimportant. As noted above, changing consumer behavior is part of the Rainforest Alliance and SAN mission. The certification seal is an effective tool for conveying a concise message to consumers, acting as a form of communication between farmers and shoppers. Farmers use the seal to tell consumers that they have met prescribed standards; buyers send a message back to farmers, saying that they approve. For the

Rainforest Alliance and other activists, closing this circle is an essential element of environmental education.

## Through the Media

With limited budgets and a small staff devoted to communications, the Rainforest Alliance must be thoughtful in how it spreads its message through the media. An efficient strategy has been to piggyback media efforts on existing, or developing, company campaigns. In addition, the Rainforest Alliance will provide companies with materials, information and ideas to support their campaigns.

While raising public awareness, media mentions are also valuable to the program's champions in participating companies, helping them build internal enthusiasm and understanding for the initiative. This is necessary to convince management to budget funds for promotion and expansion of the program.

The priority marketing targets for the Rainforest Alliance include: farmers, activists, governments, coffee companies, retail chains and other agenda-setters and change-makers. Their support is absolutely necessary to building initial market demand; consumer awareness and brand preference can follow.

Actor	Message	Media
Coffee farmers	On-farm benefits of the certification program, possible price premiums	<ul style="list-style-type: none"> <li>• Direct contact through the SAN members, special materials, farmer to farmer communication, training workshops, government and private extension services, traders</li> </ul>
Coffee traders	Benefits of buying and selling sustainable coffee, information about supply and demand	<ul style="list-style-type: none"> <li>• Direct contact through the SAN members and Rainforest Alliance staff, Rainforest Alliance websites, including the Eco-Index, and publications, special materials, conferences and meetings.</li> <li>• Joint projects.</li> </ul>
Coffee roasters	Business benefits of certification, such as ensuring long-term supply of quality beans, traceability, transparency, increasing brand loyalty, improved image, risk management, opportunities for leadership in CSR	<ul style="list-style-type: none"> <li>• Direct contact by Rainforest Alliance staff and supportive traders, Rainforest Alliance website and publications, special materials, conferences and meetings.</li> <li>• Joint projects.</li> <li>• Trade publications</li> <li>• Popular media</li> </ul>
Retailers, coffee shops and supermarkets	Business benefits of offering certified coffee, such as building brand loyalty, generating excitement and demand, demonstrating leadership and innovation, CSR	<ul style="list-style-type: none"> <li>• Direct contact by Rainforest Alliance staff and the sales forces of participating roasters, special materials and trainings.</li> <li>• Joint projects.</li> <li>• Website</li> <li>• Conferences and trade shows</li> <li>• Trade publications</li> <li>• Popular media</li> </ul>
Coffee activists and sister NGOs	Conservation and rural development benefits of certified sustainable coffee farming.	<ul style="list-style-type: none"> <li>• Direct contact with SAN and Rainforest Alliance staff.</li> <li>• Meetings and conferences.</li> <li>• Joint projects.</li> <li>• Rainforest Alliance websites, including the Eco-Index, and publications.</li> <li>• Organizational bulletins and magazines.</li> <li>• Popular media</li> </ul>
Other certification programs	Shared objectives, technical information, methodologies, policy, marketing plans, alignment	<ul style="list-style-type: none"> <li>• Direct contact with Rainforest Alliance and SAN staff.</li> <li>• Meetings and conferences.</li> </ul>

Government agencies	Economic and rural development benefits of sustainable coffee farming. Certification is an opportunity, not a barrier to trade. Other policy issues. Certified farms as allies in national and regional conservation, development and marketing programs. Rainforest Alliance compliance with labeling regulations.	<ul style="list-style-type: none"> <li>• Rainforest Alliance websites, including the Eco-Index, and publications.</li> <li>• ISEAL.</li> <li>• Meetings, workshops and conferences.</li> <li>• Joint projects.</li> <li>• Organizational bulletins and websites.</li> <li>• Popular and specialty media.</li> <li>• Direct contact with Rainforest Alliance and SAN staff.</li> <li>• Meetings and conferences.</li> <li>• Rainforest Alliance websites, including the Eco-Index, and publications.</li> <li>• ISEAL.</li> <li>• Meetings, workshops and conferences.</li> <li>• Joint projects.</li> <li>• Popular and specialty media.</li> </ul>
Consumers	Benefits to farmers, workers, wildlife and the environment of certified, sustainable coffee farming. Good quality coffee. Support participating companies. Buy certified.	<ul style="list-style-type: none"> <li>• Popular media.</li> <li>• Specialty publications, such as supermarket magazines.</li> <li>• Point-of-sale information.</li> <li>• In-store campaigns.</li> </ul>

**Does Consumer Awareness Translate into Sales?**

There is little or no consumer awareness of the Rainforest Alliance Certified seal today, though the seal is quite well known among farmers, coffee companies, traders, activists and NGOs. Rainforest Alliance Communications Department will generate consumer awareness of the seal through strategically selected media and by piggybacking on the campaigns of participating companies. The expected growth in consumer awareness will give confidence to the venders of certified coffee and create a receptive environment for their promotions. This is important and necessary, but we know that sales are not necessarily proportional to consumer awareness.

The Fairtrade movement, for example, has done studies of consumer awareness in several countries and found that large majorities – often around 80% – of survey respondents recognize the Fairtrade mark. However, the number of people willing to buy Fairtrade products remains low, rarely breaking the five percent barrier.

Certified products will only go mainstream if they are marketed to mainstream consumers by companies with well-known brands. With the exception of organic groceries – in which products are often purchased for personal health reasons – most certified products are selected by shoppers because they are readily available, fairly priced and effectively promoted. In other words, shoppers buy what is marketed to them.



Unlike Fairtrade, the Rainforest Alliance does not want its seal to be seen as a brand. In this sense, it is more like an organic seal, a trustmark to support and add value to a company brand. Thus, consumer awareness of the seal is important and useful, but not essential to sales, especially at the beginning of a campaign. Credibility is essential. If a journalist or consumer activist looks for the program behind the seal, the program must be sound. And marketing is essential. Fairtrade and organic programs have had the benefit of promotion by governments, churches, unions and NGOs such as Oxfam. Rainforest Alliance Certified will have to develop similar support.



### Marketing

This is a propitious moment for UNDP/ GEF to support the marketing of Rainforest Alliance Certified, since two global market leaders are launching campaigns in several countries. Kraft is introducing certified coffee in the UK, France, Sweden and Italy this fall and in the U.S. next year. Chiquita will put millions of bananas bearing the seal on store shelves in Austria, Belgium, Denmark, Finland, Germany, Holland, Norway, Sweden and Switzerland, beginning in October.

Presumably, these product introductions and their accompanying media campaigns will increase consumer awareness, but it will be years before recognition of the Rainforest Alliance seal competes with recognition of the Fairtrade and organic seals. These latter programs have been marketing for more than 20 years, with multi-million-dollar grants, media support and collaborative governmental initiatives. Since seal recognition does not directly translate into sales – and sales are a motor of the program – we will measure

sales in terms of volumes and use that as a proxy for seal recognition.

At the moment, we estimate that Rainforest Alliance Certified products are available in 20,000 outlets in the U.S., Europe and Japan.

**For snapshots of various companies and the marketing they have done with Rainforest Alliance Certified products, please download the PDF file at [http://www.rainforest-alliance.org/gef/cert\\_promo\\_campaigns.pdf](http://www.rainforest-alliance.org/gef/cert_promo_campaigns.pdf)**

## Part (Annex) VIII: Rainforest Alliance Coffee Certification Program

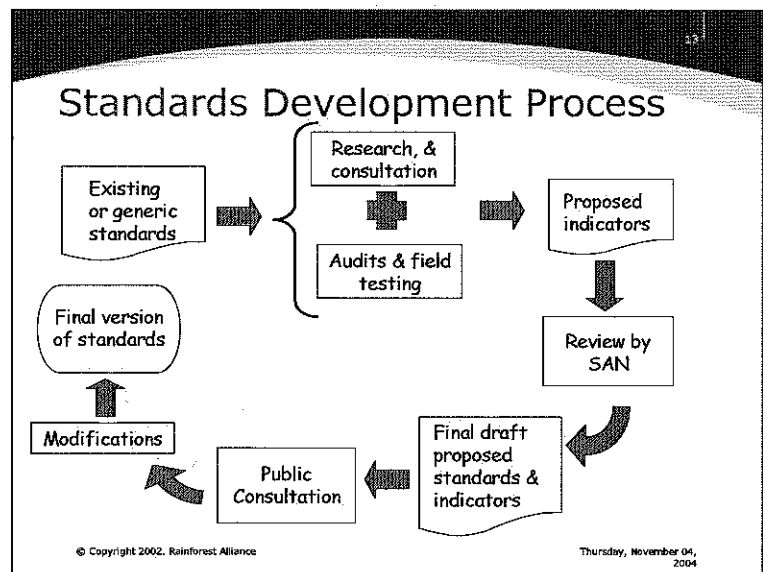
The Sustainable Agriculture Network (SAN) is a coalition of independent, nonprofit, conservation organizations that promotes the social and environmental sustainability of agricultural activities through the development of standards, and by certifying farms that meet those standards. Network members provide certification services to the producers and agricultural companies in their countries, and contribute knowledge and experience to the development of Rainforest Alliance Sustainable Agriculture standards. The SAN uses the *Rainforest Alliance Certified™* seal, which is awarded to those farms that meet certification requirements.

Rainforest Alliance is the secretariat of the SAN. It administers certification systems for the network, and provides certification services in Costa Rica and other select countries. Rainforest Alliance Sustainable Agriculture is currently reviewing and revising the Sustainable Agriculture certification systems in order to obtain ISO 65 accreditation.

### SAN Standards

Rainforest Alliance began developing the Sustainable Agriculture standards in 1991 through a process of research, stakeholder consultation, and field testing. The first standards were specifically for banana production, and were used for the first certifications in 1993. The program was then known as “ECO-O.K.” The current standards, approved by the SAN, are based on ten principles, with specific indicators for banana, coffee, citrus, ornamental flowers and foliage, and cacao.

Rainforest Alliance, along with other mission-driven, nonprofit certification and accreditation entities, is a member of the ISEAL (International Social and Environmental Accreditation and Labeling) Alliance. Part of ISEAL’s activities includes the development of policies and other instruments to ensure the credibility of its members’ certification and accreditation activities. Rainforest Alliance strives to comply with ISEAL’s *Code of Good Practice for Setting Social and Environmental Standards* for the revision of existing standards, or for the development of standards for new crops or services.



Sustainable Agriculture Network standards specify criteria for best management practices and social and environmental performance for farms. The scope of the standards covers agronomic practices and integrated crop management; social, labor, and community relations; environmental management, and occupational health and safety.

By September 2005, Rainforest Alliance and the SAN will begin using generic standards (illustration) that can be applied to all crops, including multiple-crop systems, with additional crop-specific indicators for banana, coffee, citrus, ornamental flowers and foliage, and cacao. This structure will allow for optional joint audits for other certification and supplier verification systems to meet the needs of SAN-certified clients.

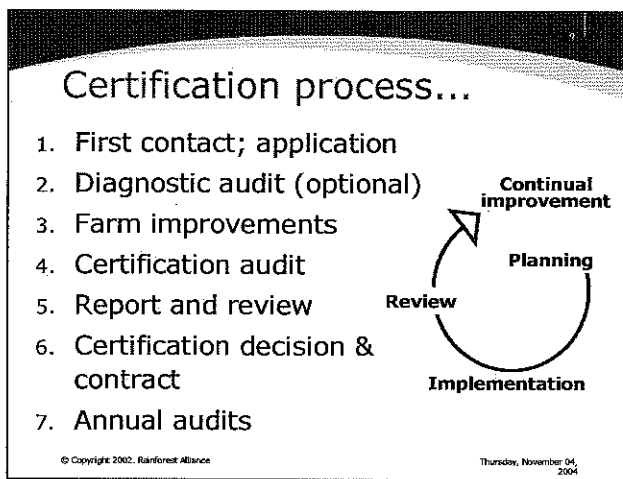
The SAN may determine that some crops may require specific indicators that more clearly define best management practices and help to reduce or avoid negative social and environmental impacts associated with those crops. These indicators will require full evaluation and approval by the SAN, as well as a public consultation process. In addition, SAN members may want to use indicators that account for local social, environmental, or cultural conditions. These indicators must not be less strict than those found in the general standards. SAN members will be responsible for developing these indicators, and for carrying out a public consultation process in their respective countries.

### Certification Process

SAN certification is designed to drive continual improvement of social and environmental best management practices on farms. The process begins with the first contact between a producer<sup>1</sup> and Rainforest Alliance or another SAN member. The producer completes and submits an application form. Based on the information in the form, Rainforest Alliance or the SAN member recommends that the farm undergo a diagnostic audit, or moves straight to a certification audit.

A diagnostic audit is designed to generate information about the challenges a farm must overcome to achieve certification. Although a diagnostic audit represents an additional cost, it provides a better indication of where producers invest their time and resources for their farms to certified. Farms with previous certification experience often choose to forgo a diagnostic and request a certification audit.

All farms are audited by teams of SAN or Rainforest Alliance auditors. The length and of the audit depend on many factors, among farm size, the type of crop, the complexity of cropping or production systems, the existence processing or packing facilities on the farm, and the number of farm workers.



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All certified farms must undergo annual audits to evaluate compliance with the standards and to verify that previous non-compliance issues have been or are in the process of being rectified. Annual audits tend to focus more on previous non-compliance issues, but not at the expense of evaluating overall farm performance against the Sustainable Agriculture standards. Farms that do not demonstrate compliance or clear progress on improvements will be assigned corrective actions and will need to undergo a verification audit. Rainforest Alliance can suspend or cancel the certification of any farm that does not demonstrate progress on corrective actions.

### What is Audited?

Rainforest Alliance certifies farms, not products. Farms are certified based on their performance with respect to established social and environmental best management practices in the Rainforest Alliance Sustainable Agriculture standards. The performance is determined by auditors who gather evidence of compliance with the standards during the audit process described above.

<sup>1</sup> Producer, as used here, is the farmer, farm manager or owner, or the designated representative of the farm or owner of the farm.

Throughout the audit process, the audit team uses different techniques to collect, verify, and analyze evidence in order to evaluate farm performance against the respective standards. These techniques include document reviews, interviews, and observations of farm operations and management practices. At the conclusion of the farm visit, the team discusses preliminary findings with farm management, so that these findings are clearly understood, and so that management has the opportunity to provide further information that may change any findings.

It is important to point out that the audit team always attempts to “triangulate” or cross-check evidence as much as possible. A typical example would be an audit team reviewing specific workers’ contracts, training, pay, and medical records; observing the workers’ activities; and interviewing the workers regarding conditions, training that they received, how they carry out their activities, if they underwent medical exams, and how they are paid. Evidence of inconsistencies between documentation, observations, and interviews would provoke further investigation and possible non-conformities if evidence indicates that conditions are consistent throughout the farm, or are otherwise systemic.

In summary, the objective of a farm audit is to confirm the execution of best management practices according to their definition in the Sustainable Agriculture standards. Incidents of non-compliance are evaluated to determine whether they are an isolated incident or the result of the lack of a systematic approach to implementing best management practices.

## **Compliance**

An audit team assigns a “non-conformity” when a farm does not comply fully or partially with some aspect of the standards. There are three categories of non-conformities:

- *Critical non-conformity.* This is essentially a “fatal flaw,” and is assigned when a farm does not demonstrate full compliance with a standard that is identified as critical. An example would be discharging untreated wastewaters directly to natural water bodies. A farm must fully comply with all critical standards before it can be certified.
- *Major non-conformity.* This non-conformity is assigned when a farm does not fully comply with any non-critical standard.
- *Minor non-conformity.* A minor non-conformity is assigned when there is partial, but not complete compliance with a standard.

In general, non-conformities are assigned only to those compliance problems that are systemic, and are not isolated or temporary incidents. Again, the audit team must determine if non-compliance issues are indeed isolated incidents, or if they reflect the lack of a management system, policies and procedures or a genuinely systemic approach to social and environmental management on the farm. In the case of an isolated incident, an audit team can assign an “observation” to alert the producer, and future audit teams, to a potential problem. For non-conformities, the audit team can assign a compliance period, anywhere from six months up to two years, based on the level of compliance; the potential environmental, social or human health and safety impacts of non-compliance; and the resources the farm has available to achieve full compliance.

Each article or sub-article of the standards is worth one point, and deductions are made for each category of non-conformity. The percent compliance for each Principle of the standards is the average score of all of the articles of the Principle, multiplied by 100 to obtain a percentage (see example). To achieve or maintain certification, farms must comply with least 50% of each of the nine Principles, and have at least 80% overall compliance with the standards. The scoring system guides and encourages farmers to make continual improvements in all areas, and it allows farmers to compare their performance with neighbors and producers in other regions.

## **Certification Decisions**

The audit team indicates in the certification or annual audit report the farm's level of compliance with the standards. An audit team cannot recommend or decide whether or not to certify a farm. The certification decision is made by the Rainforest Alliance's certification committee, whose members do not participate in the audits.

According to ISO 65 guidelines, a certification entity cannot delegate a decision regarding the certification of a client. To comply with ISO 65, Rainforest Alliance Sustainable Agriculture has established a certification committee comprised of experienced Rainforest Alliance technical staff and associated professionals, in some cases auditors. Members of the committee review audit reports and decide whether or not to certify a farm based on the conclusions of the audit team. Members of the certification committee that participated in an audit of the client farm within the past year cannot participate in the certification decision regarding that farm.

The certification committee also reviews annual audit reports to verify that progress is being made on farm improvements and standards compliance. The committee also reviews complaints from stakeholders regarding certified farms, as well as other potential non-compliance issues that may lead to an investigative or verification audit.



## **PART (Annex) VIII-A Coffee Certification Program: Sustainable Certified Coffee Growth Projections**

The project anticipates total purchases of 500,000 metric tons of certified coffee at the end of the project, increasing from a current base of 30,000 metric tons. Based on current short term demand this baseline is expected to increase to 100,000 by July 2006.

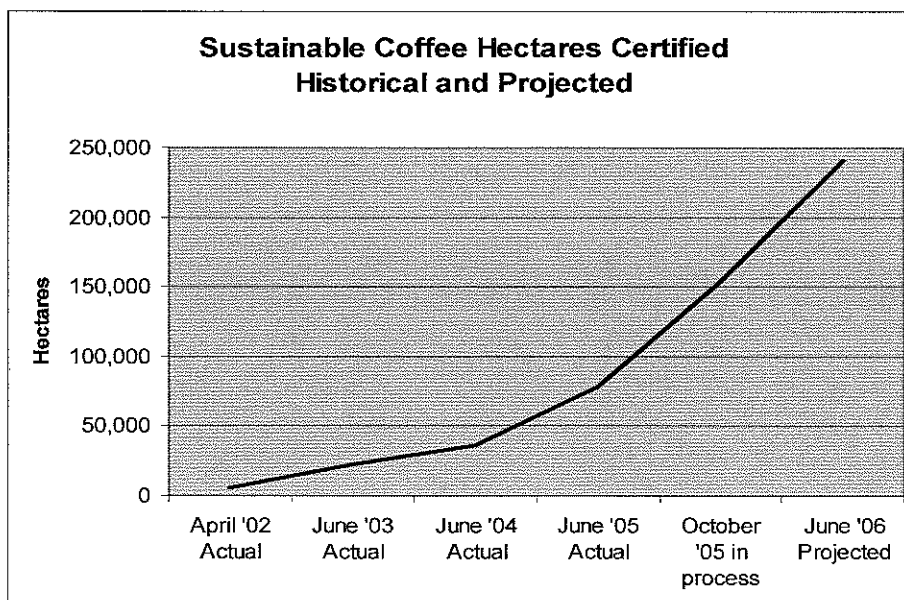
To project future volumes of certified coffee, a careful analysis was conducted of the market to identify potential future buyers. The company survey conducted during the PDF B targeted 20 important potential companies and 50 current companies regarding their future potential for purchasing certified coffee. From these interviews, a segmented list was developed of current and potential companies with their purchasing potential. In addition, the list of targets was expanded from ongoing market contacts. This target list was used to develop the target indicators outlined for the project.

Due to the confidential nature of company business projections specific company names and projections cannot be shared, but it includes some of the world's most prominent coffee companies. Rainforest Alliance is in negotiations with a series of very large supermarket chains in the US, Europe and Japan, and several very well-known coffee shop and fast food chains. These companies are considering joining the program and their business is very significant.

The project projects a total certified area of 1,500,000 hectares at the end of the project period. Of this total area, 1,000,000 hectares are anticipated to be in coffee production.

These projections are based on the close link between demand for certified coffee and supply provided from farms. From April of 2002 to July of 2004, the area certified increased steadily from 6,000 hectares to 36,000 hectares. Kraft Foods announced its commitment to purchasing certified coffee in October of 2003, after which the speed at which farms became certified during the next harvest season increased substantially.

Certification is also expanding in new geographic regions based on demand from roasters and retailers, resulting in larger production areas to join the offering. Certification in Peru increased during the first half of 2005, and the first farms in Ethiopia will be certified in the second half of 2005. The program will expand to Indonesia in 2006.



**Part (Annex) IX: Typical on-farm changes and benefits of Rainforest Alliance coffee certification**

<b>Farm Aspects</b>	<i>Common Problems</i>	<i>RA Certified Farms</i>	<i>Benefits</i>
<b>Conservation</b>			
<b>Tree Cover (only for select crops like coffee and cocoa)</b>	No shade trees or only scattered shade of a few tree species. Often exotic species of little value to wildlife are used.	<i>At least 10 native species and 70 shade trees per hectare in two strata. Canopy cover is 40%.</i>	<ul style="list-style-type: none"> <li>• Increased environmental services: water yields, carbon sequestration, recreation opportunities and biodiversity.</li> </ul>
<b>Forest Conservation</b>	Completely deforested or with little natural forest. Existing forest unprotected.	<i>Forests protected or sustainably managed. Degraded and non-agricultural areas reforested.</i>	<ul style="list-style-type: none"> <li>• Increased flora and fauna for better natural pest control.</li> </ul>
<b>Wildlife Protection</b>	Hunting or extraction of flora and fauna common.	<i>All natural ecosystems and their flora and fauna must be protected.</i>	<ul style="list-style-type: none"> <li>• Appropriate land uses: best lands for agriculture mean better yields and lower costs.</li> </ul>
<b>Soil Resources</b>	No soil conservation measures, heavy reliance on chemical fertilizers and herbicides	<i>Soil and fertility conservation program and measures implemented. Abundant use of vegetative ground cover and natural fertilizers</i>	<ul style="list-style-type: none"> <li>• Decreased runoff and stream sedimentation</li> </ul>
<u>Water Resources</u>	Excessive water use. Streams and rivers contaminated with processing and domestic wastewaters and garbage. Riverbanks and watersheds deforested	<i>Water use is measured and conservation measures implemented. All wastewaters treated before release to environment. Riverbanks reforested, watersheds protected.</i>	<ul style="list-style-type: none"> <li>• Increased natural fertility, decreased fertilization costs.</li> <li>• Reduced herbicide use.</li> <li>• Reduced water consumption and need for wastewater treatment.</li> <li>• Increased water yields from farm for internal consumption and use by neighbors</li> </ul>
<b>Worker conditions</b>			

<b>Farm Aspects</b>	<u>Common Problems</u>	<u>RA Certified Farms</u>	<u>Benefits</u>
<b>Occupational Health</b>	Nonexistent or insufficient worker safety procedures and equipment. Unsafe conditions, numerous accidents. No worker participation in improving conditions.	<i>Occupational health and safety program in place; part of daily activities. Trained workers and better safety awareness and conditions. Workers have and use safety equipment. Worker health and safety committees exist.</i>	<ul style="list-style-type: none"> <li>• Lower accident rates.</li> <li>• Higher worker productivity and less worker turnover resulting in less labor cost.</li> <li>• Lower training costs.</li> <li>• Higher quality products.</li> <li>• Less probability of union or worker actions.</li> <li>• Workers have pride, feel good about their job.</li> <li>• More knowledgeable workers.</li> <li>• Better worker-management communications.</li> <li>• Families are content and healthier.</li> <li>• Children and young workers have educational opportunities.</li> <li>• Workers are better environmental stewards.</li> <li>• No minors employed in violation of local laws and ILO conventions.</li> <li>• Young workers protected and not exploited.</li> </ul>
<b>Worker Housing</b>	Rustic, run-down housing often with dirt floors, insufficient latrines, showers and other facilities	<i>Decent housing with cement floors, showers, toilets, cooking and laundry washing areas.</i>	
<b>Worker Rights</b>	Workers do not know their legal rights and responsibilities. No contracts. Pay below minimum wage, often without legal benefits. Worker intimidation. No right to organize or bargain collectively. Discrimination may exist.	<i>Rights and responsibilities regarding pay, benefits and working hours are clear and in line with ILO conventions and legal requirements. Contracts for permanent workers. Legal minimum or above-minimum wages paid. Freedom to organize and bargain collectively. Access to management. Discrimination prohibited.</i>	
<b>Health and Education</b>	No or poor access to education for workers or families. Workers ignorant of basic health, hygiene and environmental practices.	<i>On-farm schools or transportation provided to community schools. Appropriate health, hygiene, and environmental education provided to workers and families.</i>	
<b>Child labor</b>	Minors (less than 15 years old) often employed for less pay and benefits. Often involved in dangerous activities without training. No educational opportunities.	<i>Employment of minors prohibited. Employment of young workers (15-17 years old) carefully controlled and monitored; not involved in dangerous tasks. Work doesn't interfere with school.</i>	

## ***Farm Management***

**Farm Aspects**

Common Problems

RA Certified Farms

Benefits

**Pesticides**

Toxic and environmentally dangerous pesticides used. Excessive pesticide use. Workers unaware of dangers and don't wear protective gear when applying pesticides. Chemical storage and transport unsafe.

*Internationally recognized highly toxic and dangerous pesticides banned. Pesticide use controlled and minimized; integrated pest management emphasized. Only trained workers apply and handle pesticides while using protective gear. Chemicals stored in locked sheds far from housing and waterways. Spill protection and collection safeguards in place.*

- Decreased pesticide costs.
- Less long-term toxicity and contamination impacts.
- Decreased pest problems due to pesticide resistance.
- Minimize potential for residuals on products.
- Workers protected, healthy, with no long-term effects.
- Spills and other incidents minimized and quickly contained and cleaned up.
- Clean farm, work and housing areas; increased worker pride and productivity.
- Reduced materials costs.
- Minimal probability of regulatory issues.
- Better worker health and hygiene.
- Minimize potential for product contamination.
- Good neighbor.
- Good relationships with community.
- Minimal resistance to changes or projects.

**Waste Management**

Farms littered with garbage. Processing and domestic waste dumped into rivers or not treated. Domestic and human waste not collected and treated.

*Waste is identified and quantified, where possible. All waste is properly disposed, reused or recycled. Processing and domestic waste properly treated; organic waste is often used as fertilizer. Facilities for proper human and domestic waste collection and disposal available.*

**Community Relations**

No benefits for neighboring communities and region beyond employment. Value of services and resources consumed by farm often higher than benefits generated. Isolated from neighbors.

*Farm provides employment and educational opportunities. Contributes to local development. Protects resources and minimizes consumption. Communicates with neighbors.*

## **Part (Annex) X: Criteria for selection of Project Coffee Regions**

### **Why select a Project Coffee Region?**

The RA certification system is market driven and neither Rainforest Alliance nor the SAN partners choose which farms to certify. Rather, certification occurs where a farmer chooses to transform production practices according to the SAN's sustainability standards, and requests certification. Certification is therefore not necessarily concentrated in an area which is particularly important to biodiversity.

On the other hand, it is important for the project to be able to show impact in specific geographical areas important to global biodiversity. Rainforest Alliance and the Country Representatives must select Project Coffee Regions in which we would particularly like to have impact, both in terms of biodiversity conservation, as well as in certification. It was decided that the Project Coffee Regions should be a fairly large area, which could coincide with a main coffee growing region in the country. A larger area will allow the project to demonstrate larger impacts in terms of hectares certified and amounts of sustainable coffee produced.

### **Information about the country's coffee regions**

During the initial part of the selection process of Project Coffee Regions, the project Country Representatives collected basic information about each main coffee region in the country. The information enabled the project team and Country Representative to analyze the options for Project Coffee Regions, as well as demonstrating to the GEF as well as project partners and different interest groups that the project has followed a rigorous process for selection of regions.

For each of the country's main coffee regions the following information was provided:

- Size of area
- Number of farms in area
- Number of RA certified farms in area
- Coffee coverage in Ha
- Rainforest Alliance certified coffee coverage in Ha
- Altitude range
- Average or typical farm size
- Socio-economic data (e.g. poverty levels) (describe in one paragraph)
- Farmer organization: individual producers or cooperatives (describe in one paragraph)
- Cultural aspects (indigenous communities, particular customs, social conflict or tension) (1-2 paragraphs)
- Other important aspects which would help to understand the special characteristics of the coffee region (1-3 paragraphs)

### **Criteria for selection of Project Coffee Regions**

The selection of a Project Coffee Region was done based on multiple factors, weighed against each other. Each country is different, and so is the reality of the coffee sector in each country. A coffee region will have particularities which may or may not make it a good candidate to be chosen for the project intervention, but these are not necessarily the same in each country. Below are the three criteria which guided the choice of Project Coffee Regions.

#### *A. Presence of biodiversity of global value*

Conservation of globally important biodiversity is the GEF's objective for this project, and a priority for the RA certification system. The project selected coffee regions which harbor important biodiversity and ecosystems of global importance and of high conservation priority. The biodiversity importance is typically defined by

indicators such as richness of species, high degree of endemic species, threatened species and species in danger of extinction. It can also be characteristics which are linked to the particularity of the ecosystem and its functions. If coffee is grown sustainably in these regions, it will help protect the ecosystems and the biodiversity in it.

In analyzing the biodiversity value of the country's coffee regions, indicators for biodiversity importance should be listed. Furthermore, the biodiversity importance was indicated by analyzing the areas' proximity to natural areas with national conservation priority, such as national parks, wildlife refuges, wildlife sanctuaries and other protected or priority natural areas. The coffee regions' proximity to areas of international recognition such as UNESCO Biosphere Reserves, World Heritage Sites, RAMSAR sites, or CI Biodiversity Hotspots was also documented. If the region is a part of recognized biological corridors, such as the Mesoamerican Biological Corridor, it also testified to its importance for biodiversity.

### *B. Coffee quality and market demand*

This GEF project aims to protect biodiversity by enlisting market forces in the efforts to conserve biodiversity in productive landscapes. Therefore we cannot only look at the biodiversity value of the coffee regions, but must make sure that the coffee produced in our project area has a good demand in international markets. By selecting coffee regions where the coffee is in good demand we can maximize our chances of impact.

Many factors determine if the coffee from a particular region is in good demand. Coffee quality, consistency, flavor, and fame are all determinants of demand. By analyzing the country's coffee regions, the Country Representative must determine if the coffee from each region is in particular demand. The better the demand, the easier it will be for the project to help achieve increased sales of certified coffee. The project does not necessarily prefer to promote a certain type and quality of coffee, as long as the demand exists.

### *C. Strategic considerations*

Biodiversity value and market demand for the coffee were they key determinants in the selection of Project Coffee Regions. But there were other considerations as well which were taken into account when selecting the strategically important regions. The reasons why a particular area were of strategic importance to the SAN member and RA certification system varied from one country to the next. Some of these other considerations included increased chances of success (such as significant farmer or buyer interest), importance to the strategy of a SAN partner's certification program, and the possibility of increased co-financing.

### **Rating methodology**

A general information collection of the country's major coffee regions was collected first, as explained above. Each region was then analyzed to identify its biodiversity importance, the market demand situation for the coffee from each region, and the variety of strategic considerations which could be taken into account in the selection process. Each region was then rated against the selection criteria and given a score from 1 to 5.

## The Role of Sustainable Coffee Plantations in Preserving Globally-Important Biodiversity

Oliver Komar<sup>1</sup>

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### Summary

Biodiversity conservation in agricultural landscapes is a central goal in the cultivation of ecologically sustainable permanent crops. Coffee offers excellent opportunities for biodiversity conservation, when grown under a canopy of diverse, native shade trees and associated epiphytic plants. The tropical hillsides where coffee grows best are located in the midst of global biodiversity hotspots, within landscapes that are home to a spectacular array of native plants and wildlife, and large numbers of globally-threatened species. The opportunity to improve biodiversity conservation in these landscapes through global market-driven forces (e.g., via certified sustainable export of coffee) is especially important given recent instability of coffee prices and consequent risks to producer countries' protected areas.

The global biodiversity benefits from so-called "wildlife-friendly" coffee cultivation are numerous. Ecologically-sustainable coffee plantations can provide (1) a complex ecosystem supporting diverse

species; (2) habitat for restricted-range species of global conservation importance; (3) habitat for migratory species; (4) habitat for globally threatened species; (5) contribution to the ecological functionality of landscapes and their biological corridors; and (6) indirect benefits such as reduced pollution, increased soil and water conservation, climate regulation, and improved attitudes towards biodiversity.

A single ecologically-sustainable coffee plantation of moderate size can provide diverse natural resources for the maintenance of literally thousands of plant and animal species. Individual farms in the Neotropics (where most inventory studies have taken place), if managed appropriately, can maintain among the rows of coffee shrubs, nearly 300 species of wild plants, thousands of species of fungi and invertebrates (insects, spiders), and over 200 vertebrate species (amphibians, reptiles, mammals, birds), and more when natural forest reserves are maintained. The complex ecosystems of such sustainable farms prevent pest outbreaks and provide diverse ecological services that benefit farmers and local economies.

Such ecologically attractive farms are nonetheless highly disturbed habitats where globally threatened wildlife are scarce. Even so, a number of studies have demonstrated that sustainable coffee farms provide habitat for globally-important biodiversity. Many restricted-range "endemic" species found in just one or a few ecoregions live in shaded coffee plantations. In El Salvador, 64 percent of endemic birds are resident in coffee plantations. In Jamaica, 49 percent of the island's endemic bird species are found in coffee plantations. At least nine globally threatened wildlife species, including a tree frog and eight birds including three migratory species, live in Neotropical shaded coffee plantations. In fact, 15 Nearctic-Neotropical migratory bird species that winter in coffee plantations are on the North American Conservation Watch List. In total, 90 migratory bird species are reported to winter in Neotropical coffee plantations, where many are more abundant than in natural forest habitats. Given its extensive cultivation area in the world's biodiversity hotspots, coffee offers unparalleled opportunities for biodiversity conservation within agricultural landscapes.

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**Cultivating coffee (*Coffea arabica* and to a lesser extent *C. canephora*)** in an ecological sustainable agroecosystem, such as under a canopy of diverse shade trees, or in conjunction with forested stream borders and natural forest reserves, can conserve biodiversity while contributing to economic and social goals in agricultural landscapes (Perfecto et al. 1996, Donald 2004). Biodiversity conservation in unprotected, managed lands and in the agricultural landscape is important because protected areas (11.5 percent of the planet's land surface, Chape et al. 2003) are considered too small or not well enough protected to preserve the world's biodiversity by themselves (Western and Pearl 1989, Pimental et al. 1992, Franklin 1993, Moguel and Toledo 1999). The opportunity to improve biodiversity conservation in tropical montane landscapes through global market-driven forces (e.g., via certified sustainable export products such as coffee) is especially important given recent instability of global coffee prices, putting coffee-producing countries' economies and protected areas at risk.

In 2004, coffee (*Coffea* spp.) was cultivated on approximately 10.2 million ha of land globally (FAO 2005), including 3.9 million ha in South America, 1.6 million ha in Central America (including Mexico), and 0.3 million ha in the Caribbean region. More than half of the world's coffee production area, and most of the production area of *C. arabica*, is in the Neotropics. Estimates suggest that the overall land area under ecologically-sustainable (non-modernized) shaded coffee production in the Neotropics approaches 2 million ha (C. Wille, Rainforest Alliance, San José, Costa Rica, personal communication, 19 September 2005). Unless otherwise stated, sustainable plantations mentioned in this paper include commercial polyculture, traditional polyculture, or rustic production systems (*sensu* Moguel and Toledo 1999) or "coffee under remnant forest" and "multistrata polyculture" (*sensu* Somarriba et al. 2004).

The agroecosystem can also be considered ecologically sustainable with less attractive shade systems or no shade at all if significant natural habitat patches are maintained on the farm, either as biodiversity reserves or as stream buffers, and if wildlife extraction activities and pollution impacts from agrochemicals are minimized. To be so

considered, the agroecosystem should support the long-term presence of many wildlife species that help sustain the ecological integrity of surrounding landscapes as well as the farm (e.g., through pest control, pollination, and resource recycling). In 2003, the Sustainable Agriculture Network certified sun-coffee plantations in the Brazilian Cerrado because the farms offered 1:1 mitigation, protecting as much land for natural habitat conservation as they used for coffee production (C. Wille, Rainforest Alliance, San José, Costa Rica, personal communication, 21 September 2005). The global biodiversity benefits of such plantations are mainly in the extensive habitat patches set aside as nature reserves. The patches are often in landscapes with few or no protected areas, and thus provide important biodiversity refugia. In Brazil, a single certified farm protects nearly 3500 ha of native Cerrado habitat (Rainforest Alliance, unpublished documents). Such patches contain important biological resources and biodiversity, including habitat for long-distance and medium distance migratory birds, regionally endemic species with restricted ranges, and globally threatened fauna such as the Giant Anteater (*Myrmecophaga tridactyla*). The Brazilian Cerrado ecoregion is thought to have more than 10,000 plant species, more than 10,000 butterfly and moth species, and similarly impressive diversity in other taxa. Only 1.4 percent of the ecoregion is protected, despite 4400 plant species found nowhere else and more than 50 globally-threatened vertebrate species (Conservation International 2005).

A turning point for sustainable coffee occurred in 1996, with the organization of the first sustainable coffee congress (Rice et al. 1997). Since then, two principal programs have been developed to certify sustainable production, in order to promote environmentally-friendly coffee. The Rainforest Alliance Certified program, implemented by the Sustainable Agriculture Network, recognizes plantations that are ecologically, socially, and economically sustainable (Skinner 1997, Wille 2003). By 2005, >92,000 ha of coffee had been certified (C. Wille, Rainforest Alliance, San José, Costa Rica, personal communication, 21 September 2005). The Bird Friendly® coffee program has stricter standards regarding use of agrochemicals (i.e., producers must also have organic certification to qualify), and focuses only on the ecological aspects of farms; the program is facilitated by the Smithsonian Migratory Bird Center which trains independent auditors to carry out farm certifications. Other international programs exist to



certify social benefits to coffee farmers (fair trade certified) and agronomic practices (certified organic), but are less stringent with regard to ecological practices (Rice and McLean 1999).

Dietsch (2000) and Niessen et al. (2004) noted that most coffee production takes place within global biodiversity hotspots, areas with high numbers of endemic plant species and much reduced natural vegetation (Myers et al. 2000). This fact, in itself, does not imply importance for coffee plantations, as most forms of agriculture actually threaten biodiversity. Ecologically sustainable coffee production, however, potentially could benefit some biodiversity in hotspot regions, following reasoning presented herein. In 2004, approximately 98.4 percent of global coffee production area was located within 13 global hotspot regions (Table 1). Within the 13 regions combined, less than 5 percent of the original natural vegetation is adequately protected in national parks and reserves, mean population density is 138 people/km<sup>2</sup>, 124 species extinctions have been documented since the year 1500, more than 85,000 endemic plant species grow, and over 2090 endemic vertebrate species are globally threatened according to IUCN standards. A Neotropical subgroup (five hotspots) retains 19 percent of the original natural vegetation but only 4 percent is adequately protected. In these areas, mean population density is 73 people/km<sup>2</sup>, 48 species extinctions have been documented since the year 1500, almost 37,000 endemic plant species grow, and over 1140 globally- threatened endemic vertebrate species live. Despite numerous ecological studies, the extent to which coffee plantations may contribute or detract from the conservation of this important biodiversity is poorly understood. In the Neotropics alone, the area under coffee cultivation is 23 times larger than the area adequately protected.

Biodiversity conservation in coffee plantations has been reviewed regularly (Perfecto et al. 1996, Moguel and Toledo 1999, Dietsch 2000, Donald 2004, Somarriba et al. 2004), yet much new information has been published recently. Over 20 studies of biodiversity in coffee plantations were published in 2004 alone (Komar and Escobar 2005). With the exception of Dietsch (2000), none of the previous reviews have focused on global biodiversity conservation aspects of coffee cultivation.

Many observations and several experimental studies have demonstrated how diverse wild species and ecosystem processes (together, biodiversity) in coffee plantations benefit agricultural production and

farmers themselves, through pest control, pollination services, food and medicinal sources, and other uses (Le Pelley 1968 and citations within, Alcorn 1983, Greenberg et al. 2000, Roubik 2002, Soto-Pinto et al. 2002, Philpott et al. 2004, Perfecto et al. 2004, Ricketts et al. 2004). Evidence that biodiversity in plantations help make them sustainable seems irrefutable. Is the relationship symbiotic, or are species' services being used (by farmers) with no compensation? This review summarizes known benefits to biodiversity from the plantations, although I do not intend to argue that benefits provided are (or are not) sufficient, fair, or reasonable. Below, I expand upon the apparent global biodiversity benefits of traditional, shaded coffee plantations, without taking into account the added value of any natural habitat patches that may be maintained within or adjacent to the borders of plantations. Sustainable coffee cultivation provides a habitat that is rich in biodiversity, compared not only with other agricultural habitats but often even with natural forest habitats (Perfecto et al. 1996, Greenberg et al. 1997b). Although not as valuable as natural habitat for threatened species, sustainable coffee plantations can contribute to long-term conservation of many species over regional and multinational scales. I will demonstrate how shaded, sustainable coffee plantations appear to provide (1) a complex ecosystem with diverse resources; (2) habitat for restricted-range endemic species of importance to global biodiversity conservation; (3) habitat for long-distance migratory species; (4) habitat for some globally threatened species, and buffering for others; (5) a contribution to the ecological functionality of landscapes and their biological corridors; and (6) indirect benefits such as reduced pollution, increased soil and water conservation, climate regulation, and favorable social attitudes towards biodiversity.

## **Methodological notes**

In this paper, I examine the global and regional biodiversity benefits from ecologically sustainable coffee agroecosystems, based on literature published through March 2005. Details of the literature search are given elsewhere (Komar and Escobar 2005). Most research on this issue was generated in the Neotropics, and therefore I focus on that region. In comparing biodiversity associated with coffee cultivation to the biodiversity of other habitats, appropriate comparisons are with other agricultural habitats, yet most comparisons have been with the original natural forest

habitat. Sustainable coffee cultivation, no matter how many shade trees or wildlife species are present, is never going to be as beneficial as natural habitat for biodiversity (Rappole et al. 2003). In this paper, I avoided considering the relative harm to native biodiversity caused by conversion of natural forest to coffee cultivation, precisely because farmers are generally not in a position to opt for converting their plantations back to natural forest (Philpott and Dietsch 2003). Even if a coffee plantation becomes economically unsustainable, the majority of farmers in the developing countries where most coffee is grown will seek another economically productive use of the land or sell the land to investors who will do so, for financial reasons alone, rather than permit regeneration of natural forest. Throughout, I consider a “plantation” any patch of cultivation, including small holdings.

## **How sustainable coffee plantations benefit biodiversity**

### **Sustainable coffee production maintains a complex ecosystem with diverse resources for life.**

In some tropical montane areas of the world, coffee was traditionally grown as one of many sustainable crops in diverse gardens, which sometimes contained over 300 useful species that provided food, animal feed, construction materials, and medicines (Alcorn 1983). While such rustic gardens were ecologically sustainable, they were often economically unproductive, and largely have been replaced by more modern farms with higher production of cash crops like coffee. Nonetheless, many modern coffee plantations are also probably ecologically sustainable, frequently cultivating coffee under a diverse canopy of native tree species. Although canopy cover is often 30–60 percent, considerably less than the original forest cover (85–95 percent), many of the original ecosystem elements may still be present. The plantation overstory can include dozens of tree species in a single farm of small or moderate size (<100 ha), diverse epiphytic plants such as orchids and bromeliads, and a diverse canopy faunal community (Fig. 1). Furthermore, some of the original forest understory elements may still exist along streams and on especially steep hillsides, or in uncultivated forest reserves maintained by some plantation owners for a

variety of reasons. Brash (1987) credited ecologically diverse and sustainable shaded coffee plantations as serving as a refugia and gene bank for Puerto Rico’s biodiversity in the early twentieth century when the original natural forest habitat was reduced to under 1 percent of the island, but shaded plantations covered 9 percent of the island.

**Plants.** Sustainable coffee plantations can maintain a remarkably diverse plant community. Monro et al. (2002) described 261 tree species from El Salvador plantations, where over 130 native tree species have been found providing shade on a single coffee farm (R. Rivera, *in litt.*) and up to 39 species provide shade within 0.5 ha of coffee production (author’s unpublished data). Thus, in El Salvador, about 22 percent of tree species (Linares 2005) persist as shade in coffee plantations. Monro et al. (2001) identified 38 fern species in Salvadoran coffee plantations, 11 percent of the country’s ferns. Hietz (2005) found 89 epiphyte species in Veracruz coffee plantations, representing 72 percent of the forest epiphyte diversity in the area. The epiphytic bromeliads, orchids, mistletoes, and other types of plants were not just holdovers from the original forest, doomed to eventual extirpation. Plantations with only planted canopy trees (non-original forest cover) still contained 60 percent of the area’s epiphyte species. Another study in Veracruz found a healthy epiphytic orchid population in a shaded plantation, with nearly 10,000 individuals/ha (Solís Montero et al. 2005). The diversity of herbaceous ground cover plants is reported as varying from 20 to 90 species in individual coffee farms (studies reviewed by Somarriba et al. 2004), although a plantation in Guerrero, México, had 101 herbaceous species (Moguel and Toledo 1999). Thus a single farm could have over 300 different plant species within the coffee production area.

**Fungi.** Diverse fungal flora live in coffee plantations, including moulds, mushrooms, symbiotic fungi (such as those that form part of lichens and vesicular arbuscular mycorrhizae), and fungal parasites and diseases of both floral and faunal species. Unfortunately, no fungal inventory of a coffee plantation is readily available, but fungal richness of a single shaded plantation (of any size) is probably in the hundreds of species. One study in Colombia identified 20 species of vesicular arbuscular mycorrhizae in coffee roots

alone (Bolaños et al. 2000, cited in Somarriba et al. 2004).

**Arthropods.** Large numbers of insects and spider species have been documented from shaded coffee plantations (Table 2), but no single farm has been completely inventoried. In a world-wide summary of coffee pests, Le Pelley (1968) listed approximately 850 insect species found to attack the coffee plant itself, although just a few of these species were considered serious pests. He also listed nearly 400 insect species known to prey on or parasitize the pest species. The actual arthropod richness in coffee plantations with diverse shade canopies is probably orders of magnitude higher, given that arthropod diversity of tropical agroecosystems in general can range up to 1000 species/ha (Pimental et al. 1992). Comparisons of arthropod diversity among natural forest and different types of coffee plantations have found higher diversity in traditional shaded plantations, compared both to natural forests and to modern “technified” shade or sun plantations (Perfecto et al. 1996 and citations within; Perfecto et al. 1997; Pineda et al. 2005). Few shaded plantations suffer from arthropod pest infestations, and this large diversity appears to form part of a functional ecosystem that prevents population explosions or pest outbreaks (Perfecto et al. 1996 and citations within; Greenberg et al. 2000, Perfecto et al. 2004). As such, diverse arthropod fauna contributes to economic sustainability, as well as ecological sustainability, of coffee farms.

Arthropods have rarely been evaluated for specific conservation importance (e.g., threatened, endemic, or migratory status). Thus, this group features little in the discussions presented below about conservation importance of coffee for biodiversity. Nonetheless, the huge diversity of the world’s arthropods, many of which are ecologically poorly understood or as yet undescribed to science, suggests that this group may in fact be of paramount conservation importance, especially because of ecosystem services they provide, on which human ecology frequently depends. Until arthropod distribution, taxonomy, and ecology are considerably better understood, it may be reasonable to assume that any organic or low-input agriculture is relatively valuable for the conservation of biodiversity, with respect to high-input, modern agriculture.

**Vertebrates.** Individual shaded coffee plantations, even those located far from natural forest habitats, are likely to have a vertebrate fauna of over 200 species. Pineda et al. (2005) reported 13 amphibian species from three plantations in Veracruz, Mexico. Leenders and Watkins Colwell (2004) documented 13 species of amphibians and reptiles in two Salvadoran shade coffee plantations, but a complete inventory of any sustainable plantation in that country would likely record more than 20 species (author’s unpublished data). Gallina et al. (1996) documented 24 medium-sized mammals in coffee plantations of Barranca Grande, Veracruz, including charismatic species such as puma (*Felis concolor*), margay (*Leopardus weidii*), tamandua anteater (*Tamandua mexicana*), and river otter (*Lutra longicaudus*). McCann et al. (2003) counted about 900 Mantled Howler Monkeys (*Alouatta palliata*) in approximately 2500 ha of shaded coffee in Nicaragua. Along a 1-km transect of a shaded plantation of Chiapas, Cruz-Lara et al. (2004) captured 42 mammal species, including seven medium-sized, 25 bat, and 10 other small mammal species. Thus, even fairly small, sustainable shaded plantations in Mesoamerica are likely to contain at least 50 medium and small mammal species, more if they are near sizeable natural forest patches.

Many studies of birds in Neotropical regions, reviewed in Donald (2004) and Komar (in press), have shown that more species of birds live in complex shade coffee ecosystems than in simple sun coffee ecosystems or other agricultural habitats. Actual species richness may even be higher in some shaded plantations than in nearby forest habitats, in part a result of disturbance opening up the original ecosystem to colonization by generalist and open-habitat species (Komar in press). I caution that high species richness or even abundance does not alone indicate that a habitat is high quality or beneficial (van Horne 1983, Pulliam 1988, Latta and Baltz 1997, Gordon and Ornelas 2000, Komar 2003, Rappole et al. 2003); for some species, sustainable coffee plantations could represent a sink habitat. Coffee plantations in Mexico and Central America with diverse-species shade canopies typically have 80–120 bird species (Calvo and Blake 1998, Tejeda-Cruz and Sutherland 2004, author’s unpubl. data). Plantations close to natural forests may have even more. Jones et al. (2002) documented 191 bird species from several Venezuelan shaded coffee plantations. No overall bird species list for coffee has been published, but 10–20 percent of the world’s terrestrial bird species likely live in or visit

shaded coffee plantations. Shaded coffee plantations can be used by both forest birds and open-area (field) species. The coffee shrubs themselves serve as nesting habitat for open area foragers such as doves and sparrows (Cintra 1988). In Costa Rica, coffee bushes provided higher avian nesting success than other plants within the same plantation (Lindell and Smith 2003).

### **Restricted-range endemic species**

Many of the world's coffee-growing areas happen to also fall within priority conservation areas known as biodiversity hotspots (Myers et al. 2000). These areas have exceptionally high numbers of species, in part because of the presence of many restricted-range (hereafter, "endemic") species, each found in a small area of the world and nowhere else. Most areas where many endemic species are found together are also biodiversity hotspots, and also happen to be tropical areas where coffee is grown in middle elevations (Dietsch 2000). In most areas, lists of species living in coffee plantations are not readily available, so it is impractical to examine how many endemic species also live in coffee plantations. Therefore, as an example, I examine the question for birds in a small area in El Salvador known as the Sierra de Apaneca, an area of about 96,000 ha which includes several montane forest fragments (totaling 9000 ha), extensive coffee agroecosystems (80,000 ha), and miscellaneous other land uses (7000 ha). Eleven bird species restricted to the montane forests of northern Central America occur in the Sierra de Apaneca (Komar 2002). At least seven, or 64 percent, are also resident in the area's coffee plantations (author's unpublished data; they include White-bellied Chachalaca *Ortalis leucogaster*, Pacific Parakeet *Aratinga strenua*, Rufous Sabrewing *Campylopterus rufus*, Green-throated Mountain-gem *Lampornis viridipallens*, Bushy-crested Jay *Cyanocorax melanocyaneus*, Blue-and-white Mockingbird *Melanotis hypoleucus*, and Bar-winged Oriole *Icterus maculialatus*). Even if sub-optimal habitat for these species of conservation importance, coffee plantations could play a role in facilitating these species' dispersal and gene flow among forest fragments. In another example, Johnson (2000) reported 17 of 35 (49 percent) Jamaican endemic bird species in coffee plantations.

### **Migratory species**

Migratory species are generally of conservation concern because each depends on a variety of habitats in many different geographical areas, thus potential threats are multiplied (Robbins et al. 1989). Concerns that the widespread conversion of traditional coffee farms to technified plantations was linked to declines of migratory songbirds (Tangley 1996) drove the sustainable coffee movement and development of certification programs (Wille 2003). Research has targeted migratory birds wintering in Neotropical coffee plantations, with at least 26 papers published between 1992 and 2004 (Komar, in press). Oddly, no research has reported on migratory birds in Paleotropical coffee plantations, or on other kinds of migratory fauna (butterflies, bats) in any coffee plantations. At least 90 species of migratory hawks, flycatchers, vireos, thrushes, warblers, and other types of terrestrial birds that breed in North America readily occupy shaded coffee plantations as feeding areas in winter or during migration (Komar, in press).

A number of studies have shown an apparent preference of migratory birds for shaded coffee plantations, with higher abundance and species richness even than natural forest (Robbins et al. 1992, Wunderle and Latta 1996, Greenberg et al. 1997b, Petit et al. 1999, Tejeda-Cruz and Sutherland 2004). In some coffee plantations in the Greater Antilles, Mexico, and northern Central America, 45–50 percent of the "winter" bird population consists of migrants (Greenberg et al. 1997b, Johnson 2000). Mean densities of nearly 25 migrants/ha in Chiapas plantations (Greenberg et al. 1997b) may be even higher if corrected for detectability, but appropriate correction factors are unknown. Densities should be lower in South American plantations due to range limitations of migratory birds. Many migrants set up feeding territories in plantations, which they defend during six months of the year. Overwinter survival appears comparable to available natural habitats in at least four warbler species (Wunderle and Latta 2000, Strong and Sherry 2000, Johnson and Sherry 2001). Mexican and Central American coffee plantations also are used by transient species *en route* between North and South America, such as Alder Flycatcher (*Empidonax alnorum*), Olive-sided Flycatcher (*Contopus cooperi*), Blackburnian Warbler (*Dendroica fusca*), and Canada Warbler (*Wilsonia canadensis*) (Aguilar Ortiz 1982, author's unpublished data). Fifteen long-distance migratory species recorded in Neotropical coffee plantations are considered of high conservation importance (Table 3), although it is unknown if

plantations have positive or negative impacts on these species' populations, and several only use the plantations peripherally (Komar, in press).

### Endangered species

Relatively few globally threatened species (i.e., species classified as vulnerable, endangered, or critically endangered on the IUCN Red-list, IUCN 2004) have been reported from coffee plantations. Where such species occur in anthropogenically-altered habitats, they tend to be rare and difficult to study. The critically endangered Black-eyed Tree Frog (*Agylychnis moreletii*) is abundant, however, in some coffee plantations in El Salvador (author's observations). At least eight globally threatened bird species are reported from Neotropical coffee farms (Table 4), including three long-distance migrants. While two of the migrants only use plantations peripherally, Cerulean Warbler (*Dendroica cerulea*) densities approach one individual/ha in some Venezuelan coffee plantations (Jones et al. 2000). All nine threatened species listed in Table 4 were found in shaded plantations, but not sun plantations.

Several threatened mammals were reported from African coffee plantations (Le Pelley 1968), but details about habitat use or plantation type were not given, and such occurrences may only be incidental in plantations adjacent to (or within?) nature reserves. These species include African Elephant (*Loxodonta africana*), rhinoceros (genus and species not reported), Red Colobus (*Procolobus badius*), and possibly Black Colobus (*Colobus satanas*). In Java, the vulnerable Pig-tailed Macaque (*Macaca nemestrina*) eats coffee cherries (La Pelley 1968).

The transformation of natural forest or rustic coffee plantations to non-sustainable, low shade plantations is frequently criticized as contributing to the demise of threatened wildlife through habitat loss (e.g., O'Brien and Kinnaird 2004). Conversely, and despite lack of quantitative information, sustainable coffee plantations are sometimes praised as providing habitat for threatened species (not well supported in the literature), or buffers to key reserves for endangered species. Praise for a buffer effect is supported by theoretical considerations that assume that shaded plantations are preventing further forest destruction (Dietsch et al. 2004), preventing incursion of predators or other negative edge effects into reserves, and also that plantations are promoting dispersal and gene flow among populations through a

rescue or corridor effect (Vandermeer and Carvajal 2001).

### Landscape and corridor functions

Perfecto et al. (1996) proposed that a key role of shaded coffee plantations was the conservation of biodiversity in regions particularly hard-hit by deforestation, and with relatively few protected areas. In such areas, traditional shaded coffee plantations can serve as a gene bank until rural economies allow for forest regeneration (Brash 1987, Nir 1988). This concept remains valid today, and may increase in importance as human population densities continue to increase in coffee-growing landscapes and natural habitat continues to disappear at alarming rates.

The natural ecosystem elements within sustainable coffee plantations (diverse tree species, moderately closed canopy, natural forest patches, forested stream buffers) probably contribute to landscape quality and the functionality of biological corridors. Even if these disturbed habitats are less than ideal for species of special conservation concern, they may facilitate movement among habitat patches and aid in the conservation of genetic diversity within the broader landscape. This section treats the theoretical benefits provided by sustainable coffee plantations to forest species not normally found in plantations. As mentioned earlier, some globally threatened and endemic species occur in shaded coffee plantations. These species may benefit from the corridor services of sustainable coffee plantations without using them frequently or even regularly. The corridor services potentially provided include: (1) increased movement for seasonal migrations; (2) increased dispersal events; (3) facilitation of gene flow among populations (conservation of genetic diversity); and (4) maintenance of metapopulations.

As mentioned in the section on migratory species, coffee plantations serve as a destination for migratory birds. Perhaps even more important, they also serve as stopover sites during migration (e.g., Aguilar Ortiz 1982). That is, they help form the corridor of stopover feeding areas that migratory birds depend on to reach distant breeding or wintering areas. Locally resident forest birds also visit shaded coffee plantations seasonally to forage, not breed (Aguilar Ortiz 1982, Greenberg et al. 1997b, author's unpublished data). Numerous mammal species in shaded coffee plantations may also represent seasonal presence of animals that breed in nearby forest patches (Somarriba et al. 2004). Whether such visits are due to local

migrations or dispersal, shaded plantations may help maintain local forest wildlife populations. The plantations can serve as movement corridors for forest bird and mammal species involved in altitudinal or other local migrations, common phenomena in tropical regions.

Similarly, shaded coffee plantations may facilitate dispersal of forest animals and plants across a landscape. Dispersal is a natural ecosystem function, in which young plants (i.e., seeds) and animals leave their natal areas to avoid competition with their parents. Plant seeds can be dispersed significant distances by animal carriers. This process contributes to gene flow, genetic diversity, and colonization of new habitat patches. One study demonstrated the potential for shaded coffee plantations to serve as a dispersal corridor for forest birds. Researchers placed radio transmitters on fledgling White-throated Robins (*Turdus assimilis*) born in a Costa Rican pasture bordered by natural forest and by shaded coffee plantation (Cohen and Lindell 2004). All of the fledglings dispersed into the forest, their natural foraging habitat. Some of the fledglings moved first into the shaded coffee plantation, demonstrating that to these birds, the plantation was attractive as a dispersal corridor. Unfortunately, most of the predation events recorded in the study occurred in the plantation. In this sense, the coffee plantation appeared to be a higher risk corridor than the natural forest.

Biological corridors are often proposed as a mechanism to conserve genetic diversity, through facilitation of gene flow among populations. While proposals to link forest fragments using wildlife corridors usually refer to corridors of natural habitat (e.g., Harrison 1992, Hill 1995), such corridors could be provided by agroecosystems (Franklin 1993). The long-term survival of species in habitat fragments may depend on genetic diversity that permits adaptation to a changing environment (Templeton et al. 1990). A truly sustainable coffee plantation should incorporate enough canopy cover to assist the conservation of natural ecosystems by functioning as a biological corridor, permitting gene flow among isolated populations of forest species. The dispersal opportunities provided by such a corridor would also help maintain metapopulations across the landscape as well as increase species richness in forest fragments (Merriam 1992, Hanski 1999, Vandermeer and Carvajal 2001). Genetic theory holds that genetic diversity can be maintained across subpopulations by dispersal events

as rare as one dispersing individual every generation (Wang 2004). Thus, adequate gene flow can be achieved even when the dispersal event is so rare as to be virtually undetectable.

### **Environmental and social benefits of sustainable coffee provide indirect biodiversity benefits.**

Environmental and social benefits from sustainable plantations include increased nitrogen fixation, increased soil and water conservation, reduced pollution, increased climate regulation, improved economic sustainability, improved education and health services (required by some certifiers), and improvements in social attitudes about biodiversity (Wille 2003, Philpott and Dietsch 2003). All may indirectly benefit biodiversity. Experiments showed that dangerous leaching of fertilizer byproducts was about a third less in shaded plantations than in sun plantations (Babbar and Zak 1995). Furthermore, in many sustainable plantations, fertilizer use is much reduced. Leaching of agrochemicals into ground water is a threat to both humans and wildlife (Papendick et al. 1986). Climate regulation is also important for biodiversity conservation. As global climate change accelerates, species are forced to adapt to changing environments causing shifting of potential ranges and unfamiliar community composition (Peterson et al. 2002, Root et al. 2003). Reducing the rate of climate change provides species more time to adapt, potentially averting local extinctions. Deforestation not only destroys habitat but leads to dessication within nearby forests (Lawton et al. 2001). Maintaining sustainable, shaded coffee plantations thus counters the effects of deforestation, softening the impact of global climate change on nearby forest patches. Shaded coffee plantations benefit biodiversity, compared to deforested agricultural habitats, in another sense. The forest-like canopies make wildlife and plant populations less vulnerable to storm damage (Wunderle et al. 1992). Improved economies and education, and shifts in social attitudes about wildlife should increase conservation actions and reduce hunting or habitat destruction.

### **Conclusions**

Ecologically sustainable coffee plantations provide several important benefits to biodiversity. These include habitat for thousands of plant and wildlife

species, far more than open sun plantations or other farms that lack a diverse canopy of shade trees or significant forest reserves. Many of these species are regionally endemic, restricted to the world's biodiversity hot-spots, and frequently suffer from a shortage of natural habitat in the regions where coffee is grown. A few globally threatened species have been documented using coffee plantations as habitat, although no data is available on the relative quality of the habitat for these species. Sustainable coffee plantations appear to be a high-quality habitat for dozens of long-distance migratory bird species, which often have higher densities in the plantations than in nearby natural forest. Furthermore, sustainable coffee plantations probably serve an important role in facilitating dispersal and migration of forest species across landscapes, helping to maintain genetic diversity of threatened and near-threatened forest specialist species. In some cases, traditional coffee plantations have probably served as a gene bank for the future recolonization of successional habitats. Finally, the social and environmental benefits that come with sustainable coffee certification efforts can help reduce hunting pressure, contamination, deforestation, climate change, and other agricultural impacts that adversely affect biodiversity in coffee-growing regions.

Biodiversity research is still needed in coffee plantations. Biodiversity information is generated by taxonomic inventories, and indeed a fair amount of inventory work has taken place on plantations, sometimes documenting new species for science (a frog, fungi, and several insects recently; McCranie and Köhler 1999, San Martín and Lavin 1999, Morón and Solís 2001, Gauld et al. 2002, Peterson et al. 2003). Nonetheless, few inventories have demonstrated completeness (e.g., by species accumulation curves reaching asymptotes), and in most cases not all species, even within a single higher level taxon, were recorded (frog diversity reported by Pineda et al. 2005 is an exception). Furthermore, few multi-taxon surveys have been carried out on individual farms. Thus, much more inventory work is needed to describe the biodiversity present on coffee farms. Almost no studies exist of productivity and population trends for species that reproduce in coffee plantations. Nor have effects been evaluated adequately of many agrochemicals on non-pest species in coffee plantations. Most of the available literature does not evaluate the conservation or sustainability of biodiversity. Little is known about how many species live sus-

tainably (successfully) in coffee plantations, or how management practices within plantations can affect diverse wildlife species.

Despite the need for more information, it seems safe to conclude that few agricultural crops offer the opportunities for biodiversity conservation that sustainable coffee offers, because of the option of growing coffee under a canopy formed by diverse, native tree species, each of which in the tropics practically forms an ecosystem unto itself. Nearly 2 million ha of coffee production are probably sustainably managed in northern Latin America alone, although only a fraction (perhaps <10 percent) is currently certified sustainable. Coffee's geographical range, which coincides largely with the world's biodiversity hot-spots, suggests that coffee's impact on global biodiversity may be disproportional to its production area (Donald 2004). Most cash crops (sugar, corn, rice, bananas, oil palm, cattle, etc) grown for export in the tropics require more intensive production methods that are considerably less attractive for biodiversity and cause greater negative environmental impacts (Donald 2004). Conservationists should be seeking opportunities for biodiversity conservation in the landscape matrices around and between key protected nature reserves. Sustainable coffee cultivation provides such opportunities. With the exception of natural habitat protection, no better way has presented itself for conserving biodiversity within the agricultural landscape of middle elevations of many Neotropical countries.

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Table 1. General statistics of 13 global biodiversity hotspots (source: Conservation International 2005) where 98.4 percent of the world's coffee production area is located. The possible role of sustainable coffee plantations in the conservation of biodiversity in these hotspots is discussed in the text.

	Hotspot original extent (km <sup>2</sup> )	Hotspot vegetation remaining (km <sup>2</sup> )	Area protected (km <sup>2</sup> )	Area protected (km <sup>2</sup> ) in IUCN categories I-IV	Area of coffee cultivation (FAO 2005) <sup>a</sup>	Human population density (people/km <sup>2</sup> )	Endemic plant species	Endemic threatened birds	Endemic threatened mammals	Endemic threatened amphibians
Mesoamerica	1,130,019	226,004	142,103	63,902	1,609,495	72	2,941	31	29	232
Tropical Andes	1,542,644	385,661	246,871	121,650	1,550,059	37	15,000	110	14	363
Cerrado (Brazil)	2,031,990	438,910	111,051	28,736	2,386,461 <sup>b</sup>	13	4,400	10	4	2
Atlantic Forest (Brazil)	1,233,875	99,944	50,370	22,782		87	8,000	55	21	14
Caribbean Islands	229,549	22,955	29,605	16,306	285,566	155	6,550	48	18	143
Neotropical hotspots combined	6,168,077	1,173,474	580,000	253,376	5,831,581	73	36,891	254	86	754
Guinean Forests of West Africa	620,314	93,047	108,104	18,880	812,360	137	1,800	31	35	49
Eastern Afrotropics	1,017,806	106,870	154,132	59,191	1,008,000	95	2,356	35	48	30
Madagascar and the Indian Ocean Islands	600,461	60,046	18,482	14,664	194,665	32	11,600	57	51	61
Western Ghats and Sri Lanka	189,611	43,611	26,130	21,259	341,500	261	3,049	10	14	87
Indo-Burma (includes Vietnam)	2,373,057	118,653	235,758	132,283	618,256	134	7,000	18	25	35
Sundaland	1,501,063	100,571	179,723	77,408	1,118,603 <sup>b</sup>	153	15,000	43	60	59
Wallacea	338,494	50,774	24,387	19,702		81	1,500	49	44	7
Philippines	297,179	20,803	32,404	18,060	131,353	273	6,091	56	47	48
All hotspots combined	13,106,062	1,767,849	1,359,120	614,823	10,056,318	138	85,287	553	410	1,130

<sup>a</sup>The areas given are estimated based on country statistics, assuming that a country's entire coffee production area fell within the limits of the biodiversity hotspots.

<sup>b</sup>Coffee area figure for Cerrado includes Atlantic Forest, and figure for Sundaland includes Wallacea.

Table 2. Examples of arthropod diversity reported from shaded coffee farms.

Taxa	Study area	Species richness	Sources
Diverse arthropod taxa	A single Mexican farm, coffee shrub layer	609	Ibarra-Núñez 1990
Spiders (Araneae)	10 coffee shrubs from a single Costa Rican coffee farm	44	Perfecto et al. 1996
Spiders (Araneae: Araneidae, Tetragnathidae, Theridiidae)	Soconusco region of Chiapas, Mexico	87	Ibarra Núñez and García Ballinas 1998
Diverse insect taxa	A single Costa Rican coffee farm	322	Somarriba et al. 2004
Auchenorrhyncha leafhoppers (Homoptera)	Farms in Turrialba, Costa Rica	130	Rojas et al. 2001
Termites (Isoptera)	World	16 that attack coffee bushes	Kashyap et al. 1984
Ants (Formicidae), other Hymenoptera, and beetles (Coleoptera)	A single canopy tree in a Costa Rican shaded farm	259 (30 ants, 103 other hymenoptera, 126 beetles)	Perfecto et al. 1996, 1997
Pimplinae wasps (Hymenoptera, Ichneumonidae)	El Salvador coffee district	50	Gauld et al. 2002
Scale insects and mealybugs (Homoptera, Coccoidea)	World	116 that attack coffee bushes	Le Pelley 1968
Butterflies (Lepidoptera)	A single Colombian coffee farm	168	Botero and Baker 2001

Table 3. Migratory birds reported from Neotropical coffee plantations and listed on the North American Continental Watch List, because of population declines and unabated threats to their breeding or wintering habitats (source: Rich et al. 2004). Some are rare or peripheral in coffee plantations. No data is available for migratory birds in Paleotropical coffee plantations.

Species	North American breeding biome	Wintering region	Global population estimate
Olive-sided Flycatcher ( <i>Contopus cooperi</i> )	Northern forests (>1 biome)	South America	1,200,000
Bicknell's Thrush ( <i>Catharus bicknelli</i> )	Northern forest	Hispaniola	40,000
Wood Thrush ( <i>Hylocichla mustelina</i> )	Eastern forest	Central America	14,000,000
Blue-winged Warbler ( <i>Vermivora pinus</i> )	Eastern forest	Central America and n. South America	390,000
Golden-winged Warbler ( <i>V. chrysoptera</i> )	Eastern forests (>1 biome)	Central America and n. South America	210,000
Golden-cheeked Warbler ( <i>Dendroica chrysoparia</i> )	Southwest (Juniper forests of c. Texas)	Pine-oak forests of n. Central America	21,000
Hermit Warbler ( <i>D. occidentalis</i> )	Pacific forest	Pine-oak forests of Mexico and northern C. America	2,400,000
Prairie Warbler ( <i>D. discolor</i> )	Eastern forest	Greater Antilles	1,400,000
Bay-breasted Warbler ( <i>D. castanea</i> )	Northern forest	Northern South America	3,100,000
Cerulean Warbler ( <i>D. cerulea</i> )	Eastern forest	N. Andes of South America	560,000
Worm-eating Warbler ( <i>Helmitheros vermivorum</i> )	Eastern forest	Central America	750,000
Swainson's Warbler ( <i>Lymnothlypis swainsonii</i> )	Eastern forest	Caribbean basin	84,000
Kentucky Warbler ( <i>Oporornis formosus</i> )	Eastern forest	Central America	1,100,000
Canada Warbler ( <i>Wilsonia canadensis</i> )	Northern forest	South America	1,400,000
Painted Bunting ( <i>Passerina ciris</i> )	SW and SE forests (>1 biome)	Central America	3,600,000

Table 4. Globally-threatened species recorded in Neotropical shaded coffee plantations. Some may only use plantations peripherally.

Species	IUCN threat status	Countries where reported in coffee farms	Sources
Black-eyed Tree Frog ( <i>Agalychnis moreletii</i> )	Critically Endangered	El Salvador	Leenders and Watkins-Colwell (2004)
Hispaniolan Parrot ( <i>Amazona ventralis</i> )	Vulnerable	Dominican Republic	Wunderle and Latta (1996)
Hispaniolan Parakeet ( <i>Aratinga chloroptera</i> )	Vulnerable	Dominican Republic	Wunderle and Latta (1996)
Three-wattled Bellbird ( <i>Procnias tricarunculatus</i> )	Vulnerable	Honduras	Bonta (2003)
Bicknell's Thrush ( <i>Catharus bicknelli</i> ) <sup>a</sup>	Vulnerable	Dominican Republic	Wunderle and Latta (1996)
Golden-cheeked Warbler ( <i>Dendroica chrysoparia</i> ) <sup>a</sup>	Endangered	Mexico	Dietsch (2000)
Cerulean Warbler ( <i>D. cerulea</i> ) <sup>a</sup>	Vulnerable	Colombia, Venezuela	Botero et al. (1999), Jones et al. (2000)
Azure-rumped Tanager ( <i>Tangara cabanisi</i> )	Endangered	Mexico	Dietsch (2000)
Turquoise Dacnis ( <i>Dacnis hartlaubi</i> )	Vulnerable	Colombia	Botero and Verhelst (2001)

<sup>a</sup>Long-distance migratory species.

## Figure Legends

Figure 1. A shaded coffee plantation in Nicaragua, with epiphyte-laden shade trees (photo Roberto Rivera/SalvaNATURA).



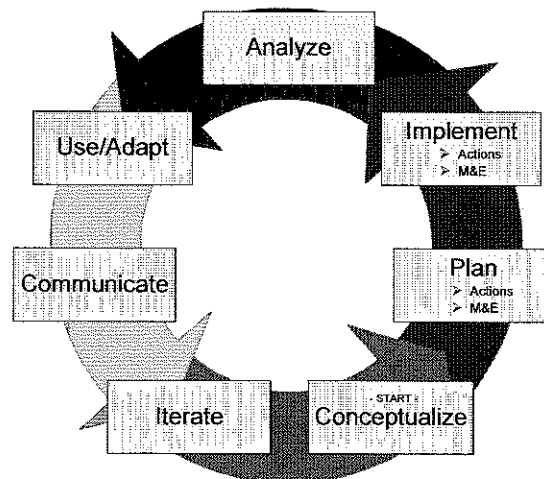
## Part (Annex) XII: Adaptive Management and Learning

Through this project Rainforest Alliance (RA) and the Sustainable Agriculture Network (SAN) will use adaptive management to significantly improve their ability to promote sustainable coffee farming and assess the impact of their activities. More specifically, RA/SAN will: test assumptions regarding the promotion of certification activities and the certification standards themselves; improve how they promote coffee certification; deepen the measurement and analysis of their impact on coffee farms; and, in certain locations, go beyond the farm level to examine the cumulative effects of certification at the landscape level.

During the PDF-B, RA/SAN worked with Foundations of Success (FOS), a not-for-profit organization committed to working with practitioners to learn how to promote environmental conservation better through the process of adaptive management. FOS explained the principles of adaptive management and assisted selected RA/SAN staff to clearly articulate conservation strategies, and the associated monitoring and evaluation plans, to address the primary threats to biodiversity in coffee producing areas. These strategies are inherent in the certification standards, but RA/SAN had not delineated them explicitly. In order to do so, FOS and RA/SAN first developed a "generic conceptual model" that can be applied to most coffee landscapes. They then adapted this model to develop strategies for a specific location in El Salvador, as a pilot for how this approach will be used in other countries during the course of the requested large-scale project.

Adaptive management has been gaining popularity in the mainstream conservation community in recent years. This concept advocates an explicitly experimental – or "scientific" – approach to managing conservation projects as outlined in the following definition: Adaptive management incorporates research into conservation action. Specifically, it is the integration of design, management, and monitoring to systematically test assumptions in order to adapt and learn. FOS advocates a number of steps in the process of adaptive management, depicted in the following project cycle diagram:

### Generalized Project Management Cycle





These steps can be defined as follows:

START: Clarify the organization's mission

STEP 1: Design a conceptual model based on local site conditions

STEP 2: Develop a management plan: goals, threats, objectives, and activities; develop a monitoring plan

STEP 3: Implement management and monitoring plans

STEP 4: Analyze data

STEP 5: Use the findings to make strategic adjustments

STEP 6: Communicate results to relevant stakeholders and external audiences

STEP 7: Iterate the process by using the findings and stakeholder feedback to modify the conceptual model and strategic plan as necessary

FOS is currently working with a number of international conservation organizations that are committed to using adaptive management to develop better ways to design, manage, and measure the impacts of their conservation actions. A number of these organizations<sup>1</sup> have formed a collaborative initiative, called Conservation Measures Partnership (CMP), to work on issues related to impact assessment and accountability. As part of this initiative, CMP has developed The Open Standards for the Practice of Conservation that bring together common concepts, approaches, and terminology in conservation project design, management, and monitoring in order to help conservation practitioners improve their actions. The standards are intended to provide the steps, principles, tasks, and guidance necessary for the successful implementation of conservation projects. They are also designed to facilitate comparison of strategies and results and learning among CMP members, and other conservation organizations.

The decision to use adaptive management constitutes a significant departure for RA/SAN as it acknowledges the need to: more explicitly examine a number of assumptions about their sustainable agriculture operations, collect additional information at the farm level to better understand and measure the impact of the changes associated with obtaining certification, and develop strategies to conserve biodiversity at the landscape level, when appropriate.

During the requested project, RA/SAN plan to use adaptive management to improve how they promote sustainable agriculture by being more analytical and specific about the factors they believe are responsible for motivating coffee farms to be interested in their certification programs in the first place and then taking the necessary steps to comply with the standards. Based on this analysis, RA/SAN will test various alternatives for providing training and generalized technical assistance to these potential clients in order to determine which forms of assistance are most effective, for various categories of farms in the five project countries.

RA/SAN will also collect additional information on a sample of farms, beyond the scope of the traditional certification process, in order to determine with greater precision and certainty the impact that the various required management changes have on socio-economic and environmental factors and conditions. This information, in turn, will be used to inform periodic meetings held with international and local stakeholders regarding modifications to the definition and interpretation of the certification standards. By increasing the type and extent of data collection and analysis, and then sharing the findings with various interested parties, RA/SAN believe it should be possible to further streamline and improve the certification standards and process, making the entire system more effective.

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<sup>1</sup> Core members include the African Wildlife Foundation, Conservation International, The Nature Conservancy, Wildlife Conservation Society and World Wide Fund for Nature/World Wildlife Fund; collaborators include The Cambridge Conservation Forum, Enterprise Works Worldwide, World Commission on Protected Areas/IUCN and FOS, which serves as the coordinator of CMP

In addition to increasing the level of on-farm information and analysis, RA/SAN will also identify a number of priority landscapes in which they will develop broader conservation strategies and more extensive monitoring and evaluation plans. These landscapes will be selected based on two separate but related general criteria: they will either be 1) regions that SAN members have already identified as important for achieving their biodiversity conservation goals within their respective countries, and where coffee farming is a significant economic activity, (and/) or 2) coffee growing regions in which a significant percentage for the total coffee farm area is either already certified by RA/SAN or in the process of being certified and where significant biodiversity exists.

In the first situation, the SAN members have already committed to focusing a greater level of time and resources to achieving conservation goals and to concentrating efforts to promote sustainable agricultural practices with farmers in the selected locations. In the second situation, RA/SAN will jointly determine when a critical mass of certified coffee farms in a given area has been achieved in order to make a plausible “cause and effect” relationship between the cumulative actions of RA/SAN-certified or “in process” farms and impacts at the landscape level. While RA/SAN have not yet determined what percentage of land needs to be certified, or “in process”, before a “tipping point” is reached and synergistic interactions and results begin to occur beyond the farms themselves, common sense would seem to suggest that such changes would begin to occur when 20 to 25 percent of the coffee farm area in a given location has been certified or is “in process”.

Based on recent trends of increased demand for RA/SAN-certified coffee, RA/SAN believe that the number and area of certified coffee farms will expand rapidly in the five project countries in the short- to medium-term. As clusters of certified/in process farms begin to emerge in given regions, RA/SAN will, therefore, analyze the potential for selecting these areas as priority conservation sites and then launch more concerted certification promotional efforts in those regions that have good potential. Over time, they will also develop landscape-level conservation plans and conduct baseline assessments to document the prevailing conditions and threats to biodiversity in the areas.

During the PDF-B, RA/SAN conducted preliminary analysis in each of the five countries to identify such potential priority sites. In El Salvador, the SAN partner, SalvaNatura, had already identified the Apeneca Biological Corridor as a priority conservation site and FOS worked with RA and SalvaNatura staff to develop a specific conservation strategy and associated monitoring and evaluation plan for the area (described in detail in Annex 2). During the early phase of the requested project, RA/SAN will collect baseline information in the Apeneca Corridor and also select several other priority conservation sites in the other project countries. They will then replicate the planning process conducted in El Salvador to develop landscape-level conservation strategies and monitoring and evaluation plans.

As the conservation strategy and monitoring and evaluation plan for the Apeneca Corridor in El Salvador indicate, RA/SAN will go significantly beyond their current level of data collection and analysis. Over time, as this additional information is made available, it will help to inform RA/SAN’s work more generally and also provide more credible documentation regarding the likely conservation effects on individual farms outside these priority areas.

RA/SAN will conduct annual strategic planning meetings in each country, as part of the adaptive management project cycle, to take stock of lessons learned during the previous year, reflect upon the implications of the findings of their joint data collection and analysis, and modify their projected activities accordingly. These changes would be both for activities designed to promote sustainable agriculture and certification at the individual farm level and at the landscape level in selected priority sites.

## Part (Annex) XIII: Rainforest Alliance Certified Coffee Impact Monitoring System

### Monitoring plan for evaluating biodiversity impacts and other results of coffee certification in El Salvador, 2006-2013.

#### 1. Introduction and background

This Annex describes the monitoring and evaluation plan for the Apeneca Biological Corridor (ABC) in El Salvador. This plan is indicative of a similar landscape-level plan that will be implemented in another coffee-growing region (in Colombia?) during the course of the requested project. In addition, the farm-level monitoring and evaluation activities outlined in this plan are indicative of the information that will be collected by RA/SAN in all five project countries.

The ABC in El Salvador is an area of approximately 90,000 hectares, or 900 square kilometers. It is one of the largest coffee producing areas within El Salvador and contains some of that nation's most significant biodiversity. SalvaNATURA, one of the members of the Sustainable Agriculture Network (or SAN, which carries out Rainforest Alliance (RA) certification activities) has managed two national parks that form the eastern and western boundaries of the corridor (El Imposible and Los Volcanes National Parks) in collaboration with the government of El Salvador for several years. In addition, SalvaNatura's Conservation Science Program has ongoing biological monitoring activities of bird populations in the corridor. It has also been certifying sustainable coffee farms in the area for more than five years and is currently working with over 40 RA-certified coffee farms in the corridor.

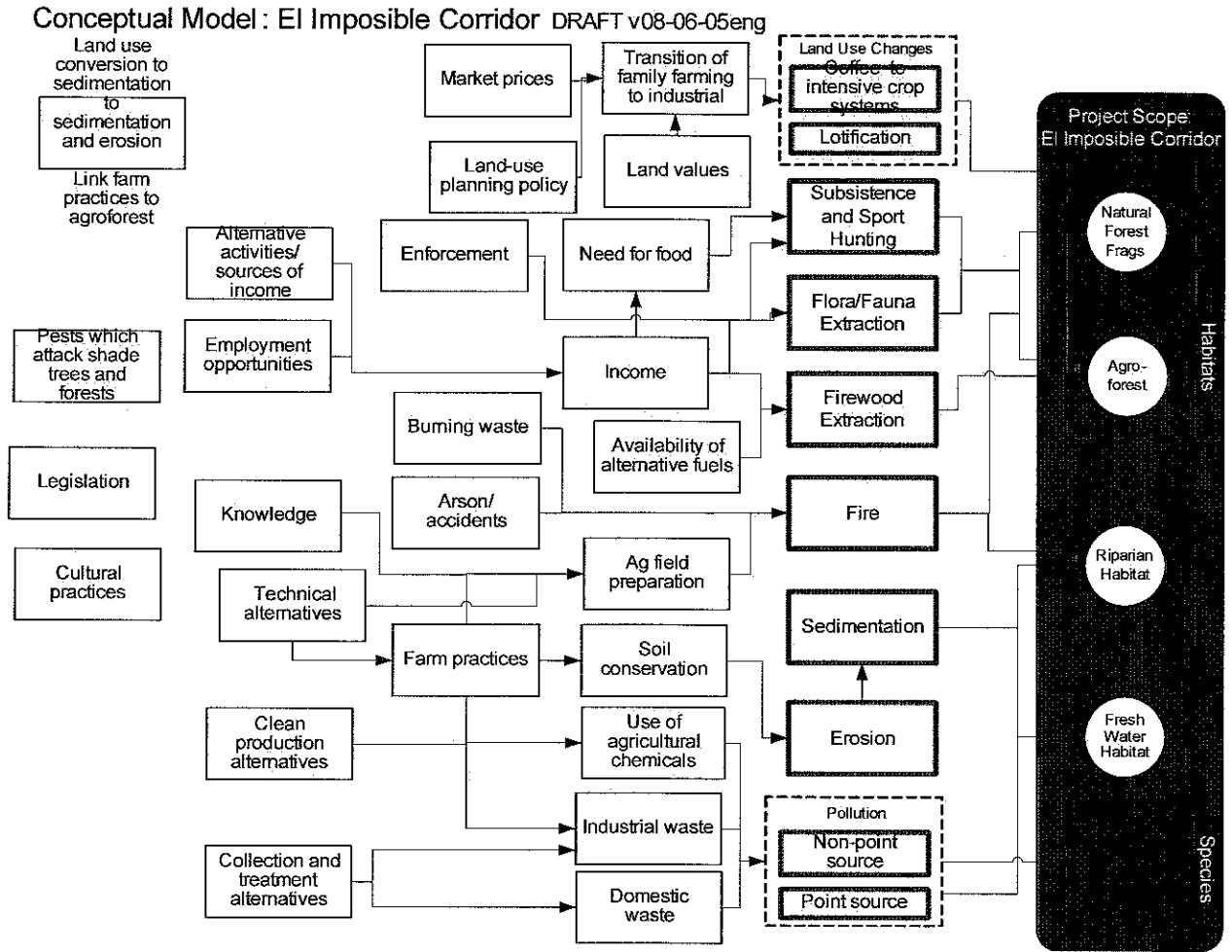
#### **Analysis of Present Situation**

As noted in Annex 1, RA and SalvaNatura worked with Foundations of Success (FOS) to validate a generic model of threats to biodiversity in coffee production landscapes. They held a series of workshops with key stakeholders in El Salvador to analyze the threats to biodiversity, and their root causes, in the ABC. The participants identified the major threats to various habitats in the area and then prioritized them in terms of urgency, the area threatened, RA/SalvaNatura's expertise/ability to address each threat, and the probability of being able to successfully reduce each threat. The following table summarizes this analysis:

Treta	Urgency	Area	RA/SAN expertise	Probability	Total Store	Ranking
Land Conversion	1	1	3	1	6	1
Technification	2	7	2	7	18	6
Forest Fires	5	6	1	6	18	6
Hunting and Extraction	4	5	1	2	12	2
Fragmentation	3	2	4	8	17	5
Contamination	6	3	1	3	13	3
Sedimentation	7	4	1	4	16	4
Firewood extraction	8	7	1	5	21	7

Based on this ranking, the participants determined that Firewood Extraction does not currently represent a significant threat in the ABC. RA, SalvaNatura and FOS representatives then developed the following conceptual model that indicates the proposed strategies for addressing these various threats in the ABC (note: Firewood Extraction has been included in the model even though it is not a current threat because it could become a threat in future and this threat is likely to be significant in

other coffee growing regions covered in this project, where this model will be applied and adapted in future).



### **Apaneca Biological Corridor Vision, Goal, Objectives and Strategies**

RA, SalvaNatura and FOS representatives agreed upon the following definitions during the various workshops.

#### **Vision:**

To conserve biodiversity in El Salvador by maintaining and improving existing habitat in shade coffee farms within the Apaneca Biological Corridor.

#### **General Goal:**

By 2013, certify 40% of the coffee production area in the Apaneca Corridor, representing 32,800 ha (34% of the total area) as sustainable (Rainforest Alliance Certified)

**Project Objectives:**

- Minimize conversion of agroforests to more intensive (high disturbance) land uses:
  - Degradation
- Reduce forest fires
- Reduce extraction of flora and fauna (including subsistence and sport hunting)
- Increase connectivity of forest fragments through improved agroforests and/or forest regeneration
- Reduce impacts caused by contamination (direct/indirect) and sedimentation
  - Reduce direct contamination of freshwater habitats
  - Reduce indirect contamination of freshwater habitats
  - Reduce erosion and sedimentation of freshwater habitats
- Reduce unsustainable firewood extraction from natural forest fragments or riparian habitats (not applicable for El Salvador model)

The Following Table summarizes the key strategies and expected outcomes for the ABC:

**Expected Results/Outcomes (all by 2013)**

<p><b>Strategy 1: Minimize conversion of agroforests to more intensive (high disturbance) land uses: Degradation.</b></p> <ul style="list-style-type: none"> <li>• reduce the rate of coffee farm conversion to other uses (hectares) by 25% (currently 7% per year)</li> <li>• <i>In 5 years, have a 50% higher margin than conventional production.</i></li> <li>• 90% of certified farms sell their coffee in the sustainable coffee market with a price premium</li> </ul>
<p><b>Strategy 2: Reduce forest fires</b></p> <ul style="list-style-type: none"> <li>• reduce the area affected by forest fires within certified coffee farms by 80%</li> </ul>
<p><b>Strategy 3: Reduce extraction of flora and fauna (including subsistence and sport hunting)</b></p> <ul style="list-style-type: none"> <li>• 100% of certified coffee farms pay at least the legal minimum wage.</li> <li>• populations of indicator game species or extractable non-game species are stable or increasing in 80% of certified coffee farms in the Apaneca Corridor.</li> <li>• reduce a degradation index by 80% in existing natural forest fragments within certified coffee farms of the Apaneca Corridor.</li> </ul>
<p><b>Strategy 4: Increase connectivity of forest fragments through improved agroforests and/or forest regeneration</b></p> <ul style="list-style-type: none"> <li>• reduce by 60% the fragmentation index for forest within certified farms in the Apaneca Corridor.</li> <li>• 90% of the natural forest fragments in certified farms have protection plans (are guarded against extraction) and are larger than 1 hectare.</li> <li>• reduce by 20% the fragmentation index for forest within the entire Apaneca Corridor.</li> </ul>
<p><b>Strategy 5: Reduce impacts caused by contamination (direct/indirect) and sedimentation</b></p>
<p><b>5.a. Reduce direct contamination of freshwater habitats</b></p> <ul style="list-style-type: none"> <li>• reduce by 95% the quantity of domestic waste contaminants deposited in sources and springs within certified coffee farms of the Apaneca Corridor.</li> <li>• reduce by 95% the quantity of agro-industrial contaminants deposited in sources and springs within certified coffee farms of the Apaneca Corridor.</li> <li>• reduce by 80% the discharge of organically-contaminated waters (produced by coffee processing) into springs and rivers from certified coffee farms within the Apaneca Corridor.</li> </ul>
<p><b>5.b. Reduce indirect contamination of freshwater habitats</b></p>