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GLOSSARY OF TERMS

CARICOM	Caribbean Community
CCA	Caribbean Conservation Authority
CEHI	Caribbean Environmental Health Institute
EAST	Environmental Audits for Sustainable Tourism
ECO-OK	Ecologically Okay Program
EMA	Environmental Management Authority
EMS	Environmental Management Systems
EPA	Environmental Protection Agency
GNBS	Guyana National Bureau of Standards
HACCP	Hazard Analysis and Critical Control Point
ISO	International Organization for Standardization
JAS	Jamaica Agricultural Society
JBS	Jamaica Bureau of Standards
JEA	Jamaica Exporters' Association
JMA	Jamaica Manufacturers' Association
NRCA	Natural Resources Conservation Authority
PSOJ	Private Sector Organization of Jamaica
QMS	Quality Management System
SRC	Scientific Research Council
TTBS	Trinidad & Tobago Bureau of Standards
WRA	Water Resources Authority

PREFACE

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ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

The target sector research results are summarized in the table below. With the exception of bauxite/alumina, no sector is trending towards the implementation of EMS. Drivers are not sector specific, except for the agro/food sector where regulations on residual agrichernicals are increasing worldwide. In most sectors, larger companies are tending towards EMS implementation at a greater rate than medium and smaller companies, hence the trend in the bauxite/alumina industry. The tourism sector has adopted the Green Globe EMS system, particularly for the hotel industry.

Tabular Summary Presentation of Target Sector Results

World Trends	Regional	Local	Drivers	Obstacles	Examples
Rum					
Emphasis on wastewater treatment rather than EMS	Emphasis on wastewater treatment rather than EMS	Emphasis on wastewater treatment rather than EMS	Global Competition, public recognition, anticipated government policy, marketing tool, internal efficiencies anticipated, known benefits of ISO 9002; increased regulations of residual agrichemicals and soil erosion (agro/food sector)	Lack of awareness, unwillingness to buy in, amount of documentation required, state of the economy, perceived cost to implement and cost to certify	Mount Gay in Barbados, and J. Wray & Nephew have commenced implementation
Sugar					
Emphasis on wastewater treatment rather than EMS	Emphasis on wastewater treatment rather than EMS	Emphasis on wastewater treatment rather than EMS	Same as above	Same as above	None reported
Agro/Food					
Increased demand for health food worldwide. Trend towards organic farming	Reactions to regulations on residual agrichemicals	Reactions to regulations on residual agrichemicals	Same as above	Same as above	Advanced Farms has commenced an EMS

World Trends	Regional	Local	Drivers	Obstacles	Examples
and eco-labelling					

World Trends	Regional	Local	Drivers	Obstacles	Examples
Bauxite/Alumina					
General move towards EMS implementation	General move towards EMS implementation	Alcan and Alcoa have commented implementation of EMS	Same as above	Same as above	Alcan worldwide has commenced implementation and certification of ISO 14000. Alcan and Alpart locally have commenced implementation and intend to get certified. Alcoa has implemented an EMS but will not seek to be certified
Coffee					
Trend towards more shade grown, less use of chemicals and eco-labelling	Not much happening	The Coffee Board is developing EMS program	Same as above	Same as above	None reported
Tourism					
Trend towards ecotourism and eco-labelling. Hotel industry has embraced Green Globe to certify their EMS	CHA is promoting Green Globe certification. Several hotels have achieved or attempting to achieve certification	EAST project assisted 5 hotels in Negril to be Green Globe certified	Same as above	Same as above	Negril Cabins, Sandals Negril, Mocking Bird Hill, Sea Splash, Rondel Village in Jamaica, Blue Waters in Tobago, others in Aruba, Puerto Rico, Costa Rica and Barbados

TOURISM IN JAMAICA

EMS - The Key To Tourism's Future In Jamaica?

The tourism industry has been literally forced into adopting and promoting EMS, as the trend has been toward eco-tourism. The Environmental Audits for Sustainable Tourism (EAST) project initiated the implementation of the Green Globe EMS in several hotels in the Negril area. The drivers to implementation (in addition to external support from the EAST project), were customer requests global, competition and public recognition. The obstacles have been the difficulty in training staff and finding recycling and other partners. The benefits to implementation has been increased awareness use as a marketing tool and greater operational efficiencies resulting in increased financial benefits. Five hotels in Jamaica have been certified and two others have submitted statements of intent (SOI). None has been certified in Barbados, however two have been audited in the hope of moving towards certification while another has submitted a SOI: One hotel four in Aruba, and one in Puerto Rico have all been certified.

The Tourism Product Development Company (TPDCo) is concerned that environmental programmes are non-existent in the majority of tourism entities in Jamaica. While the drivers include customer requests global competition and marketing identity. The main obstacle is the unwillingness of the private sector to buy into the program. TPDCo recommends that the Government enacts a policy for all accommodation, attractions and other tourism enterprises to have. EMS implemented within their establishments. If this were so, TPDCo would incorprate elements of the EMS into the existing checklist, which would assist with their monitoring ftifttion.

Similarly the Caribbean Hotels Association (CHA) believes that all properties should be EMS certified to increase competitiveness. In this regard it has formed a marketing alliance with Green Globe and in addition has collaborated with USAID subsequent to the EAST programme in Jamaica to raise funds to assist resorts in the wider Caribbean towards getting EMS.

Jamaica's Economy has become increasingly dependent on tourism. As an industry, tourism represents great growth potential since it increases foreign exchange earnings and expands employment opportunities. While tourism brings visitors to Jamaica attracted to its natural beauty and environmental and cultural attractions, the industry's growth poses special problems to the nation's environment and culture.

As Jamaica has seen tourism surge, so too have other Caribbean destinations that compete with Jamaica for a share of the tourist's dollar. Jamaica must move to the forefront in conserving its natural resources so that it can maintain or expand its tourism draw.

This report will suggest ways that environmentally responsible, economically viable tourism can be developed, both in Jamaica and in selected other venues. The report then seeks to clarify the role of an EMS policy and strategy in ensuring that tourism maintains its vital role in the Jamaican economy.

The Role of Toutism in Jamaica's Economy

In 1996, tourism contributed 20% of Jamaica's gross domestic product. Since the 1970s, the total number of visitors to Jamaica has more than tripled. The sheer number of visitors to this island destination poses a challenge to the nation's environment.

The tourist industry makes many demands on the environment, such as pressure on beaches, use of wetlands for facilities and waste disposal, removal of sea grass beds at swimming beaches, and

blocking of visual and public access to the coast. Steps must be taken to improve the ecological balance and diversify Jamaica's tourism product to attract and capture the growing number of travelers whose idea of a vacation includes more than soaking up the sun's rays. Ecotourism fits well with Jamaica's natural beauty and need and desire to be sensitive to its environment.

What is Ecotoutism?

Ecotourism has been given many definitions over the years, but the basic themes of the majority of the definitions is that ecotourism is responsible travel to natural areas that conserves the environment and improves the welfare of local people. Ecotourism is more than tourism to natural resources. Real ecotourism has the following seven characteristics:

1. It involves travel to natural destinations;
2. It is tourism that minimizes its impact;
3. It builds environmental awareness;
4. It provides direct financial benefits for conservation;
5. It provides financial benefits and empowerment for local people;
6. It respects the local culture; and
7. It supports human rights and democratic organizations.

Not all destinations are suitable ecotourism destinations. Preferred characteristics of ecotourism attractions include the following:

1. Intact Natural Resources - Ecotourists want to visit unspoiled natural environments with abundant flora and fauna. Areas must be well-preserved and a conservation program should be in place to address any degradation that occurs.

2. Environmental Education - Ecotourists want to learn about the areas that they visit. Information centers and well-trained guides are essential.

3. Conservation Activities - Ecotourists want to know how the areas that they visit are being protected. Conservation activities, research programs and environmental monitoring systems add significantly to the site.

Additionally, ecotourists enjoy sites that allow them to view unique species. Ecotourists also value sites that are "off-the-beaten path" and relatively unknown.

Jamaica has many such sites to offer visitors. In order to be successful, such sites must, among other things, be developed in harmony with natural and cultural surroundings with an environmentally friendly infrastructure, have environmental policies in order to protect natural resources, be well integrated into the surrounding community, provide well-trained guides who are knowledgeable about the natural and cultural history of the site, and provide employment opportunities to the surrounding community.

The Role an Environmental Management System can Play in Creating Ecotourism

Ecotourism and environmental management systems are a natural fit. An EMS can help a destination accomplish some of the goals of ecotourism.

An EMS can help minimize impact. Clearly, one of the chief goals of an EMS is to reduce the impact of an activity on its surrounding environment. AN EMS can be instituted at oil pciints along the "tourism delivery chain"-from the hotels that ecotourists stay in, to the restaurants they eat in, to the sites that they visit.

What can hotels, restaurants and sites do? An EMS that has been instituted by a hotel, restaurant or particular site will allow, among other things, the facility to use water judiciously and to minimize its waste generation. An EMS is tailored to a particular site.

An example of how an EMS can be used at a hotel illustrates the importance of an EMS for ecotourism destinations. After electricity, water is the second most expensive utility in most hotels. Considering that water is usually paid for twice-once for piped-in water and once for sewage treatmen - the savings from conservation are automatically doubled. A hotel that institutes an EMS will target reducing the quantity of water it uses and will aim to use different qualities of water for different purposes.

An EMS may include a more rigorous maintenance program so that a hotel will ultimately reduce its water usage. For example, one leaking toilet may waste 15,000 gallons of water a year. And remember, that loss actually occurs twice because the 15,000 gallons that gets piped in to the hotel and is wasted also must run through the sewage treatment plant for no purpose whatsoever. It may also include a towel and linen reuse policy.

An EMS may also include ways to use rainwater and recycled water for uses other than drinking, cooking and dishwashing. For example, laundry, toilet flushing, cleaning and bathing do not require the use of high quality drinking water.

An EMS may also include a strategy for dealing with the generation of solid waste. Solid waste needs to be dealt with in an EMS because it can contaminate groundwater, give off unpleasant odors at landfills and lead to littered beaches. A hotel can take responsibility for lowering its own production of garbage. Most garbage is packaging materials which accounts for about 45% of the total, while organic waste is estimated at about 40%. Tins and metals account for 10% of the waste and the last 5% is made up of paper and other waste. The goal of an EMS might be to reduce the quantity and size or volume of certain waste and phase out or replace certain materials. For example, if each hotel guest consumes four pats of butter a day, all hotels will dispose of 650 cubic feet of aluminum-coated foils a year, enough to fill four trucks. A hotel might decide to provide unpackaged butter pats. Promotion of recycling might reduce the amount even further.

All of these efforts that are part of an EMS will lead to a hotel that puts less stress on its environment. An EMS can also be instituted across an entire destination to create a green destination. (See examples below.)

What Has Been Done in Jamaica with EMS-based Initiatives?

Some sectors of the tourism industry and some communities have already taken steps to evacate their environmental impact and institute some changes. The following discussion highlights some of those initiatives, but in no way, is a complete listing of all of the efforts across the island.

EAST program (Negril)

The Environmental Audits for Sustainable Tourism (EAST) program has been one of the major initiatives by the hotel industry to-date. EAST activity is a program of environmental audits within a corporate environmental management *Sys*tem aimed at the tourism and hospitality industry. The objective of the program is:

1. To develop greater awareness and understanding of the benefits of environmental management systems and audits among hoteliers, restaurateurs and allied tourism businesses.

2. To upgrade the technical skills of Jamaicans who are expected to conduct the audits and advise on EMSs

3. To assist a select, representative number of tourism-related establishments in carrying out environmental audits.

4. To help finance in the tourism industry selected audit recommendations to demonstrate the financial benefits of the systematic application of environment-friendly practices.

The focus of the EAST approach shifted from an ISO 14000 EMS Standard to the Green Globe Standard. Green Globe is a new environmental standard supported by the World Travel and Tourism Council with a specific focus on the hotel and tourism industry. The standards are similar but it is slightly easier to attain Green Globe certification. The new measure of success for EAST project participants, then, is achieving Green Globe certification after an audit and institution of an environmental management program.

The EAST program actually audited 15 Jamaican hotels. The audits focused on energy use, water use, wastewater generation, solid waste generation, use of chemicals and management and staff practices. The audits found, among other things, that hotels used water and energy inefficiently, used chemicals excessively and unnecessarily, generated excessive amounts of solid waste, and had poor or no monitoring of energy and water expenditures. Findings of the EAST project include, among other things, the following:

1. Hotels participated for the cost benefits offered. Potential cost savings was the paramount reason hotels were interested in the program. While hotels understood the importance of the environment, it is interesting to note that, for the most part, hotel guests do not appear to be concerned with the environment friendliness of their hotels.

2. All participants considered the audits valuable. The audits served as an eyeopener because it focused on hotel operations that are not scrutinized usually.

3. Audits are expensive. The EAST project audits would cost about $10,000. Program participants felt that an audit costing more than $1,000 would be to expensive.

4. Participants learned that little things count.

5. Understanding and use of EMS is limited. The lesson that savings will result only after priority actions are identified, planned, implemented and monitored has not been universally understood. One explanation for this lack of understanding is that EMS concepts were introduced AFTER the audits and recommendations.

Some of the lessons learned from the EAST project have important ramifications for ecotourism. They include the following:

1. Understanding of EMS among hoteliers is inconsistent. The majority of the hoteliers remained unclear about what an EMS is beyond a manual and a series of activities. It will be difficult to convince the community of the importance of an EMS without a broad educational outreach.

2. Those that understand systems approaches are most likely to adopt EMS. Management must be committed to EMS approaches for them to be successful.

3. EMS should serve as a framework to which energy and water consumption audits fit. The EMS framework should include a series of recommendations that recognizes priorities and budgetary constraints. Water and energy use reduction, the most important benefits of an EMS cited by EAST participants, should fit within the framework.

4. The formal audit approach to identifying environmental issues is debatable.

   Perhaps, a better approach would be to work with hotels to identify their most significant environmental aspects and help build an EMS to address them.

5. Most importantly, training provides the framework for understanding EMS and initiating change. EAST participants were given EMS training after most of their hotels had been audited. Without the context that training would provide, the recommendations from the audit lost much of their meaning.

Other Jamaican Eforts

Many other EMS-based initiatives are being explored and implemented across Jamaica.

Blueftelds Area Sustainable Tourism Initiative

The Bluefields Bay area, a close knit group of small towns on the south coast of Jamaica, is beginning to develop tourism. The community is experiencing a small amount of tourism at present. Community leaders have made a conscious decision to become a planned, environmentally and socially sustainable tourism destination. With the assistance of some consultants from George Washington

University, the Bluefields Bay area residents developed a vision statement for the future of tourism development in the area:

> The Bluefields Bay area, from ridge to reef is a safe world-class tourism destination offering a wide variety of natural and cultural attractions managed in such a way as to protect and enhance the natural and social environment and serve as a catalyst for sustainable economic growth.

The Bluefields residents have been intimately involved in the development of a tourism development strategy. Such participation helps insure that the entire community has a stake in the success of its efforts and that the community supports the efforts to grow the tourism business in a certain direction. To that end, the Bluefields residents discussed having the area become a Green Globe destination and developing a set of environmental standards for all tourism operators to embrace. They also are considering the Costa Rican Sustainable Tourism guidelines that are up-and-coming in the geographic region. While the Bluefields residents have not yet decided which EMS path to follow, it is clear to them that they must move in that direction in order to protect and preserve the uniqueness of what they have to offer.

Manchester and St. Elizabeth

Ecotourism and community tourism have become popular in the southern portions of Manchester and St. Elizabeth. Community tourism is a kind of tourism that celebrates the Jamaican way of life, protects the special qualities of the environment, directly benefits individuals in the community economically and promotes community development generally.

In the Manchester and St. Elizabeth area, the Central and South Tourism Organization (CESTO) was formed to promote community development in the region through environmentally sound tourism, with emphasis on special interest groups such as bird watchers, horticulturists, senior citizens and church groups.

YS Falls is located in St. Elizabeth. Visitors can enjoy the river and falls, hike on a trail alongside the river, swim in the pools, go bird watching, or have a picnic. YS Falls utilizes EMS-based initiatives as much as possible. In order to reduce solid waste at the attraction, vendors are not allowed to sell drinks packaged in disposable plastic bottles. A "no littering" policy is strictly enforced. While visitors may bring picnics, they are encouraged to remove their own garbage from the site upon their departure. Interestingly, YS Falls has a composting toilet that prevents leaching of sewage into groundwater and the river. The toilet has a solar-powered lighting and ventilation system.

Portland and Port Antonio

Ecotourism aryd ccimmunity tourism have become important in the parish of Portland. In Portland, Valley Hikes and eight other resorts have formed an alliance to promote ecotourism and community tourism through the Port Antonio Marketing program.

Valley Hikes was founded in 1995. Its mission was "to promote sustainable development of eco-cultural tourism in the Portland area, thereby enriching the visitor's experience and improving the quality of life for the residents". The company offers a wide range of activities that emphasize the natural and cultural heritage of Jamaica including hiking, historical and cultural attractions, caving and camping. Valley Hikes uses about 20 trails that traverse private properties in some places, allowing visitors to see farming practices and to purchase snacks and drinks from resident vendors.

The company operates within environmental guidelines (like an EMS) that seem to be working well. For example, trails are maintained and a tree-planting program is in place. Furthermore, the guides provide information about the area and its resources which contributes to environmental awareness.

Cockpit Country Adventure Tours

Cockpit Country Adventure Tours (CCAT), located in Albert Town, Jamaica in southernTrelawny, is an enterprise initiated by the Southern Trelawny Environmental Agency (STEA). The company offers three main walking tours as well as custom tours. CCAT brochures claim that the main attraction for visitors is "minimum impact recreation and nature study". The motto of CCAT -- "take nothing but pictures, leave nothing but footprints, kill nothing but time" -- is a motto that all ecotourism destinations should embrace.

The Cockpit Country is recognized for its extraordinary biodiversity with a wide variety of flora and fauna that are endemic to Jamaica. It is ecologically important for another reason - it is the groundwater recharge area for at least four major hydrological basins in the western part of the island. It is the principal source of water for three parishes.

The context in which CCAT operates is part of a broader approach to community development being pursued by STEA. STEA identified water supply improvements as a major community development need. The need for watershed protection was recognized as critical in the region because the majority of the residents practice hillside farming on slopes prone to erosion. STEA raised funds to facilitate repairs to water supply systems. In the area of watershed protection, STEA secured a grant to implement a soil conservation project in southern Trelawny. A key factor behind the

success of the program has been the educating the residents about the economic benefits of soil conservation.

In developing, tours in the Cockpit Country, CCAT keeps in mind the need to respect the environment and the fragility of this ecosystem. The carrying capacity policies of the tours along with the measures used to control visitor impact are two EMS-based initiatives that will reduce significant environmental impacts of CCAT's tours. The guides have been taught the need to minimize visitor impacts and they strictly supervise visitors to insure that there is no littering or collecting of any kind. The tours do not generate non-biodegradable garbage because they use reusable plastic cups and plates on the tours. All waste is packed out and guides even pick up litter along the roads left by residents.

Evaluation of Other Major Countries' Efforts to Develop Ecotourism with Emphasis on Potential/Actual Role of EMS

For purpose of this report, the major countries include Canada, the United States, the United Kingdom, the Netherlands, Germany, Scandinavia and Japan. A few of the ecotourism efforts of some of those countries are detailed below.

Canada

In Canada, a number of EMS-based initiatives have been utilized in the development of ecotourism.

Sauguenay - St. Lawrence Marine Park, Quebec

The Sauguenay - St. Lawrence Marine Park in Quebec, Canada, is an estuary characterized by numerous small islands, a coast of steep cliffs, and long sand bars. The estuary provides an abundant food supply for large mammals. From June to October each year, the waters attract a variety of whales.

In 1990, the governments of Canada and Quebec agreed to establish the Marine Park to preserve the unique marine environment. In 1997, Quebec passed a statute establishing a legal basis for the regulation of the park with the goals of "protecting the environment, the flora and fauna and the exceptional natural resources of a representative portion of the Saguenay River and the St. Lawrence Estuary, while encouraging its use for educational, recreational, and scientific purposes". The next year, the Canadian government passed a similar statute.

The primary goal of the park is conservation. To that end, the governments plan to collect data on the environmental impacts of surrounding activities, develop an ongoing monitoring system and modify existing regulation or adopt new ones to achieve conservation goals. Another goal of the park is education and interpretation. Activity centers within the park support the education goals. Visitors can learn about tMd major ecosystems of the park, hike, visit beaches, go camping, scuba diving or cross country skiing.

The key EMS-based tool to accomplish the purposes of the Marine Park is distracting according to uses. The Marine Park wants to rationally organize the activities compatible with the protection of the park's marine environment, through management practices that address ecological, environmental, social, cultural and ethical concerns. The park has been divided into four districts from most restrictive to least restrictive uses. The Quebec government will adopt regulations for each district, list permitted uses, set the terms and conditions for use, as well as the time limits and conditions for partaking in given activities within each district.

One particular activity that is of concern is the enormous growth of whale-watching activities. A variety of concerns can arise from whale watching including increased whale in uries, disturbances during the breeding season and eventually a reduction in the whale population. A discussion paper to address the topic recommended "guiding principles" that included EMS-based initiatives including fostering the preservation of ecosystems through integrated management.

The success of the efforts to protect the ecosystem and adequately control the activities within the park are unknown at this time. However, the Canadian and Quebec governments have used EMS-based principles to address the threats to the ecosystem. The careful monitoring that the governments support will discern whether the approach is working or needs to be modified.

Whistler, British Columbia

Despite Whistler's rapid pace of growth as a tourist destination, Whistler has managed its growth, protected its environment and addressed the needs of both resident and tourist communities.

Whistler's regulations governing growth are based on the goals of developing Whistler into a high caliber resort destination, providing a high quality of life for the residents, and protecting the natural environment that is the main draw for both visitors and residents.

In addition to managing growth in an intelligent way by limiting the number of bed units that could be developed on the basis of the capacity of existing water and sewage infrastructure, Whistler also uses environmental protection to achieve its goals. The municipality conducts an environmental inventory to identify environmentally sensitive lands that should not be developed. All applications for any type of development must include an environmental impact review. Additionally, environmentally or visually sensitive lands may require additional development permits that may impose tree preservation requirements, buffered setbacks and landscape design elements. General environmental regulations provide protection for conservation areas and special habitats.

The inclusion of diverse constituencies within the planning, implementation and monitoring processes of tourism growth has redounded to Whistler's benefit.

United States

In the United States, as elsewhere, the challenge has been for natural attractions to maintain their uniqueness and preserve the resources that draw visitors. EMS based approaches have been utilized to meet that challenge.

Park City, Utah

Park City, Utah, the state's largest ski area, is also becoming a year-round resort. Increasing numbers of residents and tourists have brought on rapid commercial growth as well.

In the 1980s, many local leaders and residents were concerned about excessive growth pressures, particularly those associated with tourism and vacation homes. After much community deliberation, the Sensitive Lands Ordinance was passed in 1992 to further protection of those attributes of Park City that made it an attractive place to live and visit.

The sensitive areas protected by the ordinance include steep slopes, ridge lines, entry corridors, wetlands and streams. Any land development proposed within the city limits is subject to a rigorous environmental analysis paid for by the landowner. Once the analysis is reviewed by the city, a "Sensitive Area Determination" is made which can trigger additional requirements depending

on the type of sensitive areas present. For example, a Park City ordinance imposes a number of prohibitions to protect wetlands and stream corridors. Regulations essentially bar any disturbances to wetlands or stream corridors, prescribe setbacks from wetlands and stream corridors, and require that appropriate run-off control be provided to minimize sediment or contaminants to adjacent wetlands.

Sanibel Island, Florida

Sanibel Island, Florida, remains a first-rate example of how a successful growth limitation strategy can allow a region to benefit from tourism, protect its sensitive environment and maintain the character it values.

Since 1976, Sanibel has had a plan to guide its population growth and land-use changes. The three major concerns with the rapid growth of tourism were the ability of the island to handle hurricane risks to life, beaches and building; the ability of the natural resources of the barrier island to tolerate increased visitors; and the ability of the infrastructure to provide adequate water and sewage treatment. Based on these concerns, Sanibel's planning guidelines have embodied a carrying capacity to guide future development.

The carrying capacity approach is used with regard to Sanibel's environmental resources. It has strong measures to protect its special ecology. Half of the island is located within conservation areas. Much more of the remaining land is environmentally sensitive-wetlands, mangrove swamps, beaches. The land is therefore divided in to six zones and a list of permitted activities has been developed based on the level of human activity a zone can tolerate.

United Kingdom

South Pembrokeshire, Wales

In 1992, the South Pembrokeshire Partnership for Action with Rural Communities, Ltd. (SPARC) spearheaded an effort to improve the economic and social life of the local people and enhance the environment.

As with many other destinations, community involvement was integral to the development of the program. Local people in all 37 villages have participated in the SPARC program to identify the problems and opportunities in their community. They helped produce an action plan out of which sprung rural tourism as a potential source of economic growth. The community was certain, however, that they wanted a nonintrusive form of tourism that was based on its natural resources, its landscape, heritage and culture. The participation of the locals has continued throughout the program.

One organization established by SPARC provides information on an environmentally friendly transport initiative designed to develop opportunities for walking and cycling and to protect the environment by minimizing traffic.

The SPARC program has been a model of how a nongovernmental organization can help communities without access to resources succeed.

The Tarka Project, Devon, England

The Tarka Project is based on a novel by Henry Williamson, Tarka the Otter, about the travels of an otter named, not surprisingly, Tarka. To address certain social and economic changes, the Devon

County Council proposed theTarka Project which was aimed at conserving the wildlife and natural beauty of North Devon and promoting tourism.

Initially, theTarka trail was created which traces the otter's fictional journey through the countryside. It is designed to attract walkers and bicyclists. Conservation and tourism have been intertwined in the project from the beginning. TheTarka Project has raised funds for its own conservation by levies on various services sold by members of theTarka CountyTourism Association (TCTN), donation boxes for voluntary tourist contribution, and the Friend of Tarka membership organization. A newly created Tarka Conservation Fund collects and uses the funds for efforts ranging from providing new tools to community groups working on conservation projects, to buying tree saplings, to supporting educational programs for children.

One of the lessons of theTarka Project has been the need for community involvement to support sustainable tourism. Initially, the residents of the area were not included in the planning process. As a result, the conservation efforts of the project were not actively supported by tourism businesses or organizations. Only later, when the TCTA was formed, was the commitment of the tourism industry secured. This showed that the private sector would adopt sustainable tourism concepts once they understood the economic benefits.

Evaluation of Other Benchmark Countries Efforts to Develop Ecotourism

The benchmark countries have been developing ecotourism in an effort to develop their economies while minimizing the impact on the unique natural resources. For purposes of this report, the benchmark countries include Costa Rica, Trinidad, Cuba, Malaysia and Singapore, Israel and Jordan. Details of some of the ecotourism efforts of a select group of the benchmark countries are detailed below.

Costa Rica

In 1992, the U.S. Adventure Travel Society claimed that Costa Rica was the " number one ecotourism destination in the world" Costa Rica offers the ecotourist a wide range of ecotourism experiences. Costa Rica's ecotourism industry is built on its national park system.

Monteverde Cloud Forest Reserve

The Monteverde Cloud Forest Reserve is Costa Rica's leading ecotourism destination. The reserve was created initially to protect the primary breeding area of Monteverde's rare golden toad. From the beginning, local residents have played a central role in managing the growth. Through the 1980s and 1990s, the number of visitors to the reserve skyrocketed. Reserve officials began to fear large problems and took action. They limited the number of visitors at one time, restricted most visitors to well-marked trails, hired and trained more naturalist guides, and increased entrance fees. All of these efforts were an attempt to manage the increased number of visitors' impact on the surrounding environment.

The strong financial resources the reserve provides helps protect its natural resources.

Tortuguero

Ecotourism qqs been a mixed bag for the people of Tortuguero. Tourists come to Tortuguero to visit the largest nesting beach in the Caribbean for green sea turtles and other types of turtles. Tortuguero is remote and cloudy and there are sharks in the water and black, silty sand on the beach. All of these factors make it unsuitable for resort tourism. But its turtles make it a big draw for ecotourists.

This, however, has not translated into a large benefit to the people of Tortuguero, due in large part to a lack of organization and a weak sense of community. However, ecotourism has been good for conservation. The local people now understand the economic value in protecting the turtles as well as other threatened species. Local turtle guides have been trained. Tourists must visit the nesting sites in groups of ten or fewer led by a trained guide. Only one group at a time is permitted near a nesting female.

The lack of organization and fracture within the community may ultimately be a stumbling block along Tortuguero's road to balance conservation and tourism. Logging is being carried out in the community now and a road under construction is expected to bring a sharp increase in visitors.

Trinidad

Asa Wright Nature Center

The Asa Wright Nature Center was once a cocoa, coffee and citrus plantation. Now it is a 480-acre forest preserve, lodge and research facility and Trinidad's premier ecotourism destination. Beyond the fact that he center is known for its abundance and variety of birds including the scarlet ibis, it is unclear what steps are being taken to protect and preserve this resource. In fact, the once abundant scarlet ibis, the national bird, have been forced to take refuge in the swamp or fly across to Venezuela to avoid hunters' bullets. Apparently, water contamination and pressures from tourism have not improved the environment for the ibis.

Toco Village Demonstration Project

The Toco Village Demonstration Project is the result of an effort of the national government attempting to increase tourism. The vast majority of the 270,000 annual visitors to Trinidad and Tobago do not venture far from the coast. The Toco village, a small and poor interior village formed a foundation to develop an ecotourist project. The foundation developed plans for a lush, bird-laden nature trails in the mountains and visits to its five rivers. The plans have not moved beyond the idea stage yet and they do face significant obstacles in the form of inadequate infrastructure.

Malaysia

Sukau RainfNest Lodge, Sabah, Malaysia

The Sukau Rainforest Lodge allows visitors to experience the wonders of the rainforest in an environmentally low-impact way. The lodge is a model of environmental sensitivity. It was built on stilts using indigenous woods. The aim of developing the lodge was to create alternative employment for the locals who were out of work when the logging industry closed down.

The lodge uses solar energy to supply its electricity and hot water. Cloudy days do not present a problem because of the well-insulated generator. At night, a solar battery supplies the power to avoid disturbing wildlife.

Rainwater is collected, filtered and boiled for drinking. Bathroom water is also supplied by river water that is treated and sand filtered. No sewage is discharged into the river. Biodegradable wastes are composted and bottles and cans are separated and sent out for recycling.

This lodge generated $100,000 in its first two years of operation for the local economy through employment, boat, jetty, bench and plank walk building and hiring ferries and purchasing fuel and food.

Lessons Learned from Efforts in Major and Benchmark Countries

The one theme that keeps coming out of the exploration of ecotourism in the major and benchmark countries is that the local community must be educated about the importance of protecting and preserving the environment, involved in decision making, and committed to the goals of developing a sustainable community. Additionally, the government must be seen as a help not a hindrance to a local community's efforts.

Clearly the community must be educated about the importance of minimizing the impact on its most precious resources through an EMS. The long-term gains must be demonstrated so that when it is time to make decisions about tourism and ecotourism development the short-term benefits are not as attractive. Education also lets people know that implementing an EMS can have some immediate and direct positive consequences.

The community of stakeholders must also be a part of the process. From Whistler to Wales to Malaysia, it has become clear that for projects to succeed both economically and environmentally, the local community must be involved. The project must be generated from within the community and not outside it.

Through education and involvement in the process, stakeholders will be committed to the ultimate goals and doing what it takes to reach their goals. get there.

Finally, the key to the success of any attempt to develop ecotourism and the concommitant need to have a structure in place to protect the environment like an EMS is flexibility. What works for one tourism destination or hotel may not be the answer for anothdr.

Keys to Developing a Successful Environmental Management System Policy and Strategy for the Tourism Sector

One of the most important aspects of a successful EMS strategy for the tourism sector is the need to educate the members of the industry on the direct and longterm benefits of an EMS. The importance of reducing environmental impact and an EMS must be internalized in the tourism community and beyond. A low-cost approach to assess each members "environmental health" must be developed in order to include as many of the players as possible. High ticket audits will not do. Certification to a particular standard, be it Green Globe or ISO 14001, may not be the answer because of the high cost of certification. If the goal is to get as many members of the industry on the road to improving their environmental impact as possible, then the net must be cast wide.

Ecotourism cannot be developed in a vacuum. It must be based on the existence of sustainable communities, because without the support and commitment of the surrounding community in a real and environmentally astute way, ecotourism is just a house of cards that will topple at the first shift in the wind.

THE BAUXITE/ALUMINUM AND EMS: THE GLOBAL PERSPECTIVE

Bauxite/Aluminum in Jamaica

The bauxite/alumina sector has embraced EMS 'a s part of the highest level of decision-making. Bauxite/alumina companies are by their very nature large organizations. The leader worldwide, and indeed in Jamaica has been Alcan. The EMS at Alcan, internationally is the result of parallel evolutions: one within the company and the other in the world at large. From as far back as 1978, Alcan's policy statement and management practices were aimed at integrating environmental management into day-to-day running of its operations.

Locally, Ajlam has implemented all the elements of ISO 14001 but w ill not be seeking EMS certification from ISO or any other certifying organization because it believes.that its own efforts are satisfactory. Alpart has commenced implementa tion of their EMS as well. CAP (Alcoa, Jamaica), has implemented Alcoa's version of an EMS very similar to ISO 14001, but has no intention to be certified, as ther see no marginal benefit from certification.

Driving forces behind the implementation have been customer request, global competition, public recognition, government policy, marketing identity and standards. The main obstacles encountered in implementing have been, document control and getting the workforce to adhere to the dictates of the system as well as following the documented procedures.

Introduction

Without a doubt, the discovery of aluminum is one of the greatest contributions to industry and the economy during the past 100 years. From soda cans to rocket ships, aluminum has been the answer to tough design challenges as a weight and cost-saving construction alternative to steel, wood and other materials. Its value is well known in many areas of construction, as well as in automotive, aviation and marine applications, and has become the "material of choice" for a growing number of industries. In fact, a pound of aluminum can replace twice the weight of steel in most applications, and aluminum has a higher strength-to-weight ratio than most other metals or materials.

Additionally, aluminum is one of the most recycled and the most recyclablematerials in the world. As an economic force, alumina (aluminum oxide) is the third most abundant natural resource in the Earth's crust. Only oxygen and silicon are more common. Indeed, the Earth's crust contains 8 percent aluminum to a depth of 10 miles, and in its raw form, tends to combine with other common elements or minerals. It rarely occurs in nature in its metallic form. Its compounds, however, are an important constituent of virtually all common rocks, and are found in clay, shale, slate, schist, granite and several others.

The most important aluminum ore, however, is an iron-containing rock consisting of about 52 percent aluminum oxide, which was discovered in 1821 near Les Baux in southern France. The material was later named bauxite, and can be best defined today as an aluminum ore of varying degrees of purity. Bauxite has been found in all the world's continents except Antarctica. The richest deposits generally lie in areas that were in tropical and subtropical climates during formation, providing optimal conditions of heavy rainfall, constant warm temperatures and good drainage. Today, large deposits are found in the Caribbean Islands-especially Jamaica-northern South America, Australia, India, Indonesia, Malaysia, China, Russia, Kazakhstan, western Africa, Greece, Croatia, Bosnia and Herzegovina, Montenegro, Hungary, Italy and France.

While it is commonly found in paints, foil, jewelry and beverage cans, the largest user of aluminum is the transportation industry, particularly in the production of passenger cars in the United States. In fact, in 1994, transportation emerged as the largest market for aluminum, at about one-quarter of the market, with passenger cars accounting for the majority of the growth, according to the Aluminum Association. That trend continued each subsequent year, and in 1998, transportation accounted for 30.9 percent of all U.S. shipments of aluminum.

Although the majority of bauxite and bauxite production occurs in tropical areas around the wdr1d, the United States is the world's largest market for the aluminum industry, producing about $35 billion in products and exports. U.S. companies also are the largest single producer of primary aluminum, creating more than 22 billion pounds of metal annually and employing 143,000 people to the tune of $4.8 billion. In fact, experts say aluminum is one of the few products and industries left in the world that truly impacts every community, either through physical plants and facilities, recycling, heavy industry or consumption of consumer goods.

The Environmental Effects of Bauxite Mining

But it takes a lot of work and energy to utilize the many valuable uses of aluminum. The bauxite material must be extracted from the Earth-usually in large, open pits-crushed, sometimes dried and transported to processing plants via ship, barge, rail or truck where other manufacturing processes, including heat and chemicals, occur to produce the shiny metal. These basic processes for making aluminum has not changed in more than a hundred years.

These processes obviously have a significant impact on the environment in many parts of the world in a number of ways. No matter how one examines it, mining will never be considered a "green" activity. Simply said, digging deep, wide holes in the Earth and using potentially harmful chemicals to extract the ore seems less than an "environmentally friendly" practice.

No where on the planet are these environmental effects being felt more than in Jamaica. Bauxite and aluminum mining are Jamaica's second largest industry, and the island nation is the world's third largest producer of this vital, nonrenewable natural resource-behind Australia and Guinea. Bauxite accounts for about 75 percent of total exports in Jamaica annually, with the majority of it being shipped to the United States.

Because the island is so dependent on the export to support its struggling economy, bauxite mining will likely continue for generations to come. But with that industry's contribution to the economy comes a major withdrawal to the environment at a significant price. The principal environmental issues facing Jamaica with bauxite mining are caustic soda contamination of water supplies, (which is used to extract alumina from raw bauxite) bauxite and alumina dust and eco-system dislocation.

The primary environmental problem caused by the industry is the disposal of the tailings, or caustic soda, which form an alkaline mud. The original procedure that was used to dispose of the red mud was to pump material into mined-out ore bodies and valleys, according to the International Bauxite Association. However, these "red mud lakes" resulted in the percolation of caustic residues (sodium) into the underground aquifers in local areas, ultimately contaminating some drinking watert supplies. A later approach was to build sealed ponds in which the interior of the ponds was lined with 12-14 inch clay sealant. These ponds, which were 100-120 acres in area, created other problems, including their construction on highly arable lands. Ponds were designed to hold 5-7 years of mud storage. Furthermore, these ponds never dried out after they were full and consequently had to be abandoned.

This is an issue for Jamaica, because most of the bauxite on the island is "gibbsitic," which means the bauxite must be dissolved with the soda. The average grade of bauxite mined in Jamaica is

made of 45 percent alumina and 1.5 percent reactive silica-the rest is comprised of other minerals. In order to remove the iron oxides and most of the silicon oxides present, the ore is first treated with sodium hydroxide, a toxic chemical in high concentrations. The digestion process takes advantage of the solubility of amphoteric aluminum oxides to form a solution of aluminate ions, while the basic iron oxides that form do not dissolve and are separated by filtration.

The escape of caustic soda into the groundwater supply significantly increases sodium concentration of domestic well water mostly in the rural areas. Readings obtained from domestic water wells in the vicinity of Jamaican alumina refineries in the mid-1990s indicated elevated sodium and PH readings. Sodium is associated with a higher incidence of hypertension in humans. As a result of its genetic composition, the Jamaican population is particularly subject to hypertension, which can be aggravated by high levels of sodium.

The environmental impact of Jamaica's bauxite mining symbolizes the majority of mining or heavy industrial operations all over the world. Bauxite mining, which is considered surface mini.ng, is also land extensive, noisy and dusty, causing an increasing concern for the loss of habitat for Jamaica's unique plant and animal species and causing respiratory problems for habitants near mining facilities.

Bauxite mining also severely affects the water retention capability of the soil once the bauxite is extracted. The Jamaican Mining Act of 1947 requires mines to remove topsoil before mining and restore it as part of the reclamation process. However, due to the enlargement of the surface area after mining, and the extraction of much bauxite, the soil is less capable of retaining water.

Additionally, refineries and port facilities, besides handling bauxite and alumina, handle an enormous amount of fuel oil, caustic soda, lime and other chemical inputs. Storage bunkers are situated close to the shoreline and are relatively exposed, which can and do result in spills at the ports. These refineries are also subject to spills and other incidental releases, including air pollution for oil combustion for power generation.

With these issues in mind, added to the small amount of land the island nation has, Jamaica needs to find mining techniques that are less harmful to the environment and more efficient to the industry to continue to grow the economy in a sustainable way.

Environmental Management Efforts and Benefits in Mining

The mining companies in Jamaica reached an agreement several years ago outlining the general techniques that are to be used in rehabilitating bauxite mines of different sizes and shapes, in accordance with applicable laws and regulations. The initial stage of the mining process begins with careful consideration of the rehabilitation process that will be needed later so that the first 18 inches of topsoil is carefully removed and stored for replacement following the depletion of the mine. Jamaica has one of the best records for rehabilitation of mined lands in the world. The establishment of forest, growing vegetables, rearing livestock, cattle and sheep on the mined land have been some of the successful attempts made by companies to repair the environment. But there is still much room for improvement in this area in Jamaica and elsewhere.

The Jamaican bauxite companies are known to maintain well-equipped environmental units with staff trained in environmental management. This is a growing trend in this industry, and companies also are drawing upon the technical resources of parent firms in the United States, Canada and Europe concerning economic and environmental issues.

Jamaica is a member of the International Bauxite Association (IBA), established in 1974, which groups the majority of the world's main producers and has its headquarters in Jamaica. Several

foreign companies and the Jamaican government operate the Jamaican Bauxite Industry. Canada's Alcan Corp., Alcoa and Kaiser of the United States and Hydro Aluminum of Norway, all are involved in mining and refining on the island. Many of these organizations have been involved with proactively dealing with the environmental concerns for years, but a growing number of aluminum and bauxite facilities worldwide are embracing environmental management systems (EMSs) and particularly, the ISO 14001 EMS standard. Published in 1996 by the International Organization for Standardization, ISO 14001 is working for mining companies and thousands more in industry to achieve better environmental performance and continually improve a systems approach to handling environmental issues.

This systems approach toward environmental improvement and pollution prevention not only reduces the impact by the bauxite mining industry on the environment through greater environmental awareness and proper training, but perhaps more important, it also improves a company's bottom line, offering incentives to the business for taking a proactive approach with environmental issues.

“The aluminum industry can be proud of the advances that it has already made in pollution prevomtion:” said Stephen Larkin, president of the Aluminum Association in Washington, D.C., at a 1998 pollution prevention conference." As an industry, we actively work on reducing air emissions, water discharges and solid waste generation. Our primary plants operate air pollution equipment which not only captures pollutants but recycles materials so essential to our process."

Larkin added that the aluminum industry recently partnered with the U.S. Department of Energy for a vision of the environmental future in all regions affected by aluminum production.

"We hope that the government continues this trend-working with industry, listening to our concerns, using our expertise and recognizing that there is more than one way to effectively address our environmental and energy challenges"

At Alcoa Intalco Works in Washington state, company workers found the way to address those challenges was using ISO 14001, according to Aluminum Today.

Cambior kept good records prior to certification, officials said, but ISO 14001 provided additional guidance by which employees must adhere. And because mining involves elements such as exploration and operation, it is vital to note where improvements can be made in the process.

But Cambior is no stranger to environmental management systems; it's had its own EMS in place since the company's inception in 1986. But the company's top management decided that ISO 14001 would show the public that Cambior has a sound system in place and that it's committed to reducing its impact on the environment.

"It's proof that our system is good:' said Gail Amyot, an environmental engineer at Cambior. "It's proof to the public that you understand your environmental issues and control them"

Cambior said one of its biggest returns from ISO 14001 was employee awareness concerning the environment.

The company said employees are required to attend courses on the standard, emergency programs and environmental impacts. In addition, the certification process also provided Cambior with some "intangible" elements of the stanclard-specifically, employee buy-in, he said. Because the education of employees is vital to the company's production, when staff understand the environmental aspects and impacts that accompany mining, they are much more likely to become "sensitized" toward improving the company's overall EMS.

"When you involve the employees, you get it back 100-fold," said a Cambior official, adding that employee support is one of the standard's most important pluses. The official said that Cambior is already enjoying perks from implementing ISO 14001. The company can relish its competitive advantage as it settles into its role as the one of the first mining companies in the world to certify to ISO 14001.

"ISO 14001 heightens a corporate profile and its credibility:' said Bruno Delorme, Cambior's marketing manager. "Too many companies operate off the cuff:' he said, adding, many "environmental management companies have not formalized aspects and impacts-this system has allowed Cambior to mobilize things like energy consumption." In addition, the company has seen some cost savings in the use of raw materials and solid waste.

Delorme said the process of auditing Cambior was different from most. "Cambior is not your typical site. It's not one address and you simply show up to the audit," he said, adding the whole process required visiting the company's many sites to accurately measure its environmental impacts and examine its objectives and targets.

One of the most important elements of Cambior's certification to ISO 14001 is its emergency preparedness program, which ultimately works to help reduce liability. Cambior also is strongly committed to reclaiming the land to the best of its abilities when the company's mining activities are complete. Whether it's underground or open-pit mining, Cambior performs intensive studies of the land before beginning the mining process. When the mining is complete, they try their best to return the land to its original state.

Other bauxite and metal mining companies also are taking advantage of the ISO 14001 EMS. Leading companies like, Dubai Aluminum Co. in the Middle East, NALCO Ltd. in India, Slovalco in Europe all are using an EMS or ISO 14001 to address the environmental issues they face every day with mining operations.

But another leading producer of aluminum/bauxite is Alcan, headquartered in Canada. Company officials say that they not only are using ISO 14001 as a tool to take the company to new operational levels with improved environmental performance, they also are sharing their experience with their competitors and supply chains for improvement across the industry.

Environmental responsibility at Alcan starts at the top with the president and chief executive officer who, along with five outside directors, is a member of the Environment Committee of the Board of Directors. The role of the Environment Committee is to review environmental policy and management programs, monitor the effectiveness of the systems in place and evaluate management's plans and long-term objectives.

At Alcan, line management is at the forefront of overall environmental responsibility. This ensures that effective programs can be put in place, taking into account internal, local and global concerns. Each executive vice president and, therefore, each Alcan business sector, has individualized programs outlining performance expectations.*

But Alcan is taking operating performance data and technology to new heights, using it in new ways to reduce the consumption of energy, water and raw materials at each facility. All of the information must be maintained in a database to help monitor continual improvement, a goal in place at all Alcan facilities as they strive for either "plant best" or "world class" performance.

Recycling Aluminum and EMSs

Additionally, a significant and growing program with Alcan's EMS and dozens of other aluminum and bauxite companies involves recycling of materials. The business benefits to recycling efforts are beginning to show on the bottom line of these companies significantly.

Recycling is of vital importance to the aluminum industry because it saves energy. A recent life cycle study indicates that recycling saves almost 95 percent of the energy needed to extract aluminum from the original ore, proving that it is a critical component of the industry, both from its contribution to the environment and because of the favorable economic impact on production. This dual benefit is probably the reason aluminum beverage cans now account for the total beverage can market.

The amount of recycled aluminum increased dramatically in the last ten years. In 1998, of the 102 billion aluminum cans produced, about 64 billion were recycled by Americans alone. This amounted to a 62.8 percent recycling rate for the U.S. aluminum beverage can industry, up from a rate of about 15 percent 25 years ago, according to the Aluminum Association. The percentage of aluminum recycled from beverage cans continues to surpass all other recyclable packaging materials. Today, aluminum cans represent only 1 percent of total landfill volume in the United States, and this percentage is actually falling.

Additionally, almost 90 percent of automotive aluminum is reclaimed and re cycled. In fact, one noteworthy case in this effort is the Ford Motor Co., which recently required all of its suppliers, including aluminum production companies, to implement and certify all manufacturing operations by 2003. Ford itself recently announced that all of its 140 manufacturing sites have received third-party certification to ISO 14001, and has saved millions of dollars and made vast improvements with environmental performance using the standard.

But Ford is also trying to take its savings and environmental knowledge to the public. To that end, it recently unveiled the new Ford P2000, a breakthrough research vehicle program that will produce the world's lightest weight mid-sized family sedan. Ford has chosen to make extensive use of aluminum (733 pounds or 37 percent of th ' e total vehicle weight) with the vehicle's production. The vehicle is set to launtlN in the coming months.

The Concept of Sustainable Mining

Although recycling and EMSs are taking the aluminum industry by storm, bauxite mining has a long way to go before it is ever accepted in the world as an environmentally friendly practice.

But it's not out of the realm of possibility. In fact, there is a growing amount of work in the field of sustainable mining, which hopes to be the next wave of green practices in the industry.

"This is a huge topic:' said Connie Ritzert of the International Primary Aluminum Institute, a global forum of primary aluminum producers dedicated to the development and wider use of aluminum as a competitive and uniquely valuable material. "EMS and sustainability has been an issue for the aluminum industry for a long time. When you're digging up vast quantities of Earth, it's obviously a concern for management of those industries. Environmental management plans well into business management plans for this industry"

And sustainability hopes to fit into those plans as well. Since the Earth Summit in Rio cle Janeiro in 1992, however, some experts say the adjective "sustainable" has been used, and abused, in every possible context. And to some environmental groups, sustainable mining is an oxymoron. Minerals, such as bauxite, are both finite and non-renewable. Mining those minerals can, however, foster sustainable development in the region where it takes place, as illustrated in many established mining countries. Sustainable development is feasible in places like Jamaica if returns or profits

from the depletion of mineral resources is reinvested into either available substitutes or a more sustainable form of development than mining itself.

As mentioned above, however, mining is a productive activity, which has to compete fairly in terms of economic viability to ensure the economies of many developing countries continue to grow. But experts say if mining companies are serious about sustainable development, the economic, social and environmental dimensions have to be integrated. Many proactive corporations like those above see the need to shift their focus from an end-of-pipe environmental response to a more socially accountable and responsive approach. To that end, a partnership with community members should be considered.

There are several practical steps which corporations can implement in this regard. During the exploration phase of bauxite, for example, experts say that it makes economic sense to have people specialized in community development rather than anthropologists on the payroll (along with drillers and geologists), in order to launch participatory social awareness and education programs with the local community. Theseprograms are critical to facilitate the dialogue between the company anctremote communities to ensure that they grasp the implications of mining development as well as its tradeoffs. These programs will contribute to deepening the perceptions and analytical capacity of the community to understand its development options. This awareness and capacity for decision-making will prove valuable when a mining company is ready to make a big investment with a new mine.

Mining companies should also ensure that its management, field staff and shareholders are sensitive to every environmental initiative and every new mine development plan. Moreover, because mines do not last forever, mining companies should use their financial muscle to stimulate governments into facilitating nonmining economic development, and encourage the use and certification of environmental management systems for the mining industry and neighboring industries as well. This will help increase the area's infrastructure, absorb excess labor and, as a result, reduce the political and social pressure on the mine from environmental public interest groups.

Business leaders now realize that sustainable business practices and proactive environmental management initiatives enhance market success. But more important, consumers worldwide are becoming more aware of the environment around them. Using sustainable tools and proactive technology, environmental concerns can be reduced and better stakeholder trust can be achieved in the new millennium.

COFFEE PRODUCTION AND EMS: THE GLOBAL PERSPECT

Coffee and EMS in Jamaica

There have been' attempts to reduce the negative impacts of the coffee industry on the elnvironment in Latin America through various projects such as the EC O.K. Conservation, coffee project. However, none of these projects use classical EMS as its tool to effectimproved environmental management.

In Jamaica, the process towards EMS implementation has only just commenceid with an attempt at the Coffee Industry Board to develop an EMS "policy" for the industry. The main driving force is global competition, while the main obstacle to implementation, is convincing the decision-makers on the cost-benefits of EMS.

The Plant Manager of the sole processor of spray-dried coffee, Salada, says he knows very little about EMS and is not concerned because Salada has no effect on the environment.

Introduction

For centuries, coffee has been a centerpiece of life in nearly every culture on the planet. From coffee shops to coffee tables, the aroma and flavor of the world's most popular beverage is intoxicating to nearly everyone. Moreover, the production and sale of coffee is one of the planet's most lucrative commodities-second only to petroleum production. And not only is it a multi-billion dollar industry, coffee production also employs more than 20 million people globally. In those terms, coffee affects every culture, from growing and processing the coffee beans in the developing world to selling it on the NewYork Stock Exchange.

But with such a huge impact on the world's economy, coffee production has a parallel impact on the environment. The erosion of the soil from the billions of trees, the processing, the canning and transport of the final product all affect the environment and its region's inhabitants-including animals and plant life-often in a negative way. But some proactive coffee production companies are beginning to recognize these problems, and are taking steps to fix them in a systematic, life cycle manner, from the planting of the seed to the very last drop in the cup.

Coffee's Rich History

Coffee grows on trees, sort of. The coffee "tree" is actually a variety of tropical evergreen shrubs. There are three species of coffee trees and all have an African origin: arabica, liberica and robusta. Traditionally, coffee is produced on small farms beneath a forest canopy. Coffee trees tend to grow in a climate with a temperature range of 18-23 degrees Celsius (65-75 degrees Fahrenheit) at an altitude best suited to the species of coffee tree (liberica and robusta are best grown at altitudes below 2,000 feet and arabicas between 2,000 and 6,500 feet). Rainfall should be plentiful and the weather should switch between heavy rainfall and sunshine to bring the berries to full maturity. The type of soil is not crucial to the coffee trees, but good drainage is necessary. In its wild state, the coffee tree grows to about 8 to 10 meters.

Although the history of coffee is somewhat sketchy, it's effect on society can be traced back to the 15th century, where wild coffee trees, probably from Ethiopia, were taken to southern Arabia and placed under cultivation. However, one of many legends about the discovery of coffee goes back much further to the story of Kaldi, an Arab goatherd, who was puzzled by the queer antics of his flock. About 850 A.D., Kaldi supposedly sampled the berries of the evergreen bush on which the

goats were feeding and, on experiencing a sense of exhilaration, proclaimed his discovery to the world.

Whatever its historical origin, the stimulating effect of coffee undoubtedly made it popular, especially in connection with the long religious service of the Muslims. The orthodox priesthood pronounced it intoxicating and therefore prohibited by the Koran, but despite the threat of severe penalties, coffee drinking spread rapidly among Arabs and their neighbors.

During the 16th and 17th centuries, coffee was introduced into one European country after another; many accounts are recorded of its prohibition or approval as a religious, political and medical potion, according to Britannica. The first coffeehouse in London was established about 1652, and soon after, coffeehouses emerged in many parts of the city, becoming centers of political, social, literary and eventually business influence. By 1675, there were nearly 3,000 coffeehouses in England. And in North American cities such as Boston, New York City and Philadelphia, coffeehouses became popular beginning in the late 1600s.

Until the close of the 17th century, the world's limited supply of coffee was obtained almost entirely from the province of Yemen in southern Arabia. But with the increasing popularity of the beverage, the propagation of the plant spread rapidly to Java and other islands of Indonesia in the 17th century and to the Americas in the 18th century. Coffee cultivation was started in the Hawaiian Islands in 1825. Seedlings produced and shipped by the Amsterdam Botanical Gardens, later classified asarabica, account for most of the billions of trees now growing in South and Central America and the Caribbean.

By the 20th century, the greatest concentration of production was centered in the Western Hem isphere-particularly Brazil. In the late 19th and early 20th centuries, industrial roasting and grinding machines came into use, vacuum-sealed containers were invented for ground roasts, and clecaffeination methods for green coffee beans were developed. Indeed, coffee production had spread like wildfire on nearly every continent and was traded in every culture.

Coffee Production in Jamaica and Elsewhere

Today, Brazil is the world's leading supplier of coffee, followed by Colombia and Indonesia. According to researchers at the University of Maryland, there are more than 27 million acres (11 million hectares) of land now being used for coffee production global ly-equivalent to a solid one-mile wide strip of land around the equator. World coffee production in 1998/99 was forecasted at a record 107.5 million bags (60 kilograms or 132.276 pounds per bag), 14 percent above the revised 1997/98 level and up 3 percent from the previous record set in 1996/97, according to the U.S. Bureau of Statistics.

Ninety percent of all coffee farms still occupy 10 acres or less, and indigenous people own the majority. Traditional coffee farms also cultivate other crops, including cacao, fruit, avocados and trees for firewood. In the past, chemical fertilizers and pesticides weren't needed much on these smaller farms, because the shading trees inject nitrogen into the soil, and their leaf litter is home to beneficial insects that devour nematodes-soi l -born organisms that attack roots. However, the use of pesticides is growing on sun-dried farms, causing pollution problems that will be discussed later in this article.

Jamaica coffee production is ranked 31st worldwide, and the estimated figures for the recent Jamaica crop season are expected to be at record value. Although Jamaica does not have much of the world market in terms of production, the beans are well known for their exceptional quality, and "Blue Mountain" coffee commands extremely high prices. The type of coffee comes from Blue Mountain Peak, which lands approximately 2,256 m (7,402 feet) high above the coffee fields in

Jamaica. The average rainfall for the island nation is about 198 centimeters (78 inches) and the average temperature is 27 degrees Celsius (82 degrees Fahrenheit). Jamaican coffee farms grow arabica coffee, and it is graded depending on the altitude at which it is grown and processed into lowland and high mountain types of coffee.

Coffee plantations, including those in Jamaica, are usually established on cleared forestland. The young shrubs are planted in rows spaced so that the density varies between 500 and 750 plants per acre (1,200 and 1,800 plants per hectare). Seedlings or cuttings raised in nurseries are carefully planted at the beginning of the rainy season until they start producing fruit 3 to 5 years later. Their care is limited largely to the trimming required to give them a robust, balanced framework and to stimulate fruiting. However, the coffee tree does not begin to produce its full yield until its sixth year and will continue to produce beans for about 10 years.

In Jamaica and elsewhere, the coffee tree's fruit does not all ripen at one time, which is why it grows well in mild climates. In fact, it will have blossoms and berries in various stages of ripening, usually red or purple in color when fully ripened. This fact complicates the harvesting of coffee since only the ripened berries can be picked. If the berries are left too long, their beans will spoil. This fact requires that the pickers of quality coffee return to each tree numerous times to harvest its berries. Since each tree only yields about two pounds of beans per year, this equates to a great deal of labor for every cup of coffee.

Once the beans are harvested, they are prepared for market, requiring that the fruit's inner parchment and outer hull of the bean be removed. Either the wet method or the dry method removes these outer layers. In the wet method, the beans are mechanically de-pulped and then ' soaked in fermentation tanks for up to three days. In the dry method, the berries are either sun-dried or machine-dried with the outer fruit intact. After drying, they are de-hulled mechanically, producing beans that are characteristically lower in acidity, yet fuller-bodied and more complex in flavor than washed coffees.

The availability of abundant supplies of clean, fresh water often determines which processing method the coffee producer will use. In Central and South America, the wet method is predominately used, while in East Africa and Yemen, the dry method is used. After having gone through either of the above methods, the coffees are sized, sorted and graded by hand, and then sent to be roasted.

The high temperatures develop the aromatic qualities of coffee during this roasting or broiling process. Temperatures are raised progressively to about 220-230 degrees Celsius (430-440 degrees Fahrenheit). This releases steam, carbon dioxide, carbon n1pnoxide and other volatiles from the beans, resulting in a loss of weight between 14 and 23 percent. Internal pressure of gas expands the coffee beans by 30 to 100 percent. The beans become a deep, rich brown, and their texture becomes porous and crumbly under pressure.

After leaving the industrial roasters, the coffee is rapidly cooled in a vat, where it is stirred and subjected to cold air propelled by a blower. They are then sent to a grinder or sent to be packaged as whole beans, and ultimately, to the consumer.

Environmental Effects of Coffee Production

People all over the world struggling to stay awake every morning usually don't spend a lot of time worrying about where their cup of coffee comes from, or its profound effect on an ecosystem. But from the time the seed is planted to when the final product is purchased, there are myriad negative effects that coffee production has on the environment. Additionally, most people would be surprised

to learn that their coffee was most likely picked by migrant workers earning less than a dollar a day in pesticide intensi ve, high-output factory farms.

As mentioned above, pesticide use on coffee farms has several environmental effects, including a great impact on aquatic life when the chemicals are absorbed into the soil and transported from the mountain slopes into the water systems. Pesticide usage has escalated with the increase of fungicidal plagues. "Endosulphan," a chemical pesticide used to protect crops from these plagues as well as grasshoppers, caterpillars and beetles, is used extensively on coffee farms and is showing up in the island's waterways. Studies have found that Endosulphan is toxic to fish and the residues in contaminated fish and shrimp are pa ssed on to residents who fish in those rivers and streams. There is also the danger of slow chronic effects on people who bathe in Jamaica's rivers and waterways.

Additionally, environmentalists and scientists are concerned that coffee production along the Blue Mountain range is destroying the immediate environment and the ecology of areas several kilometers away, largely because of pesticide use and soil erosion.

"Jamaica has been unfortunate in that it never developed or adapted from abroad, the hillside farming technology," Dr. Ajai Mansingh told IPS News. Mansingh researches the environmental effects of pesticide use on coffee farms at the University of the West Indies (UWI). "Its prime agronomic plains and gentlysloped valleys were owned by the big plantations and the hills were left to the ordinary farmer who never had the resources for developing and implementing the required technology.

Mansingh said Jamaica's Coffee Industry Board initiated the "rape" of the St. Andrew hills in the 1980s by carrying the continental agronomic technology to the Blue Mountain slopes, in spite of great protests from environmental groups and UWI scientists. Rather than developing and implementing the cheapest and most effective technique of terracing slopes of over 30 degrees, he said the CIB agronomists cut roads and planted trees without any consideration to the angle of the slope, drainage, soil erosion and run-off of agricultural chemicals.

Additionally, in the hills of upper St. Andrew, two large pipelines from the Mavis Bank coffee plant discharges several gallons of waste daily from coffee berries into a small tributary nearby. The riverbed is now black and the once clear water is rustbrown. On the banks of the stream lie mounds of coffee berry trash thrown away after the bean-removal process. This tributary flows into the Yallahs catchment area, one of the main sources of water for Jamaica's capital, Kingston. Environmentalists say processing plants like the Mavis Bank are a major source of contamination of the island's water supply. The country's two main reservoirsMona in the east and Hermitage in the west-are fed by water running from the slopes of the Blue Mountains. The reservoirs provide water for more than 800,000 residents of Kingston, the industrial and commercial capital and its surrounding environment. Many residents in the rural areas depend on rivers flowing from the Blue Mountains for their domestic water supply.

But perhaps an even greater environmental effect that coffee production has on Jamaica is on the island's land itself, in terms of the clearing of forest canopies and its effect on rare animal and plant life. Coffee farming is responsible for the loss of some 10 to 40 tons of topsoil per year on the island. Environmentalists say that the coffee plants are not strong enough to hold the soil together, hence the huge loss.

But many of the farmers aren't aware of the damage that they are doing to the environment, believing that the lush hillside, which has been around for centuries, will remain long after they are gone regardless of what they do. But Mansingh said that on a visit to the area two years ago, he noticed that some sections were almost devoid of soil. "I was told by elderly farmers that some 40

years ago the slopes were lush green. The same could happen anywhere in the island where proper agronomic practices are not followed," he said.

Proper practices are also important to the billions of birds that migrate to Jamaica and other tropical areas each year. The close connection between birds and shade coffee plantations was first reported by American Museum of Natural History ornithologist Ludlow Griscorn in the 1930s. He noted then that coffee growers left much of the natural forest to shade their plants, and that birds and animals were little affected by the rise of the plantations. Fifty years later, University of California biologist Robert Seib did a landmark study of snake diversity in Guatemalan coffee farms, renewing the connection. A number of recent studies has also shown a clear link between coffee production and bird biodiversity. The conclusions are unanimous: Traditional shaded farms host high levels of biodiversity, but the raw ultra-productive, chemically intensive "full-sun" farms are disasters for wildlife.

There are about 250 species of birds that breed mainly in the temperate region of North America and winter mainly in the tropics, including waterfowl, shorebirds, raptors and songbirds. As they funnel down through Mexico, the narrow strip of Central America and the Caribbean Islands, the birds are compressed into spaces much smaller than their breeding area. Scientists guess that between 2 and 5 billion birds make the annual journey, and the land and trees that are winter homes to these birds are disappearing rapidly, sometimes due to sun-filled coffee plantations.

The importance of coffee as bird habitat is magnified by two crucial conditions. First, coffee is widespread, the most important crop for many areas. It occupies the intermediate altitudes between 1,500 and 4,500 feet, dominating the entire ecosystem. In addition, coffee is strategically valuable, often surrounding parks that form biological corridors between green areas or standing alone-a forested island in a bare landscape. These issue make coffee a paramount concern for environmentalists and organization like the Audubon Society.

Environmental management is also hitting the coffee industry in places like Mexico and Colombia, and of all places Malaysia.

In a region known for choking smog and pollution, the Nescafe Co. in Shah Alam has taken a proactive approach to its milling and incinerator operations, thanks to cleaner technology and aligning its management system with ISO 14001. The Switzerl and- based NestI6 Foods Co. owns the facility, which is the world's largest food company. Nestle has a total workforce of approximately 225,800 people in some 495 factories worldwide-and all of them practice environmental management and ISO 14001.

According to company documents, NestlO has made systematic efforts to account for environmental concerns of all its activities, and like most major corporations with multinational sites, the company hopes to build mutual trust with consumers, governmental authorities and business partners with a continually improved EMS.

At the plant in Malaysia, the Nescafe incinerator has almost achieved zero waste-whereas before, the facility was dumping 15,700 tons of coffee waste a year into landfills, according to a report in the New Straits Times. The facility has also gone beyond regulatory compliance regarding smokestack emissions, simultaneously reducing energy use by 55 percent in fossil fuel consumption.

Those practices earned the company the prestigious Hibiscus Award, which is a prize of recognition in the nation organized by the Research Association of Malaysia, Malaysian International Chamber of Commerce and Industry and the Department of the Environment.

Coffee companies also have been targeting the environmental wave in other parts of the world, and are even focused on growing sustainable or organic coffee, which promotes the concept of sustainable agriculture in the coffee industry.

In fact in 1996, the industry hosted the first Sustainable Coffee Congress. The event was attended by more than 200 concerned industry representatives, from producers and brokers to roasters. The purpose of the Congress was to raise awareness of coffee's role in the ecology of the tropics, and to define the criteria and marketing framework for socially conscious, environmentally friendly coffee.

The word sustainable is a popular way to describe an inherent and timeless component of the 30-year-old organic movement. While many people define "organic" as a stand against the use of chemicals for growing food, in truth, organic farming and organic certification are more holistic in nature. Organic and sustainable encompass the belief that food (or any other organic product) should be grown, processed, marketed and sold in ways that minimize and eventually eliminate any adverse impact on the environment. While these beliefs have been supported by individuals and a few companies in the past, they are now (finally) gaining general support in the coffee industry.

Indeed, there is a growing market of certification notjust of ISO 14001 for coffee farms, but of the whole process of organic coffee. Most organic certifying agencies in the United States now require a review of a coffee farmer's plan for longterm improvement of the land, a review of production methods and a review of the long-term viability (sustainability) of the operation as part of the certification audit. The National Organic Standards Board (NOSB) and the Technical Advisory Panel (TAP), as agencies recommending and reviewing the federal standards for the National Organic Program, use "overall compatibility with a system of sustainable agriculture" as one criterion for acceptability. The International Federation of Organic Agriculture Movements (IFOAM) has also been discussing language to define sustainability. While many parties are working to clarify the term, a firm definition has yet to be reached.

During the Coffee Congress, there were many open discussions held to outline a sustainable coffee cycle-from how coffee should be grown at the source to parameters for how it should be purchased and marketed in the United States. The range of backgrounds and interests represented made it difficult to reach agreement on specific points, but most experts agreed that any definition of "sustainable" needs to be three-sided. The three defining components include ecological friendliness, social responsibility and economic viability. The definitions and criteria of these three concepts are still being developed.

Whether experts call it sustainable, organic, shade grown or "green," support for the movement toward coffee produced in an environmentally friendly, socially responsible manner is on the rise. Consumers are becoming increasingly aware of the coffee trade, and coffee packages featuring words like sustainable, organic and shade grown are beginning to appear-it is still difficult, however, for consumers to know which coffee is truly produced in a sustainable way.

Today, the easiest way to ascertain sustainability is to look for organic on the label-and that information is becoming more viable and standardized every year through international efforts in eco-labeling. This will help encourage people who buy coffee to buy organic, sustainable coffee in the years ahead, which will make a serious improvement to millions of lives while improving millions of acres of fragile, and environmentally critical, tropical forest ecology in Jamaica and the world.

SUGAR

There has been a great deal of emphasis on wastewater treatment in the sugar inclust however, very little emphasis on EMS. The Sugar Industry Researchry Institute (SIRI) has taken the lead role in wastewater treatment research in Jamaica. The following statement by Frank Ward of Mount Gay in Barbaclos characterizes the state of EMS in the sugar industry in that country, it seems that in the industry, EMS is equated with wastewater treatment.

Carohf-(1975), Ltd of Trinidad has started the process towards getting EMS 14001 certification and has set its target at the end of 2001. This is driven by the need to match its competitors, and also because of impending legislation.

Very little information was gleaned on the use of EMS in the sugar industry in the rest of the Caribbean and the wider world. However, there appears to be very I ittle effort,in that direction.

RUM

There is not an industry push for the implementation, of Environmental Management Systems worldwide. Individual organizations have taken their own decision to implement an EMS, but there is no record of any similar industry approach Angostura Limited in Trinidad & Tobago has only recently decided to seek ISO 14001 certification after an external consultant recommended it. The Mount Gay Refinery in Barbados has commenced implementation because of global competition, public recognition, anticipated government policy, market, identity and cost control. All these drivers are common to most large export. Companies not particularly in the rum industry. J. Wray and Nephew Limited in Jamaica received ISO 9002 certification a few years ago and have taken initial steps to implement ISO 14001. This decision was not made because the company is in the rum business, but because it realizes the.benefits of EMS implementation.

The distilleries in Jamaica understand the role of good environmental management, however there are no plans to implement any EMS programs. Emphasis is placed on the wastewater problem rather than comprehensive EMS programs for the entire operation.

The Spirits Pool Association has been working with the Scientific Research Council (SRC), the Natural Resources Conservation Authority (NRCA) and the Water Resources Authority (WRA) towards improving the productivity of member organizations by improving waste water disposal at first and to be followed by EMS implementation. National Rums of Jamaica has not considered EMS.

Amador said that that several other large multinationals, such as IBM, Xerox and the Ford Motor Co., all have recently encouraged their supply chains to pursue ISO 14001 certification, but Dole's program takes a vastly different approach. "It's really the first of its kind because it encompasses all aspects of our operations," Amador said. "The main thrust isn'tjust Doles facilities, but to get all of the independent producers involved to meet the environmental management system requirements. And the company provides them with continuing oversight and assistance."

Dole is trying to set the new standard in the world's agricultural industry by practicing-and preaching to all involved-mature approaches with environmental management in agriculture. The concept has taken a "sea change" in attitude toward environmental issues, and has required a real transformation to educate and re-train the thousands of people and numerous operations involved in the program. Dole officials hope the system will take suppliers beyond the borders of mere compliance, and believe the approach will set the stage for others to follow.

"We've established a number of training facilities for employees and the public," Amador said. "It's important to remember that developing countries often don't have the means to provide this type of training. We're doing that, and we've developed it so it's at the level of understanding for the field worker."

Amador explained that Dole has developed a training program for the EMS that includes "proper training for the trainers." The company believes that training is one of the most important pillars in the installation of an EMS. With over 2,500 field workers involved at some individual farms, proper training requires Dole to provide technical assistance to all independent producers-including hundreds of people who aren't even employed by the company.

"We feel it's important that these people, no matter what their affiliation [with Dole], know Now to protect themselves and the environment in the fields," Amador said. "But you have to actually be in the fields to help them."

In Costa Rica and Ecuador, Dole has set up a school for EMS training. Amador said that the school focuses on the environment, ISO 14000 for each employee and worker protection. He estimated that the facility has trained more than 5,000 people. Some aspects of that training school include:

> EMS training manuals; introductory courses on environmental protection and ISO 14001; Dole's environmental policy; training of contractors; handling of waste; emergency notification; training programs for surrounding communities; talks to schools and colleges; and community talks on Dole operations and the environment.

Dole plans to continue to implement ISO 14001 at the rest of its operations worldwide in the coming year. Officials point out that the company's attention to environmental management has its roots in Doles' decade-long commitment to integrated pest management technology and practices, which was broadened into a more systematic approach to environmental management in the early 1990s. The company began the pursuit of ISO 14001 certification only three years ago this month (February 2000), but because of its rapid success so far, they plan to have several more facilities certified by the end of the year. They include fruit operations in Honduras, Nicaragua, Colombia, Chile, Thailand and the Philippines. But don't expect Dole to stop with worldwide certifications alone. They also are involved in a number of environmental studies, starting with wildlife and plant species on their banana operations, as well as more involvement with their surrounding communities and the environment.

APPENDIX I

LIST OF DOCUMENTS

1. Guyana EPA Strategic Plan, October 1999
2. Review of Existing International, Regional and National Laws, Acts, Conventions, Agreements, Protocols and Proposals pertaining to the protection of the Environment in the Caribbean, by the Rum Refinery of Mount Gay Limited, April 1999
3. Cuba Greens its Agriculture: An Interview with Luis Sanchez Almanza, Green Left Weekly, December 11, 1994
4. The Conservation Agricultural Program (various reports, the Internet)
5. Technology, Business and Competitiveness by Codetti/Caisnet (Internet)
6. Unified Industrial Diagnosis Systems for the Improvement of Competitiveness (SUDIAC) by Juan Carlos Cantillano – CODETTI (Internet)
7. Farmers fight Costa Rican Government over a Rain Forest (Internet)
8. Big win for Wildlife in Costa Rica's Courts, June 1997 – Eco Exchange (Internet)
9. The Greening of Cuba, Peter Rosset with Shea Cunningham (Internet)
10. Cuba: An Organic revolution (Internet)
11. Food First Program (Internet)
12. Cultivating Havana: Urban Agriculture and Food Security in the Year of Crisis (Internet)
13. Havana's Popular Gardens: Sustainable Urban Agriculture (Internet)
14. Organoponics (Urban Gardens) (Internet)
15. Cuban Projects in Sustainable Development (Internet)
16. Urban Agriculture in Cuba (Internet)
17. Smart Banana Program makes Headway (Internet)
18. Shade-grown research and certification in Costa Rica (Internet)
19. Alcan's Environmental Management System (Internet)
20. Sustainable Tourism, Althea Johnson, OPM (Tourism) Jamaica
21. Environmental Stewardship of Government Operations Project, Leonie Barnaby, Ministry of Housing & Environment (Jamaica)

APPENDIX 2

PERSONS CONTACTED (BY TELEPHONE, FAX AND E-MAIL)

Name	Association	Country
Atlee Brathwaite	Barbados Agricultural Management Company	Barbados
Dudley Rhynd	Barbados National Standards Institute	Barbados
Joy Hall	Caribbean Export Development Agency	Barbados
Lisa Callender	Caribbean Export Development Agency	Barbados
Gillian Wheatley	Casrina Beach Club	Barbados
John Wilson	Ministry of Energy and Natural Resources	Barbados
Atheline Hayes	Ministry of Energy and Natural Resources	Barbados
Mr. Bannister	Pine Hill Dairy	Barbados
Heather Farrell-Clarke	Pine Hill Dairy	Barbados
Frank Ward	Rum Refinery of Mount Gay	Barbados
Dr. Braithwaite	Sugar Association of Caribbean	Barbados
P. Myers	West Indies Rum & Spirits Association	Barbados
Yvonne Holder	CARICOM Secretariat	CARICOM
Cornelius Fervier	CARICOM Secretariat	CARICOM
Walter Lopez	Carara de Industries de Costa Rica	Costa Rica
Olman Munoz	CEFOF	Costa Rica
Marianna Feoli	Cogesti	Costa Rica
Myrtille Danse	Cogesti	Costa Rica
Ana Lorena Quiros	Eco Global	Costa Rica
Carlos Munoz	FUDECI	Costa Rica
Elizabeth Andio	Ministry of Agriculture	Costa Rica
Carlos Hernandez	School of Tropical Agriculture, Limon	Costa Rica
Rene Fernandez Infante	Cuba National Bureau of Standards	Cuba
Jowali Sonai	Guyana National Bureau of Standards	Guyana
Chatterpaul Ramcharan	Guyana National Bureau of Standards	Guyana
V. Oditt	Sugar Association of Caribbean	Guyana
Piers Harvey	Advanced Farms	Jamaica
Marcia Douglas	Alcan	Jamaica
Andrene Jones	Alumina Partners	Jamaica
Howard Wright	Appleton Estates	Jamaica
Timon Waugh	Coffee Industry Board	Jamaica
Arnaldo Aguiar	Costa Rican Consulate	Jamaica
Donald Campbell	Grace Food Processors (Meat) Division	Jamaica
Diane Gordon	Jamaica Bauxite Institute	Jamaica
Karlene Russel	Jamaica Bauxite Institute	Jamaica
Karl James	Jamaica Cane Products Sales	Jamaica
Andy Medlicott	Jamaica Exporters' Association	Jamaica
Velma Sharpe	Jamaica Manufacturers' Association	Jamaica

Name	Association	Country
George Morgan	Jamalco	Jamaica
Evon Brown	National Rums of Jamaica	Jamaica
Lisa Richards	Negril Cabins	Jamaica
Raymor Mills	Negril Cabins	Jamaica
Barry Wade	Private Sector Organization of Jamaica	Jamaica
Charles Ross	Private Sector Organization of Jamaica	Jamaica
Winston Butler	Salada Foods Limited	Jamaica
Lloyd Forbes	Spirits Pool Association	Jamaica
Leroy Johnson	Sugar Company of Jamaica	Jamaica
Trevor Falloon	Sugar Industry Research Institute	Jamaica
Joshua Jaddoo	Sugar Industry Research Institute	Jamaica
Helen Reece	Tourism Product Development Company	Jamaica
Dave McIntosh	Environmental Management Association	Trinidad & Tobago
Mr. Hosein	Environmental Management Association	Trinidad & Tobago
K.J. Ramkisson	Sugar Association of Caribbean	Trinidad & Tobago
Devetra Dash	Trinidad & Tobago Bureau of Standards	Trinidad & Tobago
Ann Marie Ward	Trinidad & Tobago Bureau of Standards	Trinidad & Tobago
Everald Llewelyn	Trinidad & Tobago Bureau of Standards	Trinidad & Tobago
Steve Smith	Trinidad & Tobago Bureau of Standards	Trinidad & Tobago
Anthony Guisseppie	Trinidad & Tobago Manufacturers' Association	Trinidad & Tobago