

Sustainability Analysis of the Coffee Industry in El Salvador

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Documento en Proceso. Escrito por Claudia M. Harner, investigadora-consultora del Centro Latinoamericano para la Competitividad y el Desarrollo Sostenible (CLACDS). Este trabajo busca estimular la reflexión sobre marcos conceptuales novedosos, posibles opciones de abordaje de problemas y sugerencias para la eventual puesta en marcha de políticas públicas, proyectos de inversión regionales, nacionales o sectoriales y de estrategias empresariales. No pretende prescribir modelos o políticas, ni se hacen responsables el o los autores ni el Centro Latinoamericano de Competitividad y Desarrollo Sostenible del INCAE de una incorrecta interpretación de su contenido, ni de buenas o malas prácticas administrativas, gerenciales o de gestión pública. El objetivo ulterior es acrecentar el nivel de discusión y análisis sobre la competitividad y el desarrollo sostenibles en la región centroamericana. El contenido es responsabilidad, bajo los términos de lo anterior, de CLACDS y no necesariamente de los socios contribuyentes del proyecto. Julio, 1997.

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EXECUTIVE SUMMARY

El Salvador's coffee industry is probably the most sustainable in all of Central America due to the fact that over 90% of its coffee is shade grown, which is by definition less environmentally impacting. This tiny Central American country was the only nation to stick to traditional growing methods when the rest of the region was "modernizing" its coffee farms to increase yields. This technification method calls for switching to sun grown coffee to increase yields, requiring an expensive, input-intensive production strategy which leads to substantial, irreversible environmental damage. However, El Salvador's decision was not necessarily out of environmental goodwill. Instead, it was out of economic necessity. Adverse government policies (in the late 1970s and 1980s) which discouraged investment, the escalating domestic conflict, and dryer, hotter climate conditions than the rest of the region are the key factors that prevented El Salvador from converting its coffee farms to sun grown plantations.

Although coffee cultivation is a relatively clean industry in El Salvador, negative environmental effects result from coffee processing. Waste water discharge and coffee pulp have heavily polluted El Salvador's water supplies, most notably rivers, further degrading the country's most scarce resource. There is no uniform solution for treating and disposing waste water and coffee pulp in El Salvador due to the different size and age of plants, diverse soil conditions, varying topography and location of water reservoirs. There are no legal requirements or incentives for greener production, either. Overall, processing plants lack the environmental awareness, incentive, and technical assistance to develop pollution control and prevention measures. The coffee industry has almost no access to the newly developed environmental funds Fideicomiso (Environmental Trusteeship) and FOCAM (Environmental Credit Fund), which have been created to help industries obtain financing for environmental projects.

El Salvador is already well on its way to becoming one of the most sustainable agricultural industries in all of Central America. Major environmental issues associated with the production of coffee, such as finding biological (instead of agrochemical) control solutions for pest and weed management, and encouraging farmers to diversify their coffee plantations with other crops, are being addressed with much success. However, one major hurdle still exists: to diminish the environmental impacts associated with coffee processing. In order to achieve maximum advantage of El Salvador's current position (and to be even better positioned for the future), the coffee industry must further promote the adoption of cleaner, less environmentally impacting processing techniques. If El Salvador were to fully adopt clean processing techniques, it would have a *very* powerful argument for being the world's most sustainable coffee industry. El Salvador is just beginning to realize its competitive environmental advantages. With cleaner production techniques, it could enjoy a very unique position among coffee industries in the world.

Cleaner processing technologies will not only help the environment; they should also help cut production costs and thus make the industry more competitive. There are a variety of initiatives that El Salvador could undertake to meet this objective. Improved and enforceable water quality and industry discharge regulations could be based on a partnership agreement between the government and the coffee industry establishing the reduction of Biological Oxygen Demand levels during a specified time period (i.e. five years). Increased coordination between PROCAFE and cooperatives developing their own small-scale solutions will encourage the adoption of clean technologies. Access to subsidized funds for the maintenance of coffee plantations and clean technology projects, combined with other fiscal incentives, would help to

promote the adaptation of green processes as well. Finally, the Salvadoran coffee industry should market its collective position to educate the world about the positive environmental and social impacts of its coffee production. Such measures will put El Salvador in an even better position to compete in the international coffee market, where the demand for gourmet coffee and less environmentally impacting production techniques will only continue to increase.

1. BACKGROUND INFORMATION ON THE COFFEE INDUSTRY IN EL SALVADOR

As in most Central American countries, coffee has a long tradition in El Salvador. The coffee history of El Salvador dates back to 1740 when it was first planted for personal consumption in a small area of the western region. The natural soil properties, weather conditions, and the expertise of the Salvadoran people are what contribute to this country's high quality coffee. Coffee has remained a crucial economic activity, contributing to the generation of hard currency and employment. Coffee also contributes most to the conservation of natural resources due to the fact that 92% of the coffee in El Salvador is shade grown - the highest percentage in Central America. (Rice, 1996) El Salvador is one of the most deforested countries in the Western hemisphere; 98% of the country's original forests are gone. If shade grown coffee plantations-which have many of the same biological characteristics as forests - are counted as such, coffee plantations represent about 80% of the nation's remaining forest area left today. (Panayotou, 1997)

1.1 Structure of the Coffee Industry

El Salvador is the 12th largest coffee producer in the world and accounts for 2,6% of total world production. (Monitor Company, 1997) Approximately 165,000 hectares are dedicated to coffee, representing about 12% of the nation's arable land (Consejo Salvadoreño del Cafe, 1997).¹ El Salvador produces the arabica species only. The main varieties found are Bourbon, which comprises 80% of coffee grown; Pacas (15%); and other varieties such as Caturra, Catuai and Catisic (5%). (Consejo, 1997) Arabica species produce yields three to four years after planting and have an economic life of between 20 and 30 years. In El Salvador, some bourbon trees still produce after 50 years. Coffee is grown in 7 of the 14 provinces of the country; however, most of the plantations are found in the western and central provinces of Santa Ana (34% of production), Ahuachapán (17%), Sonsonate (10%) and La Libertad (21%). Production is mostly concentrated in mountain ranges and volcanic slopes between 500 and 1400 meters in altitude. Coffee is an important employment generator, accounting for 135,000 jobs, or 25% of the agricultural sector and 7% nationwide. (Consejo, 1997). Coffee is the second principal export after maquila, and about 90% of coffee is exported. (Consejo, 1996).

There are more than 20 000 coffee farmers in the country, of which 93% are considered small and medium size, each producing less than 700 quintales per year. Small and medium-sized holdings of less than 120 hectares account for about 65% of production. (Consejo, 1997). According to PROCAFE, there are 105 processing plants (beneficios) in El Salvador, with a capacity of 1 000 to 160 000 quintales (qq) a day.² They process an average of 3 million quintales per year, although El Salvador has an installed processing capacity for green coffee of 4-5 million qq per year. There are 90 registered exporters in the country.

In El Salvador, the only charges deducted by processors/exporters per quintal are US\$1,00 to PROCAFE for research activities; US\$0,30 to Consejo Salvadoreño de Cafe to help with operating costs; US\$4,05 to the Coffee Stabilization Fund; and the "transformation," or processing costs which averaged about US\$25,29 in 1996. (Consejo, 1997) With so little

¹ 152 000 hectares are traditional (shade grown) and 13 000 are technified (sun grown). (Rice, 1996)

² One quintal is equal to 100 pounds, or 45,37 kilograms. In addition, the standard unit of coffee area in Central America is the manzana, which is equal to 0,75 hectare, or 1,85 acres.

government intervention, producers can directly enjoy the price premium benefits of growing gourmet or specialty coffees permitted by their shade grown methods. The Salvadoran system thus encourages the production of high quality coffee. In addition, before a producer's cherries are transported to any of the 105 processing plants, they are weighed. If this beginning amount has decreased in weight upon arrival at the beneficio, processors have the right to deduct up to 10% of the original amount's weight in calculating the producer's income - equivalent to a loss of up to US\$7,28 per qq. (Consejo, 1997) Lower-quality coffee is more likely to "shrink" during transport. This policy thus provides an additional incentive for producing a high-caliber crop. (Consejo, 1997, and personal communication with Echazarreta, 1997) Finally, the 90 exporters in El Salvador are free to sell their coffee to importers without special government permission.

PRODUCTION STRUCTURE		
size of coffee plantations	% of total Producers	% of total Production
qq/oro		
< 20	58,3	2,7
21-50	14,5	3,1
51-100	8,1	3,8
101-200	6,3	5,9
201-500	5,8	12,2
501-1000	3,1	14,5
1001-2000	2,4	22,2
> 2001	1,5	35,6

Source: Consejo Salvadoreño del Café.

1.2 Economic Importance of Coffee

Over the past decade, coffee's contribution to total exports has fallen, due mostly to lower coffee prices. Coffee has traditionally been El Salvador's main source of hard currency, accounting for more than 50% of total exports until the mid-1980s, when production began to decline as a result of adverse policies and the civil war. (Consejo, 1997). Unemployment and financial impoverishment resulting from the collapse of the International Coffee Agreement in 1989 affected millions of farmers in the coffee growing countries of Latin America, including El Salvador. For example, between 1988 and 1991, the world price for coffee declined by 38%. (Brenes, 1997) Prices have risen dramatically since the 1993 Coffee Retention Plan, which is an agreement among 28 coffee producing countries (which make up the Association of Coffee Producing Countries) from Latin America, Asia and Africa that seeks to restrict international market supplies by requiring members to withhold a specified percentage of coffee stocks from exportation.³ However, much of the recent boost in prices is attributable to a mid-1994 freeze that destroyed a large portion of the Brazilian coffee crop. It is too early to assess whether the 1993 scheme will lead to a more enduring coffee price stabilization than the previous international agreements.

Furthermore, El Salvador has become less dependent on the US as its principal export market. In 1985, for example, the US accounted for 58% of coffee exports, whereas Germany

³ This "withholding amount" is up to 20% of members' yearly coffee harvest deemed exportable quality. However, there is currently no retention rate due to the high prices that have characterized international coffee markets.

accounted for 28%. In 1996, only 19% of Salvadoran coffee exports went to the US. Germany and Holland accounted for 41% and 25% of exports, respectively. (Monitor Company, 1997)

COFFEE'S IMPORTANCE IN THE ECONOMY			
Year	Production	Value	Percent of
	<i>(qq)</i>	<i>(millions of US\$)</i>	GDP
1986	3100,0	546,8	4,7%
1987	3330,0	351,5	4,9%
1988	1900,0	358,0	3,9%
1989	3400,0	228,6	3,9%
1990	3000,0	260,2	4,6%
1991	3248,0	219,5	4,4%
1992	3917,3	151,2	3,6%
1993	3106,2	235,4	3,0%
1994	3036,5	270,9	3,3%
1995	3384,8	361,9	3,1%
1996	3305,2	332,3	2,9%

Source: FUSADES, Central Bank of El Salvador and Consejo Salvadoreño del Café.

2. SHADE GROWN VERSUS SUN GROWN COFFEE

2.1 Shade grown coffee

This traditional form of growing requires that coffee be planted beneath a forest canopy of trees. The canopy varies throughout coffee-growing regions, from indigenous rainforest to mixed forest. In a traditional coffee plantation, the trees fix nitrogen from the atmosphere into the soil, eliminating or greatly reducing the need for nitrogen-based fertilizers.⁴ Pesticides are less necessary because of the birds that thrive in the shade giving overstory. Weeds tend to be less prevalent in shaded plantations, and can and are controlled with machetes rather than herbicides. Leaf litter, accumulating beneath the trees, is home to insects that devour nematode pests that bore into coffee beans. Thus, toxic nematicides are not required on shade plantations. The coffee grown in the shade develops more slowly, creating a higher sugar content that, when the beans are roasted, is said to give the coffee a richer, fuller flavor. Such coffee commands a higher price in international markets.

In addition to coffee, shade grown coffee farms typically cultivate diverse crops that can include cacao, fruit, avocado and trees for firewood. These various species are not only important for maintaining the biodiversity of the coffee farm; they are also an important source of additional income. The diversification helps protect small producers from international market fluctuations, natural occurrences, and other uncertainties. By providing an alternative to deforestation, traditional coffee systems also constitute an important check against greenhouse gas emissions that contribute to global warming. As rainforests disappear at the rate of 17 million hectares per year, shade tree systems have become a secure haven for migratory birds, too, and represent an excellent habitat for the natural wildlife still surviving in the subtropical regions. (Rice, 1996)

Shade grown coffee also provides essential habitat for diverse communities of other tropical forest species. Findings by University of Michigan biologist Ivette Perfecto and colleagues from research in Costa Rica suggest that local species diversity of beetles, ants, wasps, and spiders on a single tree species (*Erythrina poeppigiana*) in shade grown coffee plantations approximates the arthropod diversity levels on single tree species in undisturbed tropical forest. (Perfecto, 1996) Also, traditional coffee is often integral to agro-forestry systems in which tree species are cultivated together with coffee and other agricultural commodities. Where geographic and market conditions are favorable, economic returns can be achieved through sustained-yield timber production in association with coffee. For example, research in Costa Rica has shown that timber from the precious hardwood species *Cordia alliodora* can occur with no significant damage to growing coffee crops. (Rice, 1997)

2.2 Sun grown coffee

Over the last two decades, in an effort to grow more coffee and increase income, many farmers in Central America and other parts of the world have “modernized,” or “technified,” their coffee farms. Technification employs a hybrid plant that grows in full sunlight, which grows three times faster than a coffee plant on a shade grown farm. This method results in an increase in the

⁴ Such species include *Inga* spp., *Erythrina* spp., and *Gliricidia sepium*. (Perfecto, 1996).

density of coffee plants from 1 000-2 000 per hectare to 3 000-7 000 per hectare in a sun grown plantation. (Rice, 1996) Sun grown coffee trees have a life of 12 -15 years, whereas those in a traditional plantation have a life of more than double this. Not surprisingly, sun grown coffee farms are much more chemically intensive - and much less sustainable. They lack the nitrogen supplied by the bacteria in the roots of certain shade trees and thus depend on a steady diet of fertilizers and chemicals. This is made worse by the fact that certain chemicals banned in other countries for their severe health effects in the Western Hemisphere remain approved for agricultural use in some Latin American countries.

Furthermore, due to the lack of a forest canopy in a sun grown coffee plantation, there are fewer insect-eating birds, which means insecticides must be used to protect the crop instead. Such input-intensive procedures result in much higher production costs than those of traditional systems. In one study, the production cost for a hectare of modern and traditional coffee was US\$1 738,94 and US\$269,47, respectively. (Perfecto, 1996) In other words, the cost to produce 1 kg of coffee was US\$1,24 for modern coffee and US\$0,85 for traditional coffee.

International Aid Agencies such as the United States Agency for International Development (USAID) heavily promoted the conversion of shade plantations to sun grown ones in the 1970s, due to the fear of the fungal disease "la roya del cafeto (*Hemileia vastatrix*)," or coffee rust. Coffee rust was responsible for the destruction of coffee production in Asia in the second half of the nineteenth century, and the disease made its way to Brazil in 1970. (Rice, 1996) The theory of switching to sun grown coffee was that if the leaves of the coffee plants were kept dry, the fungus would be kept away because it could only survive in a humid environment. In reality, throughout most of Central America, the fungus has not posed the problems originally anticipated. This is most likely due to the existence of a dry season, and the high altitudes as well as cooler temperatures -conditions that inhibit, instead of promote, the disease's onset. Costa Rica and Honduras account for the highest number of sun grown coffee farms in the region- 40% and 35% of total coffee production, respectively. (Rice, 1996).

MAJOR DIFFERENCES BETWEEN SHADE AND SUN GROWN COFFEE

	Traditional	Intensified
Varieties Used:	arabica, bourbon, maragogipe	Caturra, catuaí, Colombia, Garnica, catimor
Size (meters:)	tall (3-5 meters)	Short (2-3 meters)
Shade:	moderate to heavy, covering 60-90% of ground area	None to moderate, up to 50% of ground area
Shade trees used:	tall (25 m) natural forest species, fruit trees, bananas	Short (5-8 m), selected leguminous species, heavily pruned
Density of coffee plants (number per hectare):	1 000 to 2 000	3 000 to 7 000, with some areas up to 10 000
Years until first harvest:	4 to 6	3 to 4
Plantation life span:	30 years (and more)	12 to 15
Agrochemical use:	none to low	High
Pruning:	sometimes not pruned at all, otherwise individualized treatment	Standardized “stumping back” (cutting trunk at 12-16” to promote sprouting of new growth) after first or second year of full production
Labor Requirements:	seasonal for harvest and pruning	year-round maintenance with higher demands at harvest

Source: Rice, 1996.

2.3 How El Salvador avoided “modernizing” its coffee farms

El Salvador's decision to stick with shade grown coffee was not necessarily out of environmental goodwill. Instead, it was out of economic necessity. Since coffee is a leading generator of jobs and foreign currency, it has long been viewed as a major source of revenue by the government. This situation has often led to discriminatory treatment of the sector, which has been burdened with heavy taxation and government-imposed exchange rates. An example is Decree No. 836 of 1950, which slapped higher export taxes on coffee than on other export products. Although the decree was meant to be transitory to help the government overcome the fiscal deficit, it remained in force for 40 years. (Amorin, 1995) In addition, during the 1980s, coffee producers were only allowed to sell their coffee to the government at predetermined prices. Such adverse government policies, combined with increasing security problems due to the escalating domestic conflict, discouraged investment in the coffee industry. These disincentives and dryer, hotter climate conditions than the rest of the region prevented El Salvador from converting its coffee plantations to sun grown farms.

3. ORGANIZATIONS INVOLVED IN COFFEE ACTIVITIES

The most important organizations that contribute to coffee industry developments in El Salvador include:

- The Consejo Salvadoreño del Café (CSC) - During the 1980s, coffee marketing was nationalized and centralized under the Instituto Nacional de Café (INCAFE). In 1989, however, INCAFE was dissolved as coffee marketing was liberalized, and its functions were taken over by the newly created Consejo Salvadoreño del Café, which became the highest authority for policy making and other related activities. The Consejo represents El Salvador in international coffee meetings, suggests coffee export policies, collects statistics, and collects US\$1.30/per qq of coffee exported, of which US\$1/qq is transferred to PROCAFE, and US\$0.30 is retained by the CSC for its expenses. (Amorin, 1995)
- The Fundación Salvadoreña para Investigaciones del Café (PROCAFE) - is a research foundation started by El Salvador's private sector with the assistance of the Salvadoran government and USAID. PROCAFE generates coffee production, processing, and environmental technology research; transfers appropriate technology to small and medium size coffee farmers and processors; and conducts coffee subsector economic and planning studies. It employs close to 200 professionals. It also has a technical assistance contract with the International Research Institute and USAID that is financed by El Salvador's coffee producers with the US\$1 contribution for each quintal exported. (Amorin, 1995) Most of PROCAFE's research is in soil analysis, coffee cultivation techniques, biological controls to pests, and the use of coffee pulp as organic fertilizer.
- Producers accounting for about 25% of total production are grouped in marketing cooperatives which together form the Unión de Cooperativas Cafetaleras de El Salvador (UCAFES). UCAFE comprises 22 cooperatives and 4,500 members. 85% of its members are small and medium size farmers. UCAFE supplies equipment and inputs at lower prices than the open market, promotes the cooperative movement rules among its members, provides information on the international coffee market, and serves as a liaison between its cooperatives members and national and international agencies.
- A land reform carried out in the early 1980s led to the creation of the Union de Cooperativas Productoras y Beneficiadoras de Café (UCRAPROBEX), a union of agrarian reform cooperatives. It works with 80 cooperatives, and manages 19 processing plants. (Amorin, 1995) UCRAPROBEX accounts for 10% of production.
- The Asociación de Beneficiadores y Exportadores de Café (ABECAFE), is a trade association of processors and exporters, some of whom are also large scale coffee producers. Its members are highly influential in the country's economy and politics because of their heavy investments in the banking, industry and commerce sectors. ABECAFE members handle more than 60% of Salvadoran coffee exports, and comprises 42 exporting companies that operate 55 processing plants. Most of the members buy their coffee through intermediaries and from large and small producers.

4. COFFEE PROCESSING

In El Salvador, coffee is wet processed. Fresh ripe cherries are fed into a pulper which usually consists of rotating disks or rotating cylinders each fitted with adjustable knives. These are designed to separate the bean from the flesh of the fruit while leaving each bean intact in its parchment envelope. The pulp is usually eliminated with running water and the parchment is collected either in washing channels or in fermentation tanks. During fermentation, the slippery mass called mucilage, which adheres to the parchment after it has been pulped, is broken down by enzymes and leaves the parchment clean and crisp. Then the mucilage is washed, drained and discarded. The washed coffee is transported to the washer pump, where a second and final wash takes place. Mechanical drying takes from 24 to 36 hours, depending on the dryer and fuel used. In El Salvador, the most used fuels are diesel and coffee parchment residues. After coffee beans have been dried and ventilated, they are ready to be stored. (Amorin, 1995)

The absence of adequate facilities prevents coffee processors from performing the processing functions with little environmental impact. They lack the technology and capital to build the infrastructure and purchase the equipment they need to classify, pulp, ferment, wash and dry the coffee efficiently. Because of the use of inadequate processing technology, the pulp and waste water generated by the processing fails to be treated and is dumped around the facilities and into rivers, polluting water sources and forgoing the use of coffee pulp as a potentially rich organic fertilizer.

More specifically, the pollutants produced by coffee beneficios include waste waters, smoke, peelings (cascarilla or pergamino), mucilage, suspended solids, sugars, soluble and insoluble organic wastes, effluent from fermentation tanks, colloidal gels of pectin, and pesticide residues. For every qq of finished green coffee, the processing phase generates about 2 qq of pulp. Some 3 million qq of finished green coffee (the average amount processed per year in El Salvador) generate approximately 330 000 metric tons of solid wastes. Furthermore, although the range of water usage is 57-200 gallons per quintal of coffee, these three million qq of green coffee use an average of 100 gallons /qq of water (1,5 million m³ per year). (Amorin, 1995). During harvest and processing, the Biological Oxygen Demand in waterways may exceed 20 mg/l. The Suquiapa River, for example, has been reported to be devoid of oxygen during the coffee processing season. (Williams, 1992) This means that no aquatic life can be sustained, and that the composition of the water (i.e. pH, etc.) is altered, sometimes even permanently.

Coffee processing is not just a problem in El Salvador. The Guatemala-based Instituto Centroamericano de Investigación y Tecnología Industrial estimated that over a six month period during 1988, the processing of 547 000 tons of coffee in Central America generated 1,1 million tons of pulp and polluted 110 000 cubic meters of water per day, resulting in discharges to the region's waterways equivalent to raw sewage dumped from a city of four million people. (Rice, 1996)

5. ENVIRONMENTAL IMPACTS OF THE COFFEE INDUSTRY IN EL SALVADOR

The cultivation and production of shade grown coffee pose significant positive as well as negative environmental impacts, the most important of which are listed below.

5.1 Positive environmental and social benefits

5.1.1 Bioproductivity

- There is little or no need for nitrogen-based fertilizers because the shade trees fix nitrogen through their roots from the atmosphere into the soil.
- The coffee plantations of the country are estimated to produce 14,6 million pounds of oxygen per day, through a plant metabolic process where CO₂ is fixed to the plant biomass and in turn liberates oxygen. Coffee plantations thus provide a greenhouse gas offset. (Herrera, 1995).
- The presence of natural predators such as insects and arthropods, frogs and toads, reptiles, birds and small mammals is enhanced by the forest cover. These predators stimulate biodiversity and serve as control agents. As a result, pesticides are less frequently used.
- Weeds are less prevalent and controlled by machetes, which diminishes the need for herbicides. Weeds compete for scarce nutrients in the soil, diminishing the available micronutrients for the coffee plants.
- Shade trees retain and channel water and prevent soil erosion through the mechanical binding and pulling effect of the roots.
- Coffee pulp, a waste product, can be used as an organic fertilizer.

5.1.1.1 Habitat

⇒ Cultivation of additional crops maintains the biodiversity and health of the ecosystem, attracting a variety of insects and animals that depend on each other for survival.

⇒ Shade tree systems are a haven for over 150 bird species, many of which are migratory.

- Traditional, shade coffee production has been shown to be highly beneficial to biodiversity conservation in tropical forest ecosystems. According to a recent report from the Smithsonian Migratory Bird Center, the trend toward technification amounts to a devastating loss of habitat for the birds, which have taken to the coffee plantations in past decades owing to the deforestation of their original rain forest homes. In northern Latin America, traditional coffee covers very significant areas with closed canopy, agroforestry systems with high species diversity. For instance, neotropical migratory birds that winter in northern Latin America constitute 60 to 80 percent of the bird species that

inhabit forests throughout the eastern US and Canada; neotropical migrants also constitute a large fraction of bird species in the forests of the Pacific Northwest. (Rice, 1996) Birds numbering in the hundreds of millions and representing more than 120 species migrate annually through or to the Central American isthmus. (Rice, 1996)

- Some of these migrant species are beginning to dwindle in number. According to the US Breeding Bird Survey, over the past 25 years the numbers of golden-winged warblers have dropped 46 percent, wood thrushes 40 percent, and orchard orioles 29 percent. An essay published in Science magazine ("The Case of the Missing Migrants," November 1996) cites similar declines among the Baltimore oriole, the American redstart, and the Tennessee warbler, and concludes that the evidence "seems to implicate the shift to sun farms." (Rice, 1996)

5.1.1.2 *Quality of Life*

- Coffee plantations are virtually the only "forests" left in El Salvador.
- Coffee accounts for 7% of national employment.

5.2 Negative environmental impacts

5.2.1 Major Hurdles to Sustainability

Of the negative environmental impacts resulting from the coffee industry listed below, many have been adequately addressed in El Salvador. With the help of international organizations such as USAID, PROCAFE has invested a significant amount of time and money in the development of biological solutions to the excessive use of agrochemicals, especially pesticides. For example, against la broca (coffee rust), the parasite *Cephalonomia sthefanoderid* betren is used, and PROCAFE's goal by the year 2000 is to decrease la broca's current presence in 80% of plantations to 2%. (Consejo, 1997) Against the coffee borer, a key pest of coffee production, PROCAFE has introduced and successfully reared *Cephalonomia stephanoderis* (Hymenoptera: Bethyilidae), an efficient African parasitoid of this pest. Close to one million of these wasps have been reared in the PROCAFE central laboratories, and nine regional smaller centers have been organized for this purpose. Farmer participation is excellent, and there is a good potential for managing the coffee borer mostly through biological means within the next few years. (Williams, 1992). PROCAFE also has a campaign underway to educate farmers about how to use coffee pulp waste as organic fertilizer.

5.2.1.1 *Bioproductivity*

Although by definition, shade coffee plantation systems use less chemicals, pesticides and other substances can still contaminate water sources.

Following standard commercial recommendations for the control of the coffee borer, coffee rust, weeds and minor pests, pesticide use may reach up to 10 kg-hectares per season. The environmental impacts of pesticide can be serious, because most coffee is grown on slopes in the higher elevations and constitutes integral parts of watersheds feeding populations and

estuaries downstream. (Amorin, 1995) The runoff of these pesticides can reach superficial waterways and underground water deposits, depending on the type of soil.

Neglect of soil protection measures (such as mulching) can result in soil deterioration and erosion.

Well-managed coffee is capable of protecting the soil against erosion, loss of structure, and desiccation. However, as coffee is typically cultivated on sloping land, neglect of soil protection measures can result in drastic soil deterioration and loss. Inappropriate and excessive tilling was common during the early years of coffee development, and this resulted in much damage to soil. Rational use of chemical fertilizers integrated with organic fertilizers coming from coffee pulp and leaf mulch due to pruning enhances soil productivity and reduces soil erosion.

5.2.1.2 Coastal Resources

Water from coffee zones reaches coastal lands and can affect the shrimp fisheries in the mangrove swamps and other coastal areas because of the water's associated bioburden, in turn causing adverse living conditions. Although erosion, pesticide and fertilizer runoff would be expected to cause harmful damage to such resources, our research failed to indicate any serious problems in El Salvador.

5.2.1.3 Quality of Life

Waste water and coffee by-products (pulp) from processing cause serious contamination of most notably rivers, and thus drinking water, wildlife, and aquatic system health. The organic material produced by coffee milling fouls streams by significantly increasing the amount of particulate matter in the water. The phosphorous and nitrogen contained in this particulate matter spurs the reproduction of algae and bacteria that can consume it. The population explosion of these creatures kills life in the waterways by depriving it of limited oxygen supplies. In addition, because of the presence of fermented coffee wastes in rivers and the large amount of oxygen necessary to oxidize them, the rivers become highly acidic. High rates of fish kills are common just downstream from a wet mill coffee processor. (Saklad, 1994) This is the most serious environmental effect of the coffee industry in El Salvador.

6. INSTITUTIONAL FRAMEWORKS THAT AFFECT THE COFFEE INDUSTRY

6.1 Legislation and Regulation

As is the case in many other Central American countries, officially, El Salvador boasts a whole set of environmental laws. However, most of them are quite dated, from the 1970s and before. There are no laws that relate *specifically* to the coffee industry per se, either - at least none that coffee producers are aware of. Overall, environmental legislation in El Salvador can be characterized by:

- A lack of regulations for individual laws and thus no enforcement, causing laws to be abstract principles with no real effects.
- A wide range of laws that cover similar issues (i.e. water legislation), thus making specific applications difficult.
- Dispersion of environmental law responsibilities among different institutions, leading to conflicts, rivalry, duplication of efforts, and poor management of financial and human resources.
- Lack of understanding of the various institutions' domains and institutional frameworks, resulting in poor coordination between key groups.
- An almost exclusive tendency to address the *consequences* of committing environmental violations (instead of preventative measures). (Romero Choto, 1997)

6.1.1 Water pollution legislation highlights in El Salvador

Water quality and industry discharge regulations and standards, which would be especially appropriate for the coffee industry, are virtually non-existent, although various water-related laws *do* exist. The Health Code (1988) instructs the Health Ministry to create programs that guarantee potable water and the elimination and control of water contaminants. The Irrigation Law, (1970) administered by the Ministry of Agriculture, is supposed to regulate the conservation and distribution of water resources. The Ministry is supposed to create measures to discourage the contamination of water and to protect aquatic fauna and flora. (Cordero, 1997)

The Water Quality Regulation (1988) aims to control or reduce water resource contamination. However, no *specific* water quality standards exist. Instead, the stated water quality goal is "the physical and biological quality levels necessary to maintain, preserve, or recover water quality." Article Four, for example, assigns four different ministries to establishing regulations for polluting industrial processes. The Regulation also is supposed to establish the creation of an "Industry Registry," which would list each industry's water usage and specific chemical characteristics (quality, suspension solids, pH, etc.). (Cordero, 1997)

Although these laws exist on paper, they are virtually meaningless due to a lack of specific requirements, understanding by farmers and processors, and a lack of credible enforcement.

Not surprisingly, despite these laws, 90% of El Salvador's water resources are contaminated. (Cordero, 1997) Furthermore, 90% of the rural population does not have access to safe drinking water. (Panayotou, 1997)

6.1.2 The Pesticide and Fertilizer Law

This law, from 1973, states that the application of pesticides and other chemical products is not to harm persons, animals, crops or water supplies. It gives the Ministries of Agriculture and Health the authority to create appropriate regulations to comply with the law's intent. However, as with the laws described above, this law is not well-enforced. Overall, the above legislation in El Salvador has provided little incentive to the coffee industry to improve its polluting processing techniques.

6.2 Financial Policies and Practices

Based on current policies, the financial community seems to have failed in realizing the coffee industry's positive environmental impacts and its potential for becoming one of the most sustainable agricultural industries in all of Central America. In terms of private financing, fewer funds have been allocated to coffee in recent years. Whereas in 1993 13% of private banking activities were dedicated to coffee, in 1994, this number was reduced to 7% (Halloway, 1996). Furthermore, in general, credits for establishing new coffee plantations do not exist.

Perhaps one of the biggest disappointments is that the coffee industry has almost no access to the newly developed environmental funds FOCAM and the Environmental Trusteeship (Fideicomiso), which have been created to help industries obtain financing for environmental projects. The Banco Multisectorial de Inversiones (BMI), a government-run, "second-tier" bank (banco de segundo piso) administers these two funds, which are described in detail below.

6.2.1 Fondo de Credito para el Medio Ambiente (FOCAM)-Environmental Credit Fund

This fund, of about \$20 million, was created in November 1996 for the sole purpose of promoting environmental conservation in El Salvador. (BMI, 1996) The funds come from the Central Bank and USAID. There are three lines of credit:

- Project financing for non-traditional products, in which organic coffee is considered a non-traditional product. Loans range from 4-15 years, with grace periods of 1-6 years. During the grace period, the interest rate is 6%; afterwards it is a market determined variable rate. The debt to equity ratio of a borrower cannot exceed 4 to 1, which excludes many farmers who are interested in obtaining such a credit. Furthermore, in order to qualify for the loan, a farmer must be able to prove that he/she has entered into an agreement with one of two organic certification agencies, either the German BC-OEKO or the US Organic Crop Improvement Association International (OCIA). These agencies must provide proof that farmers are making the transitions necessary to convert to organic coffee. In addition, the cultivation of organic coffee must be in a *new* area; conversion to organic coffee on existing plantations does not qualify for the loan.

- Project financing for environmental conservation (more specifically, of soil and water resource conservation), of which coffee is excluded.
- Project financing for forestry cultivation, to meet internal demands of firewood, and which includes coffee trees. Currently, 70% of the population depends on firewood as their principle energy (combustion) source. (Panayotou, 1997) Loans range from 10-25 years, depending on the tree species, and grace period is from 4-10 years, with a 6% interest rate. However, this loan does not encourage the preservation of trees; instead, it promotes the cultivation of trees to be cut down.

As of June 1997, not one organic coffee loan had been granted, perhaps because the financial community and the government have hardly promoted these lines of credit, and because the strict requirements make it difficult to qualify for such a loan. Those large coffee growers who *would* qualify for the loan usually aren't interested in cultivating organic coffee.

BMI also has a "regular" 10-year line of credit for the coffee industry, but with a much higher interest rate: 16%. With this line of credit, a coffee grower could perhaps finance a clean technology, but not at a subsidized rate. (BMI, 1997)

6.2.2 The Environmental Trusteeship (Fideicomiso)

This trusteeship was first created with \$11,4 million (100 million colones) to promote modernization and increase productivity in the agricultural industry. By June 1997, the fund entered its "second phase," with an additional contribution of \$46 million (400 million colones). The trusteeship includes six credit lines; none of the credit requirements are well defined. Coffee is excluded from all of the credit lines except for one: "Financing for waste treatment and other environmental projects." This credit line's loans range from 4-15 years, with grace periods of 1-4 years. Loans are not to exceed 13% in interest rates. (BMI, 1996)

6.3 Fiscal Policies and Practices

Since 1989, when ICAFE was dissolved, coffee prices have been subject to supply and demand. That is, producers determine when and at what price to sell their coffee. There are no coffee export taxes other than the quasi-tax of \$1,30/qq collected by the Consejo, and no foreign-exchange controls. Producers must also pay \$4.05/qq to the National Coffee Stabilization Fund, regardless of the current coffee price. (personal communication with Echazarreta, 1997)

In terms of import taxes, there is a 19% tax on consumer goods imported, a tax of either 9% or 14% on intermediate goods (depending on what kind) imported, and **no** tax on capital goods and raw materials imported. (personal communication with Echazarreta, 1997) In addition, organic, roasted, or gourmet coffee is scheduled to receive the 6% price support that other non-traditional exports currently receive on the export FOB value. (Ministerio de Agricultura y Ganadería, 1997) That is, the government is in the process of classifying such coffee as a non-traditional export. This price support comes from the Treasury Department (Ministerio de Hacienda), is paid at the end of the year to the grower, and comes from other taxes collected by the government. (personal communication with Romero Choto, 1997)

7. THE ORGANIC, SPECIALTY AND SOCIAL JUSTICE COFFEE MOVEMENTS

While traditional tinned ground and instant coffee sales have slumped, coffee bars and specialty beans have become the fastest growing trend in the food industry over the last two years. (Pennybacker, 1996) The worldwide market for specialty coffee is currently US\$5 billion, and the US accounts for half of it. Sales of such coffee in the US increased from approximately US\$1 billion in 1990 to US\$2,5 billion in 1995. (Rice, 1996). In El Salvador, exports of gourmet (including organic) soared from 2 000 qq in 1992 to 54 265 qq in 1996 (personal communication with Echazarreta, 1997)

International initiatives to promote environmental protection in coffee producing countries are growing, too. The Specialty Coffee Association of America recently established an Environmental Policy Task Force to address ecological issues associated with coffee. (Rice, 1996) The International Coffee Organization (ICO), the principal coffee trade group worldwide, held a seminar on "Coffee and the Environment" in May 1996 at the ICO's headquarters in London. A number of specialty coffee firms participated in the First Sustainable Coffee Congress on September 16-18, 1996, in Washington, DC, which was hosted and organized by the Smithsonian Migratory Bird Center.

7.1 Organic and gourmet coffee in El Salvador

Currently, organic coffee accounts for just one or two percent of the US\$5 billion worldwide market for specialty coffee. However, organic coffee currently exhibits the fastest growth among gourmet coffee types. (Rice, 1996) Certified organic coffee obtains significant price premiums, from 10 to 15 percent above gourmet coffee without the organic trademark. In 1992, for example, in the US, the price premium was between US\$1 and US\$1,50 per pound; in Europe, organic coffee can command twice the price of conventionally grown coffee. (Ramaswami, 1992)

This price premium often translates into substantially higher returns for coffee growers, although the net benefits of moving to certified organic production can vary substantially from producer to producer, depending on added production costs and other variables. (Rice, 1996) Organic coffee co-ops pay thousands of dollars each year to cover certification costs such as the time and travel expenses of field inspectors. The downside to organic certification from many growers' perspective is the cost of periodic inspection. For the many small coffee growers who are de facto or "passively" organic producers because they cannot afford to use agrochemicals, inspection costs can present a major obstacle to certification, and thus to the premium price they might otherwise obtain for their coffee. (Rice, 1996)

Currently, four countries are producing the majority of organic coffee: Mexico, Guatemala, Peru and Indonesia (Rice, 1996) Within Latin America, Peru outnumbers other countries in terms of area, with nearly 44,000 hectares under certified production. Mexico, which produces nearly as much organic coffee as Peru, does so on just under 26 000 hectares. El Salvador has 4900 certified hectares. Other Central American countries with land devoted to certified organic coffee include Guatemala (about 7000 hectares), Nicaragua (1400 hectares), and Costa Rica (550 hectares). (Rice, 1996) Organic coffee growers are typically organized into local cooperatives that are affiliated with, and bound by the standards of, international certification programs. The largest of such programs is Organic Crop Improvement Association International

(OCIA), which at the end of 1995 claimed more than one million certified hectares (2.5 million acres) and 30 000 grower-members worldwide. (Rice, 1996) Other programs certifying organic coffee include the European-based Naturland and Demeter. To ensure properly certified organic coffee, several coffee companies have established direct relationships with growers, often forming community cooperatives. Because no broker is involved, these companies can pay growers more than they would have received from commercial coffee producers, which often results in avoiding costly certification programs. (Rice, 1996)

In El Salvador, the Cooperative League of the United States of America (CLUSA) is providing technical assistance for the production and certification of organic coffee. CLUSA started exporting organic coffee under the brand name "Pipil" in 1993, coordinating its work through the cooperative organization UCRAPROBEX. "Pipil" is currently the only organic coffee brand registered in El Salvador, and it recently won El Salvador's National Environmental Award. Production has grown from 918 qq in 1992/93 to 11 487 qq in 1996/97. In addition, with the support of the European Union, the Consejo Salvadoreño del Café has a gourmet coffee project underway to promote Salvadoran coffee under the brand name "Itzalco."

7.2 The social justice movement

Coffee producers in certain countries enjoy premium prices for their coffee due to the connections they have forged during the last decade with groups that make up what is known as the "solidarity," "social justice," "alternative trade," or "fair trade" movement. The movement is based on the idea that producers of traded commodities in developing countries can be economically successful if they receive fair prices in international markets for what they produce. Recent years have seen a growth of the movement, with trade unions, church groups, and other organizations becoming involved. In Europe, for example, fair trade coffee accounts for 11 000 metric tons of traded coffee annually, distributed in around 35 000 supermarkets. (Rice, 1996)

Like coffee that is certified organic, coffee distributed through alternative trade channels currently represents a small fraction of the worldwide specialty coffee market. Sales have increased, however, as more and more coffee drinkers have learned about the poverty and working conditions characterizing small coffee producers' lives. Global sales of coffee in the social justice market amounted to US\$400 million in 1995, according to estimates from the International Federation of Alternative Trade (IFAT), an association that oversees 36 alternative trade organizations worldwide through a code of ethics established in 1990 and updated in 1995. (Rice, 1996) Moreover, the IFAT's Code of Ethics includes environmental expectations for the participation of alternative trading organizations (ATOs). The two-point environmental section of the code states:

- It is also the aim of ATOs to encourage the production of goods by means which preserve the environment and conserve scarce resources and in ways which cherish the skills and develop the capacities of the producers and do not harm their health. This applies equally in the First World as in the Third World.
- ATOs are committed to encouraging development which is sustainable and responsible in terms of the long term survival of the human species and of the natural world. (Rice, 1996)

The social justice market is organized around the International Coffee Register, which is a company owned by the fair trade groups Max Havelaar, TransFair, and the Fair Trade Foundation. A total of 286 coffee-producing cooperatives are members of the Register, representing about half a million growers around the world. Under current arrangements, grower groups are guaranteed US\$1,26 per pound for green (ready-to-roast) coffee. (Rice, 1996) If world prices average above this figure, producers receive five cents per pound above the world price.

There are currently about 15 licensed importers of fair trade coffee. If a producer cooperative needs a cash advance to use for purposes of extending credit to individual growers, or for other expenditures, the importers provide advanced funding that can total up to 60 percent of the contracted coffee with that cooperative, at rates of interest negotiated between the importer and the coffee cooperative. (Rice, 1996)

These social justice, or fair trade markets, are more developed in Europe, where they originated, than they are in the United States and Canada. With support from their own social democrat governments and non-governmental organizations, European solidarity groups have been active for many years in Latin America. Community development projects funded by the private sector or via government funds have long been a part of Europe's development work in the region. (Rice, 1996)

8. CONCLUSIONS

Clearly, special market niches for organic and "fair trade" coffee have been well developed in recent years, most notably in Europe and the US. In many ways, strong overlap exists between the certified organic, gourmet and social justice coffee movements. The fair trade market makes linkages with small peasant producers who, because of their inability or unwillingness to use costly chemical inputs, produce what can be regarded as a "passively" organic or "organic by default" coffee. (Rice, 1996) The true issue at hand is how continued market expansion can promote environmental initiatives, such as forest conservation, as well as higher incomes for coffee growers who implement less environmentally impacting methods. Based on current trends and growing international environmental awareness, it is likely that coffee companies will increasingly support, buy and get the word out about shade grown coffee. Even the big players may be heading down that path. For example, Procter & Gamble, the owner of Folgers, recently purchased Millstone Coffee, which markets a certified organic coffee.⁵ (Rice, 1996) Most likely, increased demand for less environmentally impacting coffee on consumers' part will have a profound effect on shade grown coffee conservation objectives in countries like El Salvador.

The Rainforest Alliance ECO - OK label is one step in the right direction. The label signifies that the coffee is less damaging to the environment, but is not necessarily organic. Coffee is certified according to criteria developed by the Fundación Interamericana para Investigaciones Tropicales, a Guatemalan Non-governmental Organization (NGO). Certification criteria for the "ECO-O.K." effort on coffee include the use of native perennials as shade, as well as the maintenance of vegetation buffer strips of forest next to rivers, streams, and lakes. This initiative provides an incentive to keep traditional coffee growers (i.e. shade) from switching over to sun grown, and encourages sun growers to use best practices. Many coffee roasters have also started to market "bird-friendly coffees," organic blends purchased from shade grown coffee co-ops. In the United States, Counter Culture, in Durham, North Carolina, has introduced a brand called Sanctuary. Thanksgiving recently unveiled Song Bird Shade Grown Coffees, sales from which (15 cents per package) are donated to the American Birding Association. (Rice, 1996)

⁵ General Foods, Procter & Gamble and Nestlé control more than 50% of the roasted coffee market. (Monitor Company, 1997)

9. OVERALL CONCLUSIONS AND RECOMMENDATIONS

El Salvador is well on its way to claiming one of the most sustainable coffee - and for that matter, agricultural - industries in all of Central America. Traditional coffee growing methods provide numerous environmental benefits and thus fewer externalities to society, which are especially crucial in a country plagued by serious environmental problems, most notably deforestation. Shade grown coffee also enjoys lower production costs and a growing market, which can translate into significant price premiums. El Salvador is one of the most well-positioned competitors in this expanding market, not only because over 90% of its coffee is shade grown, but also because of the institutional frameworks that are already in place. For example, if other Central American countries decided to promote less environmentally impacting coffee cultivation methods by lifting subsidies, controlling pesticides, or implementing new environmental laws, El Salvador would not be adversely affected. This is because the Salvadoran coffee industry already operates in such an environment. Luckily, key coffee industry players are beginning to realize their country's advantageous position, the growing market trend for less environmentally impacting coffee, and the importance of maintaining current cultivation methods while developing environmental solutions to the industry's few remaining environmental problems.

Major environmental issues associated with the production of coffee, such as finding biological (instead of agrochemical) control solutions for pest and weed management, and encouraging farmers to diversify their coffee plantations with other crops, are being addressed with much success. The fact remains that coffee processing poses the most serious environmental issue in El Salvador, and is thus a major hurdle in achieving "full" sustainability and the ability to market the country's coffee as such. Due to differences in the size and age of processing plants, diverse soil conditions, varying topography, and location of water sources, it is not possible to come up with one wide-sweeping solution. To minimize the environmental effects of the waste water and coffee pulp by-products, small-scale solutions must be developed. Encouragingly, environmental awareness among coffee processors is increasing, and technical assistance projects (with the help of foreign aid) are well underway to promote pollution control methods.

For example, UCAFES is currently implementing a US\$1,3 million project started in January 1995, funded by the Interamerican Development Bank and Appropriate Technology International. The project is providing technical assistance in coop management, agricultural extension and credit services, processing and marketing of coffee, and the treatment of coffee pulp and waste water. The project has had great success in developing new technologies to, for example, allow for the reduction and recycling of water and the use of the coffee bean wastes as a fuel source (in a specially designed oven) to dry the coffee beans. As a result, at La Cooperativa de la Unión, production costs have been reduced by US\$3,45 per qq (30 colones) and water consumption has been reduced by 73%, from 150 gallons/qq to 40 gallons/qq of coffee processed. (Mencia, 1996) Such results can provide the rest of the coffee industry with a real impetus for changing existing systems, since they directly affect the bottom line. Furthermore, El Salvador announced in May 1997 that it will invest US\$23 million in projects to decrease coffee processing pollution. The funds will come from the Salvadoran government, commercial banks, the European Union, and BCIE (the Central American Bank for Economic Integration). (Barrera, 1997)

However, in order to take advantage of its current position (and to be even better positioned for the future), the country must further promote the adoption of less environmentally impacting

processing techniques. If El Salvador were to fully adopt clean processing techniques, it would have a *very* powerful argument for being the world's most sustainable coffee industry. Clean technology would not only help reduce the coffee industry's environmental problems; it will also help cut production costs (as demonstrated above). Furthermore, in order to make the rest of the world aware of its positive social and environmental impacts, the Salvadoran coffee industry must market its collective position internationally. Such objectives will be best be achieved through the creation of

- Improved and enforceable water quality and industry discharge regulations, based on a partnership agreement between the government and the coffee industry establishing the reduction of Biological Oxygen Demand levels during a specified time period (i.e. five years).
- Increased communication, coordination and technology transfer between PROCAFE and cooperatives developing their own small-scale solutions.
- Access to subsidized funds for both the maintenance (and improvement) of coffee plantations and clean technology projects as well as other incentives to undertake such environmental initiatives.
- A marketing campaign undertaken by the entire coffee industry to educate the world about the positive environmental and social impacts of coffee production in El Salvador.

9.1 Improved and enforceable water quality and industry discharge regulations

The transition to a cleaner, "greener" processing industry will have to consist of both public and private sector initiatives. The first step is to create specific water quality and industry discharge regulations that are enforceable and that if unabided by, result in fines or other stiff penalties. In this way, the coffee industry is held accountable for its polluting actions. Penalties would force processing plants to internalize the costs of pollution, and thus motivate them to implement cleaner technologies – which, as demonstrated by UCAFE, can reduce operating costs as well. This will prevent a few laggards from undermining the industry's position.

One way to address the need for regulations is to establish a partnership agreement between the government and coffee industry establishing the reduction of Biological Oxygen Demand (BOD) levels during a specified time period (i.e. five years). Preliminary results in 1996 from the PROCAFE study described above examining the waste water of 31 processing plants found the average Chemical Oxygen Demand (COD) of waste water from coffee pulp to be 67,7 kg/m³ ±29,1. (Larde, 1997) A partnership between the government and the industry to reduce Biological Oxygen Demand (BOD) levels to an agreed upon level would encourage processing plants to adopt clean technologies, and to avoid pollution fines (see above recommendation). This would help to alleviate one of the most serious environmental problems associated with coffee waste water and by-products.

However, in order to be successful, *all* of the coffee processing plants would have to be involved. An educational campaign on both the positive environmental and public relations effects of a cleaner, greener processing industry and the international image that El Salvador should promote would be essential. Currently, 40% of the processing plants are owned by independent owners (many of which are represented by ABECAFE), 30% by UCAFES, 20% by UCRAPROBEX, and 10% by small parchment processors. (Amorin, 1995) Thus, immediate

buy-in would basically be guaranteed for half of the processing plants, since they are already owned by cooperative associations responsible for 35% of total coffee production. To avoid the free-rider problem, the industry would either have to convince the other 50% of processing plants why investing in cleaner technologies is in their own self-interest, or else force them out of the market.

To encourage green investments on the part of independent processors, the coffee industry could develop commitment contracts. For example, cooperatives could guarantee amounts of coffee to be processed at individual plants on the condition that cleaner technologies be implemented, much like future contracts. PROCAFE and the cooperatives could provide technical assistance to processors wanting to implement best practices at subsidized rates (or perhaps free of charge). The goal of such an industry initiative is that those plants which refuse to cooperate would be driven out of the market, not only because of the long-term high costs of environmental inefficiencies, but also because of an inconsistent supply of coffee to be processed. Once out of commission, these plants could be bought up by groups who are interested in clean coffee processing.

9.2 Increased coordination and technology transfer between PROCAFE and cooperatives developing their own small-scale solutions

Increased cooperation between the various industry groups will benefit the coffee industry as a whole in the long run. Such coordination will help provide better and more efficient technical assistance to coffee growers and processors intending to adopt environmentally sound methods. In 1996, PROCAFE began a research project in which it is monitoring the waste water and by-products of coffee processing plants accounting for 30% of the country's coffee production. (Halloway, 1996) This research will help quantify the magnitude of the water quality problem and the effectiveness of different treatment systems in order to determine the most appropriate and cost-efficient technologies. Obviously, the more coordination there is between various groups trying to solve these problems, the better off the coffee industry will be.

9.3 Access to funds for both the maintenance and improvement of coffee plantations as well as clean technology projects

In order for there to be real change, environment-related project endeavors must be affordable. Revised regulations and a partnership agreement must thus be accompanied by financial assistance, so that the entire coffee industry has the financial means to implement less environmentally impacting procedures. For starters, the BMI should change its requirements so that the coffee industry can apply for the credit lines established by the environmental funds FOCAM and The Environmental Trusteeship (Fideicomiso).

In addition, in order for the coffee industry to become truly sustainable, El Salvador must seek out additional financial resources to not only help finance clean technologies, but other coffee-related activities as well. For example, in the long run, it will be necessary to renovate many of the country's coffee plantations, and it is crucial that the country maintain current, traditional shade tree systems. It is estimated that 50% of the coffee plants in El Salvador are 30 years old or older. (Amorin, 1995)

Possible funding sources include the Global Environmental Facility (GEF), the Biodiversity Enterprise Fund for Latin America and some sort of fund created by the Salvadoran

government (such as a gas tax fund). (Rice, 1996) The GEF is the world's only multilaterally-dedicated fund for the environment which provides grants to developing countries to protect global resources. It is governed by an independent council, and the projects it funds are implemented by the World Bank, the United Nations Development Program and the United Nations Environment Program. This would be an especially good source because GEF grants are available not only to governments, but also to NGOs and private sector businesses. The newly proposed Biodiversity Enterprise Fund for Latin America is to be directed by the International Finance Corporation, with partial support from the GEF. Finally, a national environmental fund may take the form of a trust fund, a foundation or an endowment. Such a fund, administered by both governmental and non-governmental representatives, could receive and manage money from a variety of sources and disburse grants to various groups.

The argument for establishing a collective Salvadoran coffee industry image, despite political pressure and subsidized funds, may not be enough. In addition to financing, the coffee industry might need other incentives to invest in clean technologies. Such incentives may include accelerated depreciation or tax deductions or credits equal to the amount of the clean technology investment.

⇒ A marketing campaign undertaken by the entire coffee industry to educate the world about the positive environmental and social impacts of coffee production in El Salvador

In order for El Salvador to take full advantage of its position, the *entire* coffee industry should be promoted as less environmentally impacting and socially beneficial, not just the Pipil or Itzcalco brands. In environmental terms, the industry must communicate not only its cultivation techniques, but also its less environmentally impacting processing techniques. Coffee processing is one of the dirtiest aspects of the industry worldwide. Claiming clean processing techniques *and* shade grown procedures would truly set El Salvador apart from the rest of the world as the most sustainable coffee producer.

In addition, shade grown coffee in El Salvador provides a number of social benefits. Because it is so labor-intensive, coffee production provides a major source of employment (25% of the agricultural sector). Crop diversification due to the various other trees (especially fruit) present in the typical plantation provide a buffer against low coffee prices and allow for additional food sources for farmers. Due to the nature of traditional cultivation techniques, farmers are less exposed (if at all) to harmful chemicals than their sun grown coffee grower counterparts. Nor do they have to tend to coffee plants directly under the sweltering sun, thus enjoying more comfortable working conditions. Finally, the fact that the coffee industry is not heavily regulated in El Salvador allows farmers to make their own decisions about when (and to whom) to sell their coffee. Thus, by being directly involved in the process, coffee farmers can receive higher prices for their coffee than in other parts of Central America. Since "environmental friendly" and "socially just" coffee fetches price premiums, *all* shade grown coffee producers in El Salvador could be compensated (at least to some degree) for their environmentally and socially sensitive techniques, encouraging them to stick with such processes in the future.

El Salvador must create a strong enough brand equity so that when consumers think of Salvadoran coffee, they immediately think "environmentally and socially OK."⁶ In addition, the collective coffee industry must speak with a louder voice to international coffee associations,

⁶Examples of strong association campaigns include the California raisins and the Juan Valdez Colombian coffee figure.

since the country is currently one of the leading experts on sustainable coffee. Such a public relations endeavor might require cooperation from the government as well. For example, perhaps part of the US\$1,30/qq collected by the Consejo Salvadoreño del Café could be dedicated to this industry-wide campaign.

El Salvador is in an excellent position when it comes to promoting sustainable coffee. The industry is just beginning to realize its competitive environmental advantages. With cleaner production techniques, it could enjoy a very unique position among coffee industries in the world. Implementing the proposed recommendations will put El Salvador in an even better position to compete in the international coffee market, where the demand for less environmentally impacting coffee growing and production techniques will only continue to increase.

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