Foundation Image: Communication Bridges for Environmental Organizations

July 5th, 2000

Sr. Luis Sánchez
Rain Forest Aerial Tram Foundation
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Calle 7, Avenida 7
San José, Costa Rica

Dear Sr. Sánchez:

Enclosed is our report entitled Foundation Image: Communication Bridges for Environmental Organizations. It was written during the period of April 10th through July 4th. Preliminary work was completed in Worcester, Massachusetts, prior to our arrival in Costa Rica. Copies of this report are simultaneously being submitted to Professors Arthur Gerstenfeld and Susan Vernon-Gerstenfeld for evaluation. Upon faculty review, the original copy of this report will be catalogued in the Gordon Library at Worcester Polytechnic Institute. Thank you very much for the time and help you have given to us.

Sincerely,

Katherine Dennen Jamie Stern-Gottfried Jessica Weathers

Report Submitted to:

Dr. Arthur Gerstenfeld
Dr. Susan Vernon-Gerstenfeld

Costa Rica, Project Center

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FOUNDATION IMAGE: COMMUNICATION BRIDGES FOR ENVIRONMENTAL ORGANIZATIONS

July 5th, 2000

This project report is submitted in partial fulfillment of the degree requirement of Worcester Polytechnic Institute. The views and opinions expressed herein are those of the authors and do necessarily reflect the positions or opinions of the Rain Forest Aerial Tram Foundation or Worcester Polytechnic Institute.

This report is the product of an education program, and is intended to serve as partial documentation for the evaluation of academic achievement. The report should not be construed as a working document by the reader.

Abstract

This report, prepared for the Rain Forest Aerial Tram Foundation, presents recommendations for increasing communication among environmental organizations in Costa Rica. The methodology conducted was a set of interviews with various directors of environmental programs throughout the country. From these interviews, communication among environmental organizations was identified to be a major problem. The recommendations to address this problem are holding a conference, creating a consortium, and designing a web page all focused on increasing communication among environmental organizations

Authorship Page

The table below indicates which project member is the primary author of each section. KD is Katherine Dennen, JSG is Jamie Stern-Gottfried, and JW is Jessica Weathers. Each section of the report was thoroughly edited and revised by all members.

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Last, but not least, we would like to thank our advisors, Professors Arthur Gerstenfeld and Susan Vernon-Gerstenfeld, as well as their now inkless pens they used to edit our drafts. We would like to thank them for the assistance and guidance they provided us both in the United States and Costa Rica.

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Executive Summary

Due to the growing awareness of environmental issues in Costa Rica, the formation of environmental protection organizations has greatly increased. Those environmental groups are focused on educating the community about environmental issues and directing research projects to learn more about preserving the ecosystems of Costa Rica. Recently established, the Rain Forest Aerial Tram Foundation wishes to play a major role in preserving the environmental integrity of Costa Rica. They have already developed educational programs to instill in visitors an appreciation for the rain forest.

In order to promote the goals of the Rain Forest Aerial Tram Foundation, we developed approaches to environmental problems that we believe will result in creative solutions to those problems we identified in Costa Rica. We determined what these approaches should be by interviewing experts of the environmental field. Many experts in the area of environmental protection expressed concern about specific issues plaguing the environment of Costa Rica including emissions trading, pharmaceutical research in the rain forest, sustainable development as a means of ecotourism, environmental education, and community involvement in environmental issues. Although these are all important issues, a theme of poor or no communication between the various environmental organizations in Costa Rica surfaced as a common concern among the environmental experts that we interviewed.

Most of the interviewees expressed concerns that the non-profit organizations in Costa Rica are not communicating on a regular basis. They see this as a problem because it creates a lack of awareness of the current projects and goals of organizations in surrounding areas. This lack of awareness can be detrimental to the objectives of

organizations because it can cause setbacks that would not occur if there were better communication among groups. For example, if communication were improved, chances for funding would improve by reducing the number of overlapping requests for grant money from organizations that are doing research in the same area. Not only could chances for funding be improved by increased communication, but also chances for research may be improved. Many experts pointed out that often research progress is slowed down by the lack of communication because organizations work on projects that have already been done or are currently being done by other organizations without even realizing it. Increasing communication enables joint research to increase and therefore, organizations will not waste time and money completing studies that have already been pursued.

Our recommendations to the Rain Forest Aerial Tram for increasing communication among environmental protection organizations in Costa Rica include three combined suggestions. When implemented, these recommendations should help alleviate the communication problem among the various environmental organizations in Costa Rica. We also made suggestions for funding these recommendations

We first recommend that the Rain Forest Aerial Tram Foundation investigate the possibility of organizing a conference that invites members of the environmental community. The central theme of the conference should be increasing communication among environmental groups in Costa Rica. Subtopics of the conference should be communication regarding the specific issues such as emissions trading, pharmaceutical research in the rain forest, sustainable development as a means of ecotourism, environmental education, and community involvement in environmental issues. This

conference should bring together important groups in Costa Rica so that they can work together towards finding a sustainable solution to each problem.

The second recommendation we are making to the Rain Forest Aerial Tram Foundation is the implementation of a consortium. This consortium could be a solution to communication problems and could possibly be a topic covered in the conference. To start, members of the consortium should be influential organizations in order to gain credibility and clearly establish the objectives of the consortium. Then, once the consortium is established and has gained a strong reputation in the environmental community, more organizations will become members. The Rain Forest Aerial Tram Foundation should provide the central office for the consortium as a way to initiate the program.

Third, we also recommend that the consortium implement a web page that serves as a centralized way to organize information regarding organizations, research and project opportunities. The web page can be arranged so that all participating organizations would be able to publicize their current and past research efforts as well as upcoming programs.

Finally, we recommend a set of foundations that the Rain Forest Aerial Tram Foundation should investigate for possible funding for these programs. This list includes the W.K. Kellogg Foundation, the MacArthur Foundation, the National Science Foundation, the William and Flora Hewlett Foundation, the Tinker Foundation, and the Woodrow Wilson National Fellowship Foundation. We chose these foundations based on their mission statements and what projects they have previously funded. For example, these foundations have all previously funded projects in Latin America, therefore, they

are candidates that we recommended. We used those two areas of information to match the foundations to our recommendations.

There are a few constraints facing the implementation of these ideas. First, the conference may need to publicize a concrete format before representatives will be interested in attending. If there is no initial specified format, some experts will be concerned that their interests will not be covered during the course of the conference. Another constraint facing the implementation of these recommendations is the issue of controlling the consortium and web page. It was brought to our attention that if one organization does not take the initiative in the beginning, all of the participating organizations may compete over power and create set backs in the original goal of the consortium. This is why we are recommending that the Rainforest Aerial Tram Foundation take the initiative and organize a consortium.

By implementing the recommendations presented in this report, the Rain Forest Aerial Tram Foundation can help to improve communication for environmental groups throughout Costa Rica. Through the improvement of communication, our recommendations will help the environmental organizations work together more effectively and, thereby, have a greater impact on the environment. The Rain Forest Aerial Tram Foundation will also gain many new affiliations through the implementation of these programs, which could be beneficial to such a recently created organization.

1.0 Introduction

Our project is aimed at helping the Rain Forest Aerial Tran Foundation establish itself in the environmental community by identifying current problems in Costa Rican and creating recommendations to solve them. It was important for us to have an understanding of the current environmental situation before we could create any recommendations.

Environmental issues have increasingly become an area of global concern in recent years. Fears of pollution and global warming destroying the ecological systems of the entire planet have prompted the formation of many environmental groups. In an effort to protect and preserve the environment, many of these groups work towards helping to insure the environmental integrity of the world. As more information is learned about the delicacy of the entire plant, there has become an increased focus on educating people about the importance of preserving and protecting the environment.

Being one of the most studied aspects of environmental ecosystems, rain forests are a main focus of many environmental organizations. Having a plethora of unknown species of plants and animals, environmental groups worry that in the destruction of the rain forest, valuable information may be forever lost. Deforestation and agriculture have caused entire areas of original, primary rain forest to be completely cut down. As a result of this clear cutting, many species have become extinct, and information about many plants, insects, and animals are no longer available.

In Costa Rica, despite the fact that the country is only 0.01 percent of the global land area, it is estimated that there are at least 4 percent of all living species. The

sustenance of the rain forest is critical to insuring Costa Rica's capability to host a variety of species. As a result, many environmental groups in Costa Rica are working towards increasing the protection and preservation of the rain forests. By educating communities and children about the importance of ecosystems, the environmental groups aspire to change the attitudes people have toward the rain forests. They intend to teach people of the importance about preserving the delicate ecosystems for scientific, economic, social, and moral purposes.

The Rain Forest Aerial Tram Foundation advocates for the preservation and protection of the rain forests through the implementation of ecotourism. The Tram uses this as a means of educating people in the importance of the rain forest. Being a successful example of the principles of ecotourism, the Tram is able to preserve a large portion of land as primary forest while still benefiting economically. By riding the Aerial Tram, tourists experience the rain forest and gain an appreciation for the beauty and diversity present in the canopy of the rain forest.

As visitors alight into the canopy, they become part of the 450-hectare landscape. Bordering Braulio Carillo National Park, the Rain Forest Aerial Tram was constructed in 1992 by Donald Perry, a canopy researcher. Although the tram was originally constructed for research purposes, Perry discovered that there was a significant amount of public interest in touring the canopy. So, in 1994 Teleférico del Bosque Lluvioso, the Rain Forest Aerial Tram, became open to the public as a tourist attraction to educate visitors about the importance of the rain forest.

Within the past year, the Rain Forest Aerial Tram expanded and established a foundation in conjunction with its business. The Foundation is aimed at helping to

preserve the environment through education and conservation programs. The Foundation, which implements environmental programs, is composed of a separate board of directors from the company. Only in the past year did it attained 501 (C)3 status allowing the foundation to be recognized in the United States as a certified organization to which corporations can donate money and receive a tax deduction.

The newly recognized and established Foundation intends to educate people about the importance of the environment in an attempt to influence the choices they make that affect the environment. Many of the environmental education programs the Foundation has implemented are specifically directed toward children with the long-term goal of influencing the decisions they make as adults. By designing programs that are targeted at promoting an appreciation for wildlife and the interrelationships of different forms of life on the planet, the Foundation believes that increasing public awareness will help preserve and protect the environment.

Our project is focused on promoting the goals of the Rain Forest Aerial Tram Foundation. By helping the Foundation develop creative solutions to environmental programs in Costa Rica, we aspire towards make a lasting effect on preservation and exploration of the diversity of the rain forest ecosystem. The implementation of our recommendations for solving these problems should have a lasting, beneficial effect on the environment.

To develop creative solutions to environmental problems, we first identified the major environmental issues present in Costa Rica. To achieve this goal, we needed to identify the most experienced environmental experts in Costa Rica. Through conducting

interviews with these experts, we were then able to discuss many different topics of environmental concern.

From our interviews, we became more aware of the socially related environmental needs present in Costa Rica. We discovered that many directors of the various environmental organizations felt that a lack of communication limited the idividual success of each organization's programs. This identification helped us to determine solutions that address the problem of inter-organization communication. We then created a list of recommendations that we believe could solve the problem. With this list of recommendations, we also provided the Foundation with possible funding sources that could potentially support our recommendations. By making these recommendations, we believe that we may help to make a difference in the environmental community of Costa Rica.

This Interactive Qualifying Project, fulfilling one of the three project degree requirements of Worcester Polytechnic Institute, identifies areas of environmental concern and offers possible solutions to alleviate the overall environmental situation in Costa Rica. The IQP is designed to develop the interaction between technology and the society it influences. The solutions we have recommended, if implemented, will directly affect the society in Costa Rica in a positive manner through beneficial change to the environment. By determining possible topics, solution ideas, and providing funding options for the Rain Forest Aerial Tram Foundation, we were able to provide the Foundation with information and ideas necessary to implement actual solutions. Our efforts helped to enable the Foundation to aid the environmental protection community of Costa Rica in improving and establishing environmental programs that may have a

lasting effect and may permanently improve the environmental attitudes of the entire society. This increased environmental awareness will ideally help the country develop in a more environmentally conscience manner.

2.0 Background

This background section includes information on environmental education, ecological research, current environmental issues it Costa Rica, various conference structures, consortium case studies, the grant writing process, and specific foundation information. The environmental education section covers the history, the implementation, and case studies of environmental education. The ecological research section discusses aspects of preserving the world's ecology. The current environmental issues in Costa Rica section covers some basic ecological and environmental issues present in Costa Rica today. The conference structures section layouts two modern conference formats. The consortium case studies section examines three existing consortiums. The grant writing section covers the beginning stages of research project formulation, the content and proper writing style, and the review process used in grant proposal writing. Finally, the Foundations section reports on specific foundations that could potentially fund environmental projects.

2.1 Environmental Education

Environmental education is a new and growing field of education. In this section of the background, we define environmental education, provide a brief history of environmental education, give some general goals of environmental education, and report on a set of case studies.

2.1.1 Definition of Environmental Education

Since environmental education, sometimes referred to as EE, is a relatively new field of study, a working definition must be provided. Thompson (1997: 3-4) reports that the International Union for the Conservation of Nature and Natural Resources (IUCN) held a meeting entitled "Environmental Education in the School Curriculum" in Nevada in 1970. One of the results of this meeting was the following widely accepted definition of environmental education:

> Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture, and his biophysical surroundings.

Thompson continues by saying this definition helped solidify the position of environmental education in the world. Also, Thompson mentions that from the establishment of this definition, other "educations" were established. These new fields include development, global, peace, citizenship, and human-rights educations.

2.1.2 History of Environmental Education

Robinson (1993: 11-2) discusses some of the early implementations of environmental education and awareness. In March of 1962, President Kennedy sent congress a "Message on Conservation." This message was a call for the nation to become more environmentally aware. It called for better use of resources and the establishment of new national parks. Robinson cites Kennedy's message as a key point in the history of environmental education, but that the movement had started much earlier. He mentions a

Yellowstone expedition of 1870 and the stories the people from the expedition brought back east that conveyed a message of conservation.

Robinson asserts that three major issues for society emerged from a growing level of environmental awareness: dealing with a new self-image, negotiating new problems between citizens, and fearing what was not known. People had to deal with themselves as consumers on the environmental level for the first time. This new self-perception proved very difficult for many people. Though already in existence, a battle between conservationists and corporations became quite heated and pitted citizens against each other. Many people, only slightly educated about new environmental concerns, became worried about issues in which they had little knowledge. They became worried about mysterious, lethal substances that could not be sensed in any way. All of these new worries, some more legitimate than others, became a reality for Americans in the early stages of environmental awareness.

2.1.3 Curriculum Design

This section of the background is largely based upon Saveland (1974: 27-30). Saveland calls for environmental education curricula to have a rationale and to be based in sound educational methods. A curriculum should support growth towards a potential vocation, lead towards showing the interrelationships within a society, and demonstrate the possibility of living a diversified life. Saveland believes that all three of these educational principles still hold their validity in environmental education. The first principle demonstrates that everyone becomes both a consumer and producer in a world of limited resources. The second principle should show students that knowledge gained

can influence the actions of law and policy makers towards the environment. Saveland says that, although not well documented, the third principle can allow students to take pride and have positive feelings regarding the environment.

According to Saveland, four typical aspects of good education also relate to environmental education as well as the three aforementioned principles of an environmental education curriculum. These four aspects include having the curriculum provide for individual differences, showing relevance of the subject matter, being at the same level of the students' capabilities, and being balanced in terms of providing a variety of different types of activities. All of these educational principles, according to Saveland, appear frequently in environmental education. Often environmental education programs promote individual creativity. EE programs can easily show relevance of subject matter with simple examples or field experience. Keeping to the level of the student ability can be difficult, but is necessary for effective environmental education programs. EE programs that contain balance leave room for students to become more motivated than stylistically uniform programs.

Rome and Romero (1998: 34) discuss that, in developed countries, visits to parks and nature reserves is a very beneficial part of environmental education. Often these destinations have visitor centers that have many forms of educational resources. Rome and Romero continue to explain that these field trips, as part of conservation education in developing nations, are not just highly beneficial, but that they are necessary. They explain that these programs are necessary for future conservation to occur.

The actual content of curriculum obviously varies with the design of it. Environmental education teaching techniques range from highly unstructured, free

learning environments to very well organized lectures. However, Filho in Schneider (1992: 199) warns that educators often use only one methodology with which they are familiar. Filho suggests that teachers should examine all methodologies available before one is selected for environmental education.

2.1.4 Goals of Environmental Education

Like all forms of education, environmental education has a purpose. Obviously, a large part of all education is the conveyance of knowledge. However, Bogner (1998: 18) tells of other major goals of environmental education. Bogner says the ultimate goal of environmental education is to influence behavior. This happens initially with the passing of information. The passing of information is intended to change attitudes towards the environment. Attitude change, in turn, ideally, modifies behavior. Balzer in Troost and Altman (1972: 243-4) words the same ideas as Bogner, but slightly differently. Balzer says that, in fact, environmental education should be designed with behavioral modification in mind.

2.1.5 Case Studies

This background section examines a series of case studies to show how and to what effect environmental education programs have been implemented. The function of the case studies is to inform the reader about the types of environmental education that exist and some of its effects, especially in Latin America.

2.1.5.1 Fifth Grade Brazilian Rainforest Education

Harnot and Johnson (1998: 18-20) report on a fifth grade class in Hoover Elementary School in Iowa City, Iowa that learned about the Brazilian rainforest. The class started by reading different newspapers and magazines. The students, themselves, selected the topic of the rainforest in Brazil. After this selection, the social studies teacher encouraged the students to do research. The teacher also brought in a guest speaker who had lived most of his life in Brazil. The speaker relayed information about the ecosystem and economic factors involved in preservation of the rainforest. The class continued to do research on the ecosystem of the rainforest and held fundraisers to help with rainforest conservation. The students were motivated, even though they realized that they would not be able to meet the people that would receive the money they had raised. This fifth grade class was given the opportunity to explore a topic of environmental education in which they had interest.

2.1.5.2 Students Establishing Environmental Education in Belize

Rome and Romero (1998: 35-7) write about a group of fifteen North American college students who traveled to Belize to establish environmental education programs. The students went as part of a program from School for Field Studies in Massachusetts. The objective of the program was twofold: the students learned about tropical forests and they also left behind many resources for a nature reserve concerning conservation and environmental education.

The students visited the Rio Bravo Conservation and Management Area in the northwestern region of Belize. This site was selected because it had many visitors from

local schools and also had an outreach program to attract local youth and adults. This site could benefit from the program because it had little established in the way of environmental education programs. The information on the four major trails at Rio Bravo was limited to a few posts with numbers and there was only one trail with a written guide.

While in Belize, the students researched Belizean ecology, attended lectures in the field, tented under the rainforest canopy for four weeks, and completed his or her own interactive environmental education project to help the conservation program of the reserve. The students left behind the results of their project work. These results included texts for self-guided nature trails for young children, pre-teens, and adults; a design for interactive directional signs, or signs which have interactive features beyond just simple text, for visitor education and direction; teaching manuals for Belizean teachers concerning Belizean ecology for science curricula for grades 4-6; an interactive display that demonstrates sustainable use of rainforest products; and a brochure for Rio Bravo.

Rome and Romero point out that this project demonstrates how developing countries can still have well-developed environmental education programs even if the country does not have a well developed infrastructure.

2.1.5.3 Education versus Deforestation in Honduras

Godoy, Groff, and O'Neill (1998: 649-51) conducted a study of the role of education in deforestation in Honduras. Cleaver and Schreiber (1991) in Godoy, Groff, and O'Neill say, based upon information from African nations, that the larger the enrollment of primary education in a town, the smaller the amount of natural resources

lost. Godoy, Groff, and O'Neill conducted their study with Amerindians in Honduras. They claim that greater education will help rainforest dwellers by promoting newer technologies that are more environmentally protective to be used as well as to enable them to change cultural norms.

This study specifically shows that the correlation between education and deforestation, on a small-scale level, is non-linear. The non-linear relationship indicates, that with up to two years of schooling for Hondurans, deforestation declined in their residential vicinity. Yet, between two and four years of education, destruction of forests increased. And finally with more than four years of education, deforestation decreased again. On average, Godoy, Groff, and O'Neill show that each additional year of education lowered the destruction of old-growth rainforest by four percent and the area cut by 0.06 hectare per family each year.

The authors hypothesize that the non-linear result is due to two different effects of education on deforestation. The first of effect of education is a "productivity effect," which means that farmers use more land strictly for crops. The second effect of education is a "risk diversification effect," which means that farmers compensate for possible crop failure by working at non-agricultural jobs. At the first level of education, farmers are first introduced to environmental conservation and, thus, clear less forest for agricultural purposes. At the next level of education farmers wish to increase production and diversify it by planting other crops such as rice, which tend to be very land intensive and, therefore, increase deforestation. At the third and final level of education farmers realize the importance of taking non-farm jobs and, thus, once more, clear less forest.

2.2 Ecology

The maintenance of the earth's ecology is vital to the preservation and livelihood of many species of plants and animals. Without the presence of a sustainable environment, many species invariably risk extinction. As a result of growing concerns over increasing extinction rates, the preservation of the earth's ecological systems has become a major focus of many environmental groups. By utilizing indicators that measure the rate of change in ecosystems, it becomes possible to identify problems present in an environment and determine the steps need to alleviate the amount of negative impacts.

2.2.1 Definition of Ecosystem

Ecology, the study of the relationship between an organism and its environment, has raised many issues concerning the planet's overall well being (Webster's, 1998). Since the balance of an ecosystem is crucial to the sustenance of life on the planet, Cowan and Van Der Ryn (1996: 133), Fleagle (1994: 68), and Adriaanse et al (1995: 2) all agree that it is very important to address issues involving the integrity of ecological systems. The authors note the rising number of environmental groups interested in promoting the ideas of sustainable development, which attempt to minimize the adverse effects that humans development has on the environment. They argue that without the protection and preservation of the world's ecosystems, the extinction rate of many species of animals and plants will inevitably increase. Cowen and Van Der Ryn (1996: 9) admonish that as ecosystems begin to be exhausted, they become incapable of sustaining life forms. The actual extinction of certain species then furthers the imbalance of the

ecosystem and lessens its ability to sustain other species of plants and animals. To insure the protection of many species, Adriaanse et al (1995: 27) believe that a greater focus needs to be given toward the preservation and re-growth of entire ecosystems in an attempt to maintain the biological diversity that they sustain.

Noting that many factors affect the conservation of an ecosystem, Fleagle (1994: 68-69) states that global changes such as the spread of agriculture, growth of the world population, and industrialization inevitably cause effect on their surroundings. Other factors such as ultraviolet radiation, climate changes from the ozone depletion and acid rain infallibly also contribute to the disruption of the biodiversity of varying ecosystems. He states that species that are less tolerant to environmental changes are more likely to become extinct because they are unable to adapt to the rapidly changing environment. Consequently, the destruction and alteration of the tropical rain forests in Costa Rica are at risk of losing less tolerant species forever.

Fleagle specifically cites his concerns that UV rays may be endangering an entire ecosystem. Using Phytoplankton, the base of the marine food chain as an example, Fleagle (1994: 69) comments that the UV-B light that is now able to permeate the earth's ozone is believed to be damaging the DNA of the Phytoplankton's, and because Phytoplankton is the base of the marine food chain, it is very likely that its depletion or extinction would greatly disrupt the entire marine food chain

2.2.2 Ecological Indicators

Adriaanse et al (1995: 27) note that, presently, there are not many methods for monitoring the depletion and adaptation rates of different species. The only indicators

currently utilized to measure an ecosystem's biodiversity are lists of endangered species, statistics on wilderness areas, and statistics on the degrees of protection needed for certain areas. In order to maintain the biodiversity levels of an area, Adriaanse et al find that the problems must be addressed individually and the entire ecosystem examined.

Cowan and Van Der Ryn (1996: 134-138) remark how humans have caused a disruption in the balance of four billion years of evolutionary design. To counteract the imbalances, they state that it has become increasingly important to try to maintain and rebuild the ecosystems. They estimate that 27,000 species per year are doomed, and without regeneration and protection of the ecosystems, humans may disrupt the entire balance of the ecosystem so greatly that it eventually may not be able to sustain human life. Consequently, Cowan and Van Der Ryn advocate utilizing the premises of sustainable development to promote ecological designs that maintain and regenerate ecosystems into a healthy balanced state able to maintain its own biodiversity.

2.2.3 Ecological Design

Emphasizing that humans must acquire the skills necessary to interweave both human and ecological design, Cowan and Van Der Ryn (1996: 17), also advocate ideas of sustainable development. By creating a system that incorporates industrialization into an area while incurring a minimal amount of negative effects on the ecosystem, the authors encourage the utilization of ecological design. By using design principles that are conducive to their surrounding environment, they hope to increase the amount of awareness and attention developers give to ecological preservation. By finding ways to minimize the affects that industrialization has on the environment, Cowan and Van Der

Ryn firmly believe the ideas of sustainable development are crucial to insuring the integrity of the ecosystems (1996: 3-15).

It is agreed by Cowan and Van Der Ryn (1996), Fleagle (1994), and Adriaanse et al (1994), that the goal of ecological engineering and design inevitably encompasses minimizing the negative effects humans inflict on natural ecosystems in order to maintain the ecosystems biodiversity. Through increasing awareness of the importance of maintaining and regenerating varying ecosystems, the authors mentioned above advocate spreading the ideas of sustainable development as a means of protecting the ecosystems for the future.

2.3 Costa Rica Specific Issues

According to the Institute of Biodiversity (INBio), Costa Rica is one of the most diverse regions of land in the world. With an estimated 4 percent of living species being found within a country comprising less than 0.01 percent of the world's global territory, Costa Rica has become well known for its biological diversity and resources. Stating specifically that Costa Rica has 295 tree species per 10,000 square kilometers, while Colombia has 35 species and Brazil 6, INBio explains that the number of species of trees present in Costa Rica is significantly higher than the number of species present in other larger countries well-known for their biological resources. INBio states that the least studied aspects of the rainforest remain in the topic areas of arthropods and invertebrates. Less than 20 percent of these species have been described. Also, less than 2 percent of groups such as fungi, bacteria and viruses have been described. Another area in which little is known is the symbiotic relationship between epiphytes and fungi in the canopy.

The rainforest, being important for medicinal purposes, has also become the focus for pharmaceutical research.

2.3.1 Forest Preservation

Although Baker remarks in the Costa Rica Handbook (1994) that Costa Rica has one of the world's best conservation records, with one-quarter of the country is under some form of official protection, he also notes that deforestation outside of the national parks and reserves continues at an alarming rate. Despite efforts toward conservation of forests, almost the entire country has been deforested outside of protected lands. In Costa Rica the remaining tropical forest is disappearing by at least 520 square kilometers a year. Now, less than 1.5 million hectares of primary forest remain, which is approximately 20 percent of Costa Rica's original amount. Baker also remarks that despite the seemingly sincere efforts of the Costa Rican government, the nation's forests are falling faster than anywhere else in the Western Hemisphere.

2.3.2 Sustainable development

Clark (1990: 2) described sustainable development as development that does not discount future generations in its planning. He quoted then Prime Minister Brundtland of the World Commission on Environment and Development (WCED) as characterizing sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."

Clark (1990: 2,6) explained that the world was inhabited by more than five billion people who were seizing more than, 40 percent of the world's photosynthetically fixed

organic material and using it for their own purposes. Due to the large number of people in the world, several environmental transformations began to take place. Deforestation and soil erosion accelerated while there was a decrease in plant diversity and an increase in water usage. Although these negative factors increased, several other negative factors, including human-induced extinctions and release of toxins into the environment, decreased by 1990.

With this increased awareness of environmental issues, by 1990 Clark (1990: 3) believed that sustainable development would be best done on a local scale but with a "global environmental perspective." He also explained the three objectives that he believes managing sustainable development should encompass including controlling human population growth, assisting economic growth to meet the basic needs of subsequent human generations, and finally, structuring economic growth so that it has potential for positive environmental change that stays within safe limits. He concluded that by 1990 (1990: 9) that the best way to accomplish sustainable development was to look towards "high-income, high-density regions of the industrialized world" because they have had the largest impact on the destruction of the environment and probably have the most economic resources needed to improve the environmental situation.

MacNeill (1990: 111-113) described the obstacles to sustainable development as mainly being social, institutional, and political because most governments still think of economic and environmental sustainability as being two separate topics that are dealt with by two separate branches of the government. Instead, according to MacNeill in 1990, they should be dealt with at the same time since they have relative impacts on each other. Most countries depend on their ability to sustain their environmental resources

such as agriculture, forestry, fishing, mining, and tourism in order to have a successful economy. Sustainable growth, MacNeill said, should not undermine the environment on which it depends. Therefore, MacNeill concluded (1990: 118) that the most important condition for sustainable development is that "environment and economics be merged in decision making".

Ruckelshaus (1990: 126) explained that since developed nations have the greatest ability to effect sustainable development, it holds true that the spread of prosperity to underdeveloped countries would help environmental situations on a whole. By spreading the wealth, ecological balance would be attained and, therefore, developed nations would continue to thrive, but the rest of the world would not be destroyed in the process. According to Ruckelshaus in 1990 (1990: 128), contemporary sustainability consciousness should include the following: realization that the world is finite and that the regeneration of this world depends on natural systems that should not be destroyed, realization that economics must account for the cost of environmental impact so that the environment can be preserved through the economic market, and realization that a habitable global condition depends on the sustainable development of the entire planet.

2.3.3 Epiphytes

Being one of the less understood aspects of the rainforest, the canopy possesses its own entire climate system. In the Costa Rica Handbook (1994), Christopher Baker notes that although the ground level of the rainforest has a uniform heat and high humidity of 90 percent, which scarcely varies, the canopy of the rainforest exhibits much more variance. In the canopy, temperatures fluctuations can be as great as 15 degrees Celsius

between night and day, and the humidity can vary from 60 percent to 95 percent depending on the wind and amount of sunlight present. Baker, therefore, concludes that within 100 vertical feet two distinctly different climates prevail. He also mentions the delicate cycle of nutrients and minerals being quickly reclaimed from decaying matter that leave of the soil and are returned to the canopy. As a result of the intricacy of the canopy of the rainforest, more investigation needs to be done to better understand the connections of species among the canopy.

Epiphytes, which dwell in the canopy, are one of the least studied elements of the rainforest canopy itself. According to the Mark Egger (World), orchids comprise 88 percent of the epiphytes present in Costa Rica. They state that orchids are one of the more intriguing aspects of ecology. To this date, not one species of orchid is known to exist without a symbiotic relationship between its root and a fungus, called mycorrhiza. The fungus is believed to play a critical role in the germination of the orchids when the tiny orchid seeds have no food source of their own. Generally, each genus of orchid corresponds to a genus of fungus.

According to Baker, the variety and sizes of orchids vary greatly. The size of the flowers can vary from less than one millimeter across to single petals reaching more than half a meter. The pollination of orchids is known to occur through five different animals. Mark Egger states that the main classes of pollinating organisms are bees, flies, moths, butterflies, and birds (World). The relationship between the flowering orchid and its vehicle of pollination is very specific, where cross-pollination is believed to occur infrequently. Baker notes that one species of orchid produces a flower that closely resembles the form of a female wasp and even gives off the odor of a female wasp in

mating condition. Male wasps consequently attempt to copulate with it and deposit pollen within the flower or carry pollen to the next flower. Another species of orchid drugs the bees that enter the flower for nectar and cause them to be intoxicated and fall into the pollen. Pollination techniques have become so species-specific that hybridization of different orchid species is avoided by each having developed its own vehicle of pollination.

Costa Rica is known to possess more than 1200 species of orchids according to Mark Egger, Baker and the Rain Forest Aerial Tram. The Rain Forest Aerial Tram alone posses more than 300 species, and Baker notes that Lankester Gardens features over 800 orchid species. Each year in San Jose, an annual orchid show held in March, offers a weeklong "Costa Rica National Orchid Show and Tour," with visits to the show and to private orchid collections.

2.3.4 Pharmaceutical Interests

Baker warns that when the rainforests are destroyed, many unknown species are destroyed with it. Among the species that are becoming extinct, the world may be losing chemical compounds useful for medicinal purposes. Although the majority of uses and species of plants, and animals in the rainforest are unknown, some medicinal purposes have been discovered. For example, the bark of the cinchona tree has been the prime source of quinine, used in an anti malarial drug. Curare, a vine extract used by South American Indians to poison their arrows, is also now used as a muscle relaxant in modern surgery. Scientists recently discovered a peptide secreted by an Amazonian frog called *Phyllomedusa bicolor,* which may be useful for strokes, seizures, depression, and

Alzheimer's disease. Baker also notes that almost 40 percent of all drugs manufactured in the United States are to some degree dependent on natural sources. Remarking also that more than 2,000 tropical rainforest plants have been identified as having some potential to combat cancer.

2.4 Conference Structures

Amy Steffen (personal communication, June 19th, 2000), an organizational development consultant in the United States, has facilitated numerous conferences, many of which have been for non-profit or environmental organizations. Steffen said that she has run a conference structure called Open Space that she recommends to help solve the communication problems in the environmental community in Costa Rica. Steffen also recommends a Future Search conference structure as a framework for participants to work towards a solution of communication issues. She said that both of these conference types are powerful methods to foster meaningful dialogue, identify common agendas, and create lasting relationships and alliances. The descriptions, which are reviewed in the following section, are defined by Alban and Bunker (1997).

2.4.1 Open Space Conference

According to Alban and Bunker, an Open Space conference is "a meeting method based on the principle that people who are passionate about something will naturally focus, manage, and hold themselves accountable for progress." This definition continues to explain how an Open Space conference is roughly based on tribal and village meetings.

An Open Space conference is planned with one central theme to be discussed. This central theme is the extent of the planning of this style of conference, save logistical planning. The people who attend an Open Space conference participate because they are passionate about the topic of the conference and are willing to take responsibility for change.

When the meeting begins, the leaders of the conference review the central theme and open up the first session for participants to identify specific issues that they feel need to be addressed within the central theme. This method creates an agenda for the conference. Each participant then selects the specific issues of personal interest that they feel need to be resolved. When every attendee does this, small groups are formed and problems are solved within these groups.

An Open Space conference works on a few conceptual principles that are quite different from those of more traditional conferences. The first principle is the idea that the group attending the conference is the "right" group of people. This is true because what is important, in terms of results, in an Open Space conference are the interactions, conversations, and alliances formed among the participants. Due to this level of involvement of participants, who attends and how many people present are not as important as what happens during the course of the conference.

Another major principle of this conference style is that what happens is what should happen. This means that because there is not a preset agenda, the work that needs to be completed will get accomplished by the close of the conference. This principle also extends to the idea that the conference will find its own natural conclusion. When all of the business that must be done is finished, the conference ends.

2.4.2 Future Search Conference

The format of a Future Search conference is a highly structured, three-day conference designed to create a vision for the future using many different viewpoints of participants. A Future Search conference can be very productive because it is designed to have everyone involved in the issue of discussion present.

The flow of the conference is made up of three different interaction formats for participants. The first means of interaction for participants is that the entire attendance at the conference is present in one meeting. This meeting is run by the leaders of the conference and addresses more general issues. The second format of meetings is in stakeholder groups. Stakeholder groups are smaller groups that are all composed of similar viewpoints within each group. Every viewpoint on the central topic has a discussion group. These group meetings are designed for the clarification of the specific viewpoints and for the exchange of ideas among the holders of a similar viewpoint. The third and final way in which the group meets is in a mix of all possible viewpoints. These meetings are forums for participants to explain and listen to viewpoints that differ from their own in order to reach a common understanding.

A Future Search conference needs to have everyone involved in the issue of concern present so that the various small groups can be productive. The conference focuses on the future, rather than the problems that have arisen in the past. The conference is also designed for participants to "think globally, but act locally" in their planning, a concept that means thinking of long-term, widespread impacts of day-to-day policies and actions. The product of a Future Search conference is the creation of a

working plan that addresses all the viewpoints of an issue and works for all organizations involved

2.5 Consortium Case Studies

In an email interview received on June 22, 2000, Fred Baus, the director of Colleges of Worcester Consortium, provided information on the purposes that a consortiums serve along with how they are formed. He remarks that some consortiums begin as a formalization of existent relationships between organizations. Others are motivated by the possibility of obtaining external funding from foundations that require concrete evidence of cooperation. Community pressures in specific areas can result in the formation of consortia, and other consortia are formed for academic reasons. He then uses the Worcester Consortium as an example of an organization in which the informal exchange of information between the presidents of each college led to the creation of a formal cooperation functioning as mechanism for cooperation.

Mr. Baus then notes that the main elements that are needed to insure the success of a consortium are a commitment to leadership; sufficient resources; an understandable outcome of the cooperative endeavor; and a clear context of interests, such as economic, political, or social. He specifies that the goals of the consortium must be clearly defined for the consortium to be successful. Furthermore, he explained that in order for a consortium to function properly, the people involved must be personally or professionally interested. Forewarning that the sustenance of a consortium relies on the ability of individuals to find real value in its existence he re-emphasizes the fact that a consortium must serve a purpose.

2.5.1 Colleges of Worcester Consortium

The Colleges of Worcester Consortium is an organization composed of fifteen colleges located in Worcester, Massachusetts. The consortium exists to develop and manage collaborative services that enhance its members' educational missions and institutional operations (CWOC, June 20). Founded in 1968 by the presidents of the colleges and universities located in Worcester, the Consortium is a non-profit organization with voluntary membership. The Consortium provides students with several benefits, such as cross registration of classes, dual degree programs, and collaborative career services.

The Consortium is currently composed of fifteen governing members and fourteen associate members (COWC). The governing members, known individually as Directors, comprise the "Board of Directors" (fax, June 14th, 2000). Only presidents and chief executive officers of accredited colleges and universities are permitted to become members of the Board of Directors. Upon application, the candidate must obtain a 2/3 vote of the Board of Directors. Directors then become the representatives of their respective college or university. Some of the responsibilities of the Board are holding meetings, creating committees as needed, and specifying each office's duties.

Associate Membership may be granted upon the recipients' application and approval by 2/3 of the Board. Upon receiving Associate Membership status, the recipient is permitted to attend the meetings held by the Board of Directors, but the Associate members have no voting powers.

Annual meetings are held each year during April by the Board of Directors as designated by the Chairperson. Regular meetings may be established as needed by the

Chairperson and the Executive of the Board, who does not have voting power. Special meetings may be held when requested by the Chairperson, or at least three voting members of the Board.

A quorum is constituted by a majority of the Board and is sufficient authorization for cooperate action. The Board also elects six members that they determine to represent the diversity of the institutions to the Executive Committee. The Executive Board is composed of the Chairperson, Vice-Chairperson, President/CEO, Chief Financial Officer, and Chief Student Affairs Officer. The Executive Committee is subordinate to the Board, and only the Chairperson and Vice Chairperson possesses voting powers. The Board selects the Executive Director, who is responsible for carrying out the responsibilities of the cooperation. Four members of the Executive Committee constitute a quorum, and the Committee must vote upon any action taken and report the minutes to the Board. The Executive Committee as an entity that serves as a link among the members.

The purpose of the Consortium is to contribute to the programs and services of the member institutions. To do this the Board is given the power to amend and repeal the bylaws as they see fit. The Consortium also maintains a web page that lists the participating colleges, events calendar, and details of the services that the Consortium provides to students.

2.5.2 The Envirosense Consortium

The Envirosense Consortium in Kennesaw, GA was formed by a group of companies to address environmental issues regarding indoor air quality and offer solutions to these issues. The non-profit organization's main goal is to create a "Total

System Approach" (Envirosense). Components of this approach encompass utilizing sustainable design and environmentally sound building principles in building design and construction, production specifications, and operations and maintenance to insure the well being of people and the biosphere. The consortium also serves to gather and disseminate information on indoor air quality and sustainable design and their relationship to personal well being. The last goal of the Consortium is to monitor the legislative and regulatory action of all activities relating to the Envirosense Consortium's purpose.

2.5.3 Consortium for Environmental Challenges

The Consortium for Environmental Challenges (CEC) is an organization affiliated with Massachusetts Institute of Technology's Center for Environmental Initiatives (MIT). The Purpose of the CEC is to bring together corporate, governmental and non-governmental organizations in an attempt to collectively assess global environmental challenges in respect to their impact on ecosystems, economic development, and social welfare. The main goals of the CEC are to use science and technology to improve the understanding of existing and emerging global environmental problems, and then to utilize the knowledge they have gained to influence the policy making process. The CEC aims to provide the necessary infrastructure to enable the stakeholders of communities to be able to assess environmental problems through using a credible, informed, and data driven process of evaluation.

In implementing an effective approach of assessing environmental issues by using science and technology, CEC hopes to influence policies, product designs, and consumer

behavior by providing workable, profitable, and environmentally sound solutions to global environmental problems. To achieve this goal, CEC is composed of members who are willing to assess environmental challenges in relation to the impacts on ecosystems, economic development, and health. This assessment is then shared among the members of the consortium and the knowledge is used to promote unbiased, scientific, technological, and social policymaking. In increasing communication and knowledge shared through the Consortium, environmental problems could be alleviated on a larger scale and cost-effective environmental solutions could be better implemented.

2.6 Grant Proposal Writing

This section focuses on techniques necessary to write a successful grant proposal. These techniques include information regarding content and writing style of grant proposal authors. This section also includes information about the grant review process and gives suggestions for common guidelines to follow in order to write a successful grant proposal.

2.6.1 Becoming a Principal Investigator

The proposal writing information in the following paragraphs is mostly taken from Leukefeld and Ries (1995: 9-11,17). They believe that in order to become an externally funded principal investigator (PI), an organization must define themselves differently from other organizations that have received money previously from a grant funder. This differentiation is necessary in order to distinguish themselves from these other companies in the eyes of the reviewers. There are several ways to achieve this:

through research or evaluation expertise, which allows the PI to form focused and compelling questions about research; through positioning that comes through networking or collaboration to open channels of communication; and through personal and management skills that come through experience and practice and allow the PI to achieve peak performance. High quality research is the cornerstone of competitive research. The authors suggest that in order to develop areas of research that interest the funding organization, the PI must review his or her own previous grants awarded, make a list of his or her preferred research methods, and review publications from the funding sources.

White (1975: 230) describes several ways to convince the potential funders that the project is worth funding. One way is to make sure that the proposed project is within the scope of the funding agencies objectives. Another way is to prove that the PI is familiar with "state-of-the-art" equipment or knows all of the significant previous work in the area of research.

2.6.2 Proposal Content

According to Leukefeld and Ries (1995: 29-34), the funding source will have expectations, and the applicant should reflect these priorities in the grant proposal. The most effective way to adhere to the funding organization's priorities is to choose funding sources that have expectations that match the goals of the research to be funded. If the mission statement does not fall into the priority list of the funding source, the grant will not be read. Choosing a funding source takes great care. In order to be successful, the PI must adhere to: application deadlines; eligibility restrictions; funding restrictions, such as the maximum amount of funding money available or time restrictions on the funding;

restrictions on the types of projects for which the source is looking; and application instructions. Leukefeld and Ries recommend that the applicant understand review criteria that the review board uses. An example of funding criteria that the National Institute of Health (NIH) uses includes: originality, scientific significance, appropriate scientific approach, qualifications of the staff in the research area, availability of resources, and proposed means for protecting the environment that the research may have an adverse effect upon.

White (1975: 15) suggests that the organization requesting funding do extensive research into funding agencies that could possibly provide grant money. This research could entail finding information on prior grants awarded by prospective funding agencies, special requirements made by the prospective funding agencies such as credentials, affiliations, and geographical location, and deadlines and budget restrictions that the funding agency may express. Murphy (1999: 31) recommends that if the PI has any doubts about the deadline, PI's should call immediately and clarify their uncertainties. He also suggests that when PI's send the proposal to the funding agency they should find the name and title of the person to whom the proposal should be sent. Murphy admonishes prospective grantees never to use general phrases like "To Whom It May Concern" and "Dear Sir or Madam".

Leukefeld and Ries (1995: 137-154) continue to explain that the basic components of an application for funding should include a title, objectives, literature review, preliminary studies, experimental design and methods, an abstract, and a section on specific details, which usually pertains to a budget.

White (1975: 233) recommends that the PI also include a cover page as part of the grant proposal. This page should serve as an identification tag that allows reviewers to route the proposal to the proper personnel so that it can be dealt with properly. It should include the title of the project, the names, addresses, and phone numbers of both the PI and the PI's organization, the date of submission, the proposed project period dates, the amount of the funding request, and the signature of the PI and any other representatives of the organization. Leukefeld and Ries explain that the title should be interesting and informative, yet short. The applicant should also be aware that grants are sometimes sorted by first word categorization. Therefore, the first word in the title is important.

Merritt in Geever (1997: 32) adds that the PI should include in the cover letter any past relationship, if one exists, with the funding agency. If there is a cover letter in conjunction with the cover page, according to Henson (1997: 201), then the following brief paragraphs should be included: problem statement, capabilities, methods, impact, evaluation, budget, and summary. It should not be more than two pages.

The objectives section, as Leukefeld and Ries explain, is an expression of the PI's goals, which include long-term goals, specific aims of the project, and hypotheses generated from the specific aims. Sometimes, they say, it is helpful to add a brief rationale statement that provides information on the current situation and explains the positive consequences of the proposed research. The literature review for a grant proposal should inform reviewers of past research and make the reason for the proposed research clear. It will demonstrate the knowledge of the PI and the need for research.

The preliminary studies section, according to Leukefeld and Ries, should provide reviewers with evidence that the PI has the experience to do the proposed research. It

should show a relationship between the PI's prior work and how this knowledge will assist with the proposed project.

Leukefeld and Ries continue to explain that the experimental design section should include subjects, instruments, procedures, and statistical analyses, if any, that the PI feels is necessary for the proposed research. The designs should be clear to the reviewers and should be as simple as possible. If subjects are utilized in the research, explanations of characteristic attributes of the subjects that are appropriate for testing the hypotheses need to be included. When humans are utilized, the PI must be certain to include information about expectations for including minority groups and the PI should include plans for sampling if his or her expectations of population diversity are not met. Whenever there are subjects used in research, there should be information on methods used to protect the subjects from adverse effects of the research. White (1975: 179) explains that researchers should also look at government regulations regarding human subjects because they are usually stringent and constantly being updated.

The instruments section, as Leukefeld and Ries illustrate, should describe what instruments, if any, are utilized and why they are appropriate for the proposed project. The section on procedures should describe the proposed data collection methods. It is also important to include any information on how to approach situations in which errors in data collection might occur. Also, any instruction procedures used to train data collectors must be presented. Statistical analysis of the project should describe the approach of data analysis including handling outlying data and any data transformations that might be used. For example, if there are outliers in the data, one way of approaching

the problem is to eliminate up to four outliers, thereby reducing the spread of the data. The experimental procedures section should also include a realistic research timeline.

According to Leukefeld and Ries, the abstract should be a summary of what is being proposed and how it is going to be done. The abstract is important because, Leukefeld and Ries say that sometimes decisions about the research are made solely on the content of the abstract. White (1975: 235) suggests that the abstract be one hundred to three hundred words long. She also says that sometimes the abstract is included on the cover page as an additional aid in directing the proposal to the correct review committee.

Leukefeld and Ries (1995: 154-155) state that there should always be a literature-cited section that helps the reviewer consider the merit of the project. Citations should be completely and carefully done according to the standard put forth by the source.

They define (1995: 159-170) the specific details section as mostly including a budget analysis. The budget should include lists of costs for items such as personnel, investigators, statisticians, assistants, consultants, equipment, travel, supplies, and other items that specifically pertain to the project. Also, it should include indirect costs of the research, according to the same researchers, including secretaries, maintenance, utilities, and graduate student support. For any items that are included in the budget, there should be a justification paragraph explaining the use of each of these items and for each budget category. Other details in this section, acc should include biographical sketches of all the key personnel involved in the research, information about facilities available to the research group, and the income that can possibly be generated for the PI due to the project. There should also be information regarding adherence to federal regulations by the applicant. Murphy (1999: 31) also advises that the PI indicate how they are going to

maintain the program after the grant is expired. Addressing all these aspects shows the foundation that the PI is planning ahead and will not let the research fail.

Any appendices included in the grant proposal should only be expanded information that is not completely necessary to the reviewer and is fully explained in the text of the proposal. Reviewers are not obligated to read appendices. Therefore, the appendices should not include any information essential to the evaluation of the project.

According to Murphy (1999: 31), information regarding intent of collaboration or current collaboration with other organizations is useful to the success of the proposal. There should also be letters of support from any external organizations. Foundations are interested in hearing what other people think of the PI's organization more than what the PI thinks of his or her own organization. Henson (1997: 137) agrees and adds that external evaluations should be done throughout the duration of the grant. This will help in two ways. One, it will give added assurance to the funding agency that the PI will be held accountable for unacceptable use of the grant money. Two, it will provide information about the success of the first grant if the PI should decide to ask for additional funding.

Park in Geever (1997: 31) explains that also included should be information regarding who else is funding research for the PI's organization and the amount. Mason in Geever (1997: 32) also adds that supplemental material such as brochures or videos should be sent later.

2.6.3 Proper Proposal Writing

Leukefeld and Ries (1995: 193-204) explain that reviewers make judgments based on grammatical errors by the writer and how the material is presented. Project proposals must be readily understood. The PI must be effective, persuasive, and efficient at communicating the significance of the proposed project. One way to do this is to manipulate the physical appearance of the document. Leukefeld and Ries believe that double spacing, headings arranged according to application instructions, headings appropriate for placement of the topic in the overall document, concise paragraphs and sentences with minimal use of semicolons all make for an easily read proposal. All sentences should be in the active voice.

The organization of the proposal should allow the reviewer to be able to answer questions easily. The proposal should stay focused on the topic yet be complete and should have minimal use of technical jargon. Good spelling and grammar are essential for a good first impression. Murphy (1999: 30) warns the PI that spell checkers in word processing programs do not catch words that are spelled correctly but inappropriately used. He also advises that the PI make sure to send the proper number of copies of the proposal to the agency so that the agency is not bothered with having to duplicate the proposal.

The most important step in writing a good proposal, according to Leukefeld and Ries, is to prepare many drafts. Revisions allow the proposal to be scrutinized more thoroughly and, therefore, further develop the paper. Pequegnat and Stover (1995: 42) agree with Leukefeld and Ries and suggest that the first draft be drawn six weeks prior to the submission date. Pequegnat and Stover also recommend that the proposal be given to

several other people to review. The proofreaders should include someone who currently has a grant in the same area of study or the same funding source. The grant writer also must be sure that the people the proposals are sent to are not members of a group that might review the grant. If this occurs, the reader will be disqualified as a reviewer. Pequegnat and Stover suggest that someone who is not in the field of research of the proposal should read it to determine if the content is understandable. The writer should ask this reader to make notes on the paper, such as assumptions made from reading the proposal and indicate any sections that are not clear to the reader.

Park in Geever (1997: 32) says that "bells and whistles" are not necessary, meaning that extraneous additions to the proposal will not add or detract from its success. Lajoie in Geever also suggests that the documents should not be tightly bound so that the pages can be separated easily.

2.6.4 The Review Process

There are several funding mechanisms within research grants that should be considered according to Leukefeld and Ries (1995: 47,52). There are investigator-initiated grants and funding source-initiated research projects. The investigator-initiated grants come from an interested investigator who wishes to do research in a particular field. This type of grant is of the traditional style in which the PI is either doing a collaborative effort to complete the research or the PI is the sole investigator. The other mechanism involves the funding source's interests in completing a project. These types of grants include Requests for Application (RFA) and Center Grants. RFA's are invitations for PI's to apply to do research on topics that interest the funding agency.

Center Grants include working in facilities provided by the funding agency. Center Grants will also provide a link between several facilities so that there are more scientific resources.

Professor Weathers (personal communication, April 14th, 2000), who has served on many review boards and has written many grant proposals, says that private agencies are more likely to fund international organizations than governmental agencies. Bauer (1984: 161-162) explains the difference between private funding agencies and governmental funding agencies. He says that private agencies have fewer restrictions placed upon them from the government, such as who to fund and how to go about the reviewing process, therefore more organizations apply to them for grant money. Private agencies are aware of this fact and sometimes they request information about why the PI did not apply to governmental agencies or why the PI was rejected by governmental agencies. Private agencies also do not conduct as many on site visits as governmental agencies do to check up on the use of their grant money.

According to Leukefeld and Ries (1995: 54-56), the grant review process takes from four to twelve months to complete. There are some slight differences between the review process of most agencies, but they all follow the same basic steps.

The following steps are based on the NIH review process and are representative of other government agencies' reviewing processes. The review board consists of sixteen to twenty scientists who represent a wide range of areas. The proposal is given to primary and secondary reviewers who read it and do an in-depth critique. These reviewers then present the proposal to the rest of the board whom, after discussion, vote

on the scientific merit of the proposal. Then the board assigns the proposals a score based upon priority.

The reviewers are mostly interested in the scientific merit of the application, but they are also interested in the budget with respect to the scientific goals. In addition to a priority score, the board assigns each proposal a percentile rank that shows its standing with respect to other proposals in terms of proposals that receive a better or equal priority scale. The application is then sent to the national advisory council that is made up of approximately ten scientists and at least two non-scientists. The council concentrates on the importance of the application for the funding agency's goals. The council then sends the application to the specific organization within the funding agency that is going to award the funding. The funds are awarded in terms of percentile ranks and are given out until the organization's funds are exhausted. The steps for the review process are summed by Lorian in Pequegnat and Stover (1995: 40): the investigator initiates the research idea and submits the application; the application gets assigned to a review group who evaluates it for scientific merit; the organization evaluates it for relevance; the advisory council recommends action; the organization makes selections and issues grants; and, then the grantee manages the funds and conducts the research.

Murphy (1999: 31) advises the PI to thank the funding agency immediately after hearing of grant acceptance and several times thereafter. He also suggests that the PI keep the funding agency well informed of the progress of the research. He reminds us that the golden rule of fund raising is that prior donors are always the best prospect for funding in the future. All of the interviewees in Geever agree that immediate thanks for funding is imperative. This gratitude assures the funding agency that the grant was

received. Occasionally, the agency desires a reply letter informing the agency that the PI accepts the grant. This should be returned immediately so that there is no miscommunication.

Professor Weathers (personal communication, April 14th, 2000) says that when she reviews proposals she often looks for the most unique, exciting ideas because they draw her attention. Murphy (1999: 31) agrees that a proposal should try to be as creative as possible, but admonishes that it is rare for organizations to have unique ideas simply because of the number of applications that funding agencies receive. Claiming to be unique sends warning that shows a lack of awareness of the PI to other research in that field. He cautions PI's against referring to themselves as unique unless they have extensively researched past and present projects. A way to be unique suggested by Henson (1996: 62) is to offer exciting examples of how the research is going to be carried out.

Pequegnat and Stover (1995: 44) point out that the PI should anticipate rejection, especially if he or she is new to the grant process. If the PI is rejected, they should consider submitting a revised proposal that adheres to the comments of the reviewers more precisely, but this will have to be done as a new submission in the next year. Sometimes the staff of the source reviewing the grant are allowed to sit in on the review sessions. If the PI can contact the staff, it may be possible to have an inside look at the interests of the reviewers of the proposals. Henson (1996: 62) reminds the PI that they need to be flexible when participating in the grant proposal writing and reviewing process.

Geever (1997: 34) lists some trends in recent grants awarded that may be useful for the PI to take into consideration. There are more sophisticated requests for money than ever before. There is also more competition for money since there is less governmental subsidy available. Grant makers are interested in the stability of the non-profit organizations they are funding. Strong characteristics in leadership, planning, and financing are ways the organization can distinguish itself.

2.7 Foundations

The following list contains a brief summary of possible funding sources from which the Rain Forest Aerial Tram Foundation could possibly obtain funding to implement an environmental program. Although the discussion of the foundations varies in content due to the inconsistency of available information, it provides each prospective funder's interests and their mission statements. All the information provided below has been obtained from each foundation's respective web page.

2.7.1 W.K. Kellogg Foundation

The W.K. Kellogg Foundation provides funding to encourage Latin American countries to solve their own problems and meet their own needs. In their mission statement, the Foundation states that they focus on helping "people help themselves through the practical application of knowledge and resources to improve their quality of life and that of future generations" (WKKF). The Foundation supports individuals, communities, and institutions in solving their own problems. In promoting countries to

begin identifying solutions to their own problems, the Foundation feels that a more lasting effect will be incurred by their efforts.

2.7.2 Lindbergh Foundation

The Lindbergh Foundation focuses on establishing a balance between technological advancement and the environmental preservation. Funding provided by the Foundation is directed toward individuals whose educational initiates actively help to further promote a balance between technology and the natural environment. Upon being contacted, they responded eagerly that they would be very interested in funding a program in Costa Rica related to environmental education.

2.7.3 MacArthur Foundation

Focusing on fostering lasting improvements of the human condition, the MacArthur Foundation is involved with many programs directed toward bettering the quality of youth's lives through educational programs. The MacArthur Foundation today has assets of $4 billion and makes grants totaling more than $170 million annually (MacArthur). The Foundation is interested in supporting research, policy development, dissemination, education and training.

One of the Foundation's interests is subsidizing programs that coincide with the goals of their Global Security and Sustainability grants. This overall program area promotes peace within and among countries, healthy ecosystems, and responsible reproductive choices (MacArthur). The Foundation's interests are directed toward increasing the sustainability of the environment, forming new partnerships and

institutions, and exhibiting the United States interests and responsibilities in the world. Having these goals, the foundation is interested programs that produce systematic and sustainable change in conserving ecosystems and insuring their capability of supporting human life.

Although the Ecosystem and Conservation Policies portion of the Foundation's Global Security and Sustainability grants are currently being rewritten, in the past, they have concentrated on tropical forests, marine areas, and bio-diverse regions. In these regions, their programs typically focus on legal and policy reform, conservation, and sustainable development (MacArthur). By focusing on selected ecosystems where biodiversity is threatened, the Foundation hopes to primarily promote the sustainable utilization of the resources in Asia, Latin America, and Africa.

In these regions, the three areas in which the foundation focuses are strengthening conservation in science and research, supporting environmental law and policy, and encouraging sustainable development. To strengthen conservation in science and research, the Foundation advocates the collaboration of scientists from developing countries and those from industrial countries. Through this collaboration, the Foundation hopes to strengthen research in tropical areas and unite research with action. To support environmental law, the Foundation advocates the strengthening of policy analysis capacities by encouraging individuals to become environmental lawyers and judges. To encourage conservation and sustainable development, the Foundation believes that connections among economic development policies, natural resource management decisions, and long-term productivity need to be addressed.

The New Partnerships and Institution grants are another large program area in which the MacArthur Foundation is interested. These grants are provided to generate new institutional relationships in global problem solving to aid in the strengthening of society's effective participation (MacArthur). The Foundation believes that the promotion of new partnerships through alliances among businesses, community groups, and government agencies is essential to improving the management of any global problem. By providing grants that support the strengthening of society though alliances and dialogue, the Foundation supports programs that strengthen sub national and national networks and focuses particularly in Mexico and Africa. Through these networks, the Foundation is interested in projects that promote sustainable development, the preservation of biodiversity, and public participation in the legal, economic and social aspects of ecological conservation, environmental protection and resource management (MacArthur). Upon being contacted, this foundation was very interested in becoming involved in an environmental program

2.7.4 National Science Foundation

The National Science Foundation (NSF) strongly advocates the expansion of science and technology in health and environmental fields. By investing over $3.3 billion per year, funding approximately 20,000 projects each year, NSF is committed to helping to improve public health safety and protect the environment (NSF). Funding studies abroad, such as the Organization of Tropical Studies (OTS) in Costa Rica, the foundation hopes to promote research and education in rain forest. The formation of the OTS program, affiliated with Duke University, has made it possible for students to travel to

Costa Rica and study the rainforest at La Selva. Through the OTS program, NSF has also supported rain forest research and education programs at La Selva.

2.7.5 The William and Flora Hewlett Foundation

The Hewlett Foundation, which provides monetary subsidence to promote the well-being of mankind, supports activities and organizations of a charitable nature (Hewlett). The Foundation specifically focuses on U.S.-Latin American relations and also on the environment and education. Their goal of focusing on the U.S. and Latin America is to strengthen the collaboration between U.S. and Latin American relations. The Hewlett Foundation strongly favors initiatives that actively collaborate with partner institutions where significant and permanent enhancements of the institutions are apparent. One area of interest that the Foundation specifically mentions is in improving people's decision-making abilities on issues of major public importance by increasing public participation.

2.7.6 Rainforest Action Network

The Rainforest Action Network (RAN) aims to protect the rain forests through education, communication, and direct action (RAN). By using campaigns, conferences, and publications, the RAN has helped to increase awareness about the importance of preserving the rainforests. The RAN began by the convening of thirty-five organizations world wide at an international conference. At that conference, the activists formulated a plan of action aimed at saving the world's rain forests. Today the Network is composed of over sixty countries, and through financial contributions and networking services, the

RAN supports the efforts of organizations aimed at achieving ecologically sustainable solutions within their own regions.

One example of the RAN influence on the public can be seen in the boycott that they advocated in the late 1980's. By pressuring consumer's to boycott Burger King, because they purchased beef from agricultural areas that promoted deforestation of the rain forests the Rainforest Action Network caused Burger Kings sales to drop 12 percent in 1987. As a result, Burger King cancelled their $35 million dollar contract with Central America and announced that they had stopped importing rain forest beef (RAN).

The encouragement of consumers' awareness was strongly supported in the United States, and as a result of their campaign, 150 Rainforest Action Groups were formed to support the salvation of rainforests (RAN). These Rainforest Action Groups became essential to the grassroots work of educating local communities and exerting effective pressure for change.

The Raniforest Action Network believes that through educating American consumers, people can begin to understand how consumption patterns play a critical role in tropical deforestation in rain forests abroad. They hope by encouraging people to not purchase tropical woods, they can also help to alleviate the deforestation rates of the rain forests.

2.7.7 Rainforest Alliance

The Rainforest Alliances Catalyst Grants Programs provides a relatively small amount of money, usually approximately $3,000 or less to other countries in need of funds to initiate projects. Their prográm emphasizes quickly getting fund to countries in

need to provide them with assistance to begin an urgently needed project. They hope that their initial investment will create a long lasting effect on the specific area. In general, they hope that the funded program will be able to generate and sustain itself once it receives the initial funding to get started. Their mission is to develop and promote economically viable and socially desirable alternatives to the destruction of this endangered, biologically diverse natural resource, through education, research in the social and natural sciences, and the establishment of cooperative partnerships with businesses, governments, and local peoples (Raniforest Alliance).

2.7.8 Rockefeller Foundation

The Rockefeller Foundation's primary focus is to help poor people desperately in need of social and environmental improvements such as food and health. By promoting the well-being of mankind throughout the world, the Foundation hopes to alleviate some of the social problems that people in other countries face. Previously completed projects include a Social Responsibility program in Ecuador, and the creation of the Gender and Social Responsibility programs in Mexico.

2.7.9 Tinker Foundation

The Tinker Foundation primarily awards grants in Spain, Portugal, Ibero-America and Antarctica to support organizations and institutions that promote the interchange and exchange of information within the communities concerned with the affairs (Tinker). By funding these geographic areas, the foundation hopes to catalyze the exchange of information between Spanish and Portuguese speaking countries and the Western

Hemisphere. Funding is usually directed toward projects addressing environmental policy, economic policy or governance issues. The foundation suggests that any project attempting to attain funds should have a strong public policy component, offer innovative solutions to problems facing these regions, and incorporate new mechanisms for addressing these programmatic areas. They also strongly encourage the collaboration of U.S. institutions and the countries within their areas of interest. Possible activities that they list are research projects, conferences and workshops.

To attain funding, the proposals submitted must follow the specifications set forth in the foundations web site, and must be submitted by an institutional entity and be geographically focused on Latin America, Iberia or Antarctica Spain and Portugal. It is recommended that applicants submit a brief description to inquire about the Foundation's interest before the actual proposal is submitted. Projects already funded for one year include a $25,000 grant to Lighthawk, which is a program that brings people into the rain forest canopy and promotes conservation of protected areas in Mexico and Central America. By using aerial education to fly over the rainforest and educate people of its importance, Lighthawk hopes to help protect and defend the rainforest.

2.7.10 The Woodrow Wilson National Fellowship Foundation

The Woodrow Wilson National Fellowship Foundation (WWNFF) main focus is to increase human potential through educations. The foundation is interested in generating new leaders through sponsoring education (WWNFF). The Foundation has funded several conferences.

3.0 Methodology

The goal of this project was to aid the Rain Forest Aerial Tram Foundation in developing environmental programs that they could initiate in order to address for environmental problems in Costa Rica. We had several objectives during the course of the project that helped us meet this goal. These objectives were to identify key individuals and organizations in the environmental protection community, determine critical issues challenging the environmental community, and decide on the best ways to focus on these issues in order to create solutions. Ultimately, our work culminated in a series of recommendations and a list of foundations that could potentially fund our suggestions.

3.1 Determining Experts to Interview

The best way for us to learn more about the current environmental issues in Costa Rica was to contact important members in the environmental protection community.

We began our search by talking with our liaison, Luis Sánchez, about contacts that he felt would be most beneficial to our project. He provided a list of people and organizations including Rodney Vargas from OTS, Pablo Calderon from UNDP, Emile Rojas from FECON, Chris Willie from both Fundacion Ambio and Rainforest Alliance, Jorge Polimeni from Fundacion de Parques Nacional, Alvaro Umaña from the World Bank, Oscar Brenes from WWF at CATIE, Instituto Interamericano de Cooperacion para La Agricultura (IICA), Asociacion Nacional Indegina (ANAI), and Insituto

Centroamericano de Administracion de Empresas (INCAE). We attempted to contact everyone on our list and succeeded with most.

We set up and conducted interviews. From these interviews we proceeded to add to our list of contacts by asking our interviewees whom else they felt would have additional valuable information. Our list grew to about 20 people and organizations which included the following contacts: Erick Vargas from INBio, Jorge Warner from Lankester Botanical Gardens, Jesus Cisneros from IUCN, Jose Miguel Molina from the Omar Dengo Foundation, Carlos Barquero from OTS at La Selva, Isabel MacDonald from FECON, Carlos Araya from Neotropica, Vilma Castillo from the Ministry of Education, Viviene Solis from IUCN, Franz Tatenbach from Fundicor. In addition to the contacts that we acquired while in Costa Rica, we continued to contact several people in the U.S. who we thought could have beneficial information regarding environmental issues. These people had expertise in areas of the environment and ecology or information regarding issues that we found to be important and that list included Prof. Heaton, Prof. Robakiewicz, and Prof. Weathers all from WPI; Jonathon Giles from OTS at Duke University; Amy Steffen, an Organizational Development Consultant in the United States; Fred Baus, the Director of the Consortium of Worcester Colleges; and Matthew Gardener the director of the Center for Environmental Initiatives at Massachusetts Institute of Technology, where the Consortium of Environmental Communication is maintained.

3.2 Determining Critical Issues

By using informal interviewing techniques, we were able to determine the most important issues regarding the environment in Costa Rica. Starting with the list that we received from Luis Sánchez, we conducted interviews by using a flexible list of questions before the interview. These questions were worded in a way that allowed the interviewee to express their concerns without being led in a particular direction. By the end of the interviews, if the specific issues that we wanted to address had not previously been brought to discussion, we addressed these issues directly. We did this by asking the interviewees whether they thought certain subjects were good ideas, in a way that would not bias their opinions, but merely let us gain an idea of where they stood on the subject from an experts point of view. We tried to ensure that we inquired about similar topic areas in each interview in order to have set categories of information to compare with each other. We also informed the interviewees of other's opinions in the environmental community regarding specific issues, if we thought it was appropriate.

After making a list of areas of concern expressed by the first five interviewees, it was evident that communication was the most common area of concern among people in the environmental community that we had interviewed. After determining this, we hypothesized that communication problems are of great concern to the Costa Rican environmental protection community. In subsequent interviews if we specifically paid attention for issues of communication brought up by our interviewees. In most of the interviews, the interviewees raised the topic themselves. In the few occurrences that communication was not brought up, we raised the issue with the interviewee at the end of the interview. We did this because we felt that the opinions on communication of the

interviewees, including those that had not raised the issue, are important because of their status in the environmental field. The questions that we asked at the end were focused on determining solutions, rather than eliciting specific responses. Because we had not identified the communication problems when we first began our interviews, we proceeded to contact the people that had already been interviewed in the beginning of the project and inquired as to their opinions on communication issues.

3.3 Determining Solutions

After we concluded that communication was the primary area of concern for environmental organizations, we were able to ask interviewees how they felt this problem could best be solved. Many expressed their opinion that a conference is a good way to increase communication and a few gave examples of conferences that had been held in the past and people to contact in order to find out more information regarding this subject. Some of the interviewees also volunteered information about web pages that their respective organizations set up to increase communication between people in their group. We were also informed of small consortiums in Costa Rica that could inform of us of how their participating groups communicate.

We further researched the ideas of a conference, consortium, and web page by looking on the internet and contacting experts in those fields. From information we gathered in our research, we determined the most logical ways to implement these solutions so that we could provide the Rain Forest Aerial Tram Foundation with recommendations.

3.4 Matching Foundations

After determining our proposed recommendations for environmental issues, we re-researched foundations that we had previously identified with prospective funding programs. This research was done to aid the Rain Forest Aerial Tram Foundation in determining which funding sources should be contacted for each recommendation. We then provided the Foundation with a list that matches each proposed program with the most likely funding sources.

The most likely funders were determined using information gathered from their respective web sites and from talking to representatives for as many organizations as possible when we were in the United States. We found that the foundation's mission statements, geographical areas of interest, and previously funded programs were the most important information necessary in order to tentatively determine the most likely candidate from which to receive funding.

4.0 Findings and Analysis

The original focus of this project was to identify specific environmental issues that could be addressed by the Rain Forest Aerial Tram Foundation through environmental education programs and ecological research projects. The next step was then to match these programs with potential funding agencies. Although the funding is still of concern to this project, our findings suggest less of a focus on specific environmental issues and more on other issues of immediate importance to the organizations interviewed, such as interaction between environmental and social issues and communication problems between organizations.

Our questions in the interviews that we conducted were oriented towards eliciting information about specific environmental issues. Although we did receive data on a few specific environmental problems, the interviewees always seemed more concerned on reporting the social problems related to the environmental issues. A theme of poor or no communication between the various environmental organizations in Costa Rica surfaced in most of the interviews.

Once a large amount of the information we collected showed us that communication was an issue, we began to research some possible solutions to increase the communication among the organizations.

4.1 Interaction Between Environmental and Social Issues

Although our interviewees spoke about several issues, they all were concerned with the relationship between environmental and social issues. All of the issues of

emissions trading, pharmaceutical research, environmental education, and community attitude and involvement were mentioned to have very strong social problems entwined within the environmental problems.

4.1.1 Emissions Trading

Emissions trading is the idea of carbon dioxide fixation for an exchange of money between two nations. Certain countries produce more CO_2, or carbon dioxide, than the vegetation of their land can naturally absorb. This CO_2 still needs to be, and is, consumed elsewhere on the planet. Other countries, such as Costa Rica, have a large number of plants that intake the CO_2 and release the needed oxygen. The idea of emissions trading is that the country producing excess CO_2 provides monetary subsidization to a country rich in vegetation for the environmental service of CO_2 fixation.

The idea of emissions trading was furthered defined when the Costa Rican government recognized carbon dioxide fixation as an environmental service. Eric Vargas, the course and workshop director at INBio, explained to us the concept of environmental services. He said that since carbon dioxide fixation is a natural occurrence that is necessary for human survival, it became recognized as an environmental service. Because carbon dioxide became an environmental service, emissions trading became a common practice.

Pablo Calderón, a consultant for the State of the Nation program at the United Nations Development Program (UNDP), talked to us about the problem present in Costa Rica with emissions trading. He says that the problem is in the distribution of the money

that the country receives. The money is dispersed to owners of the land that uses carbon dioxide. Types of land that are recognized as CO_2 consumers include primary forest, secondary forest, and plantations. Owners of plantations currently receive more money per land area than the owners of primary or secondary forest because the plantations grow faster than primary and secondary forests, and it is believed that they, therefore, fixate more CO_2. Herein lies the environmental problem; the creation of plantations, which often requires the destruction of forest, is financially beneficial to those who create the plantations. The larger amount of money paid to the plantations gives incentives to the owners of primary and secondary forests to cut down the forest and create a plantation. Creating more of a strong social issue is the fact that there is no scientific backing to plantations taking in more carbon dioxide than forest. In fact, as Sr. Calderón told us, many people in the scientific community believe that plantations take in far less carbon dioxide than either primary or secondary forest.

4.1.2 Pharmaceutical Research

Pharmaceutical research in the rain forest is still a relatively new idea. Merck and INBio made a first-of-its-kind research agreement in 1992. The agreement allowed Merck to have research done in specific parts of the rain forest in which INBio has research rights. The specifics of the agreement were never disclosed. Nevertheless, on our tour of INBio Parque we found out that 10 percent of the money Merck paid went directly to MINAE, the Ministry of the Environment and Energy. Merck wanted to gain the research rights so they could develop new products. Eric Vargas, Course and Workshop Director at INBio, told us that what Merck was doing was called

bioprospecting and was both beneficial for the drug company and the rain forest. He said that what Merck is doing helps in the discovery of more of the biodiversity of Costa Rica, which supports it through the sustainable development of INBio.

Sr. Pablo Calderón expressed some concerns about Merck's ethics in the agreement. He questioned why the terms of the agreement were never disclosed. Sr. Calderón was worried that Merck will not honor the rights of the indigenous people whose livelihood is based on the rain forest. His opinion is that Merck unethically made money from the agreement because the money they paid largely went to INBio and little went to the Costa Rican government or people. Sr. Calderón also told us that other drug companies, including Smith, Kline & Beecham, have made similar agreements with other organizations that have research rights to other forest areas.

4.1.3 Environmental Education

Four people that we interviewed expressed problems in the current state of environmental education in Costa Rica. The problems identified were both the difficulties of executing educational programs for private foundations and the troubles of education that take place in public schools.

The problems that private foundations have maintaining environmental programs are largely due to the difficulties of finding financial support for such programs. Often programs will be established but must be dropped because of a lack of funding. Rodney Vargas, the coordinator of development for the OTS, told us that programs that they developed and implemented had to be cancelled due to lack of funding.

Many environmental education programs are designed for the audience of greatest impact: public school children. Pablo Calderón told us that over 75 percent of Costa Rican students attend public schools but have little opportunity to visit rain forests due to limited financial resources in the public school system. Many people also told us that it is important for children to see the rain forest so they can internalize environmental issues in a way not possible through more typical classroom education. These two facts are the reason why many organizations focus environmental education programs on public school students. Carlos Barquero, director of the La Selva children's program for the OTS, told us that due to limited resources, public schools can pay little or nothing for a visit to a foundation and, therefore, the foundation has problems funding such programs.

These limited resources are also the cause of problems with environmental education in public schools. Sr. Calderón also told us that there is only one woman, Vilma Castillo, working at the Ministry of Education who is in charge of environmental programs for all 3,800 public schools in Costa Rica. Jose Miguel Molina, from the Environmental Education Department at the Omar Dengo Foundation, expressed concern that public schools in Costa Rica are not using modern, interactive methods of education. Many interviewees expressed concerned that there is very little material on environmental education even in the science curriculum in public schools, let alone any content of social implications of environmental problems. Rodney Vargas reported that despite environmental education being in some curricula, it is not a daily objective. Also many of our interviewees including Rodney Vargas, Carlos Barquero, Pablo Calderón, and Jose Miguel Molina think that in class preparation and follow up of visits to environmental education programs are almost always inadequate, if existent at all.

4.1.4 Community Attitude and Involvement

Another common problem that our interviewees freely discussed many times was the environmental attitude of Costa Ricans. They believe that there are two major attitudes that people have that are detrimental to the environment.

The first of these attitudes is of an individual nature. Carlos Barquero told us that many people believe, for one reason or another, that their individual actions mean nothing to large-scale environmental issues. This manifests itself as people thinking they are not the cause of environmental problems, as well as them believing that no matter what they do, they cannot help the current situation.

The second of these attitudes is one of frustration. Pablo Calderón told us that people are frustrated that they are not involved in many environmental programs that take place in their community. Isabel MacDonald's views on this issue are very similar to those of Sr. Calderón's. The both agree that local people are often forced to change the way they run their lives due to environmental policies in which they had no voice. These people are often disgruntled and not willing to help the cause of environmental protection. This attitude seems more justified when one realizes the economic loss many people suffer from such policies. Sr. Calderón recommends that ecotourism include the local community and permit financial benefit for those people.

A solution to these attitudes, which is rarely being practiced in Costa Rica, according to those we interviewed, is community involvement in environmental programs. This lack of involvement causes the feeling of alienation and does not allow people to see how they can make a difference.

One program that Rodney Vargas told us that the Organization for Tropical Studies has implemented in the past, but had to discontinue due to a lack of funding is called environmental rural appraisal. The program was designed to have a community solve its own environmental problems. First, community leaders were identified. Then, with the community members, they identified the environmental problems that that specific community faced and identified how those problems affect other problems on a larger scale. Once all the problems were identified, solutions were researched and generated by the community, and if appropriate, they were implemented. This type of program gives the people of the community a voice in the environmental policy and shows them that they can generate change in the current environmental situation.

One other problem that we informed of by Jesus Cisneros was of environmental involvement of the private sector. Sr. Cisneros believes that pressure must be put on the private sector to contribute to the conservation cause. He said that this pressure should come in the form of a need for social improvement or charity.

4.2 Communication Problems

Most of the interviewees expressed concern that the non-profit organizations in Costa Rica are not communicating on a regular basis. They see this as a problem because it creates a lack of awareness of the current projects and goals of organizations in surrounding areas. This lack of awareness can be detrimental to the objectives of organizations because it can cause set backs that would not occur if communication between groups was not an issue.

The interviewees expressed that their concern of a lack of communication results in each organization being isolated from the rest of the environmental protection community. This isolation limits resources for each individual organization. Also many of the interviewees felt that programs may unnecessarily be repeated by different organizations because communication is not happening. Many people felt that with increased communication, the various organizations of the environmental protection community in Costa Rica could work more efficiently as individual organizations and all the organizations together could have more of an impact of solving environmental problems.

Carlos Barquero believes that using a common area for communication, such as the internet or a newsletter, will improve the current communication problem with the exchange of ideas. He added in his interview that he thinks that the current circumstances under which communication takes place is not as efficient as possible. He thinks it is too time consuming to go to separate meetings with separate organizations in order to exchange ideas. Eduardo Carillo, who works in Areas Protegidas at the Centro Agronomico Tropical De Investigacion Y Enseñanza (CATIE), agrees that efficient communication is not being implemented in Costa Rica and he believes that a consortium would be a good solution to this problem, but warns us that it may be hard to implement one. He warned of the difficulty of starting a consortium because of the high level of organization it would require, as well as the fact that the environmental organizations of Costa Rica are extremely busy and may not initially be interested.

4.2.1 Technology's Role in Communication

Jose Miguel Molina from the Edward Dengo Foundation explained that the best way to pool knowledge and information between organizations is to use current technology as a basis for communication. He said that it is the most efficient way to assemble information in an organized manner and present it in a manageable way.

Sr. Molina explained the concept of New Technology of Communication and Information (NTCI) that uses technology to establish education, sustainability, and globalization of communication. He believes that constructivist education, or learning by experiencing rather than by being taught, is the best way to educate people. Technology can enable people to take part in constructivist education by allowing them to have experiences that they wouldn't normally be able to achieve on their own. He explains that virtual education, using the internet and multimedia, can improve education standards and attain constructivist-learning styles. Sr. Molina believes that the best way to teach environmental education is through constructivist education because people must interact and get involved in order for effective action to take place. He believes that not only can technology be used to make education more exciting and make the quality of life better, but it can also be used to improve communication.

Eduardo Carillo points out that there is currently no internet program to increase communication in the environmental community being implemented in Costa Rica. However, he agrees, as does Carlos Barquero, that the internet would be a good way to exchange ideas as an alternate method of communication to increase efficiency.

4.2.2 Communication in Relation to Funding

Most of the money that is given to non-profit organizations in Costa Rica comes either from wealthy international companies or from the private sector in Costa Rica. The wealthy international companies usually only give funding to one company in Costa Rica, or even Central America, per year resulting, therefore, in a limited amount of money being spread between the non-profit organizations in Costa Rica. And, according to Jesus Cisneros of the International Union for the Conservation of Nature (IUCN), the private sector of Costa Rica usually only gives money to limited numbers of organizations in order to attain tax exemption. For this reason, there is a lot of unnecessary competition among non-profit organizations, according to Rodney Vargas of OTS.

As Jesus Cisneros at IUCN stated in his interview, there is a strong possibility that creating better alliances between organizations will increase the chance of all of the organizations receiving funding. By pooling knowledge and information, organizations can work together to apply for funding so that there is no overlap in funding requests by organizations doing work in the same field of research. They can also share information about current funding and research opportunities or trends that may apply to other organizations more appropriately than their own.

Jorge Warner from Lankester Gardens explains why some organizations are cautious when it comes to signing agreements. He says that some organizations want to form alliances only to increase their chances of funding and not for the benefit of both organizations involved. For example, he says that some organizations only want to form alliances with Lankester Gardens because they are affiliated with the University of Costa

Rica (UCR). This means that they may want the alliance because they can have the recognized name of the UCR behind their organization, which may help to increase their chances of funding, not because they have anything to offer the garden. Jorge Warner believes that alliances are good only when they are mutually beneficial to both parties involved.

5.0 Recommendations

Since we determined that problems in communication among environmental protection organizations are the largest, most pressing issues in the Costa Rican environmental conservation effort, our recommendations are designed to address these problems. It is our belief that if the issues of communication are solved, the solutions will lead towards solving the other specific environmental issues Costa Rica faces today.

Based on the communication issues people told us about, we strongly recommend the Rain Forest Aerial Tram Foundation be either the initiator or key leader in the development of the following:

1) A conference on communication among the environmental protection community
2) A consortium for all of the environmental organizations in Costa Rica
3) A web page that can support increased communication for those groups

We have included funding recommendations for providing these programs with financial support.

5.1 Conference

To directly confront the lack of communication in the Costa Rican environmental community, we recommend that the Rain Forest Aerial Tram Foundation investigate the possibility of organizing a conference, which we call "Environmental Conference 2001." This conference would be open to members of the environmental community and designed to address the issue of communication.

Environmental Conference 2001 would be very beneficial for increasing communication among the various environmental protection organizations in Costa Rica. The following is a model of a conference that we believe would be the most productive to increase inter-organizational communication.

To create a productive conference that would increase communication among Costa Rican environmental organizations, invitations would be provided to all such organizations. Personal contacts that the Rain Forest Aerial Tram Foundation already has should be the basis for creating a list of organizations to invite. Obviously, the more organizations and programs represented, the more effective the conference. It would be optimal for the directors of environmental research, education, community involvement programs, and sustainable development programs as well as organizational directors of the various groups to be present as representatives. Members of the Rain Forest Aerial Tram Foundation that are organizing this conference would make the best decisions for selecting the invitees.

The agenda of Environmental Conference 2001 would best be organized as two, separate distinct phases. The first phase of the agenda should resemble a traditional conference, with designated speakers, meeting times, and topics of discussion. The second phase should provide time for open discussion, problem-solving efforts, and alliance formation to occur. We believe that the combination of these two agenda styles will optimize the conference's ability to increase communication among the various environmental protection organizations in Costa Rica.

We recommend that the first portion of the agenda be clearly focused on presenting topics to increase communication among the environmental organizations in

Costa Rica. Specifically it would be beneficial for the conference to have subtopics of communication in the agenda. We suggest that these subtopics include communication in research activities, communication in environmental education activities, communication in community involvement programs, and communication in sustainable development programs.

Each subtopic should be discussed with the same themes of communication. We recommend that these communication themes be what programs are currently being done in each topic area of research, environmental education, community involvement, or sustainable development; who is implementing these programs; creation of alliances in that area; and funding for programs of that type. If the conference covers all of these themes for each of the subtopics, communication could be greatly increased in each subtopic area and new programs can be implemented to solve the actual environmental problems.

The format of the second phase of the agenda should be left open-ended. The format should be very similar to an Open Space conference structure, which is explained in detail in the Background section of this report. The most beneficial use of this time would be to create small interest groups focused on particular issues. These issues would be determined by the participants at the start of the second phase of the conference. By running the second half of the conference in this manner, organizations that have similar interests can create action plans for the future together and specific alliances can be formed. This is the first major step for increasing the overall communication among environmental organizations.

We recommend that this structure be used for the second portion of the conference because of its natural tendency to create alliances and increase communication. Furthermore, Alban and Bunker recommend considering the approach of an Open Space conference for problems that must be solved across organizational lines and for conference groups that have a large amount of control over the results and proposed actions. Both of these conditions are met for the conference we recommend. Our advice for this conference involves the many organizations of the Costa Rican environmental protection community. The participants would optimally be the directors and heads of the various programs, so they would have a high degree of control over the outcome of the conference. Also, the attendees that may make alliances at the conference will be the ones responsible for tending to these alliances in the future.

5.2 Consortium

To help address the communication issues present in the Costa Rican environmental protection community, we recommend the creation of a consortium with as many of the various environmental organizations as possible being members. The formation of an environmental consortium in Costa Rica would function as a communication network that enables the members to communicate more effectively with each other. Through an increase in collaboration, communication, and shared environmental goals, the environmental protection organizations of Costa Rica would be better able to address and solve environmental problems. By working together as a consortium, the environmental groups would be able to share their knowledge and experience in many different areas and, thereby, increase their individual environmental

awareness. The consortium we recommend would, therefore, have the common goal of ultimately helping to protect and preserve the environment in all areas for the well being of present and future generations.

An important aspect of creating a consortium is deciding what organizations should become members. Obviously, the more organizations involved, the stronger the consortium can become. For this reason, we recommend that as many interested organizations as possible become consortium members. Starting the consortium, however, may be a difficult task. Therefore, starting with an initial membership of just a few organizations, then slowly expanding, may be the best method to creating the consortium. From our interviews, OTS, INBio, Lankester Botanical Garden, CATIE, FECON, and Neotropica may all be interested in initially joining the consortium. We recommend that the Rain Forest Aerial Tram Foundation formally contact all of these organizations to determine interest.

Because the creation of a consortium will require a large amount of preparation and effort and because we are recommending the Rain Forest Aerial Tram Foundation take the opening initiative, we also recommend that the Foundation initially head the consortium. As the consortium grows, no one organization should have control over the consortium. Therefore, we recommend that in the early, growing years of the consortium the different groups who are founding members share the directional responsibilities until a self-sufficient governing body, independent of all other organizations, can be developed.

Since the consortium will require an office to provide all of the functions we suggest, we recommend that the Rain Forest Aerial Tram foundation provide the office

space necessary. This action will show true determination and leadership in the creation of the consortium by the Foundation.

As for the services that should be provided, we believe the consortium ought to utilize several different methods of communication that all result in the unity of the various environmental organizations. A forum for easily exchanging ideas and concerns could allow organizations to communicate their views and opinions on specific matters. To provide a place for these issues, we recommend that meetings be held on a regular basis to discuss environmental problems and solution. From these joined discussions, fully developed solutions could be achieved and then actions could be taken. We also suggest that the consortium publish a periodical notifying all member organizations of the recent interests and programs of other groups. Email could also be used in conjunction with a periodical to quickly and efficiently distribute information on different events and topics to all member organizations. We also recommend that the consortium could function as an organized information center, which keeps detailed, accessible records of events, programs, and research implemented by other organizations. Working together, the organizations would have more support as an entity and the likelihood of funding could also be increased. As a result of increased support both socially and economically, the implementation of larger and more successful environmental programs would be increased. Also, unnecessary duplication of programs could be avoided.

Being a grouped network of organizations, the consortium would also have more power and influence both politically and socially. Because the consortium would represent the decisions of the entire body of environmental organizations, their opinions and beliefs would be more respected and adhered to than any individual environmental

organization. By uniting the environmental organizations of Costa Rica they will all become stronger. By working together the organizations would be able to more directly alleviate environmental problems for the entire society. In doing so, their efforts as a whole would reach more people and could have a larger impact and influence on policies, regulations, and attitudes towards the environment. Consequently, there are many benefits that result from the formation of a consortium.

We recommend the actual structure of the consortium be similar to that of the Worcester Consortium. Details of the Worcester Consortium can be found in the background section of this report. We recommend that the consortium be comprised of an executive, decision-making, board, action committees, and associate members. To form such an infrastructure, the leaders of the environmental community in Costa Rica would unite and make a mutual decision to form the consortium. This consortium would then become a formal structure of alliances who posses common goals.

To achieve the goals set forth, the consortium would have a board of directors that vote upon issues and delegate responsibilities as needed. The executive board would be formed by the original members and would be responsible for maintaining the bylaws of the consortium and would require a 2/3-majority vote for any actions to be taken. To insure the self-sustenance of the consortium, we recommend that the board should also be responsible for determining the qualifications of executive board applicants. The board would then vote upon the applicant to determine if he/she would become a member of the board and the representative of their organization.

The associate board would be composed of interested members who attend meetings. The associate board would not have voting power, but they would be able to

voice their opinions and partake in the delegations of the executive board. Decisions reached through the voting of the executive board would result in the formation of action committees. These action committees would then execute the actions as delegated by the Board.

As a whole, we recommend that the consortium serve the member organizations in creating solutions to environmental problems, while also helping the entire society of Costa Rica. Each organization would be given the opportunity to acquire more knowledge and learn of the experiences and interest of other organizations. As a result of strengthening their backgrounds, each organization would then individually be better able to make decisions concerning environmental protection and preservation. Therefore, not only would each organization benefit from collaboration, but they would also be benefiting all of society through working together to help solve environmental issues more effectively.

5.3 Web Page

The suggestion of a web page is another recommendation that we are making to the Rain Forest Aerial Tram Foundation. The web page can be used to increase communication among environmental organizations in Costa Rica, something that desperately needs to be brought into focus.

We recommend that the Rain Forest Aerial Tram Foundation initiate the creation of this web page. To do this, the Foundation may need to hire an individual or web page design firm. The content of the page, which we have tentatively outlined below, should

be fully determined collaboratively between the Foundation and web page designer to cover all possibilities and optimize performance.

The web page should contain information on all of the participating organizations. The format of the web page could be done in several different ways. One way is that all of the organizations would have links located on one central homepage that connects to the separate organization's web pages. Another method could be to have summaries of all of the participating organizations on one page, organized according to topics of interest. Either way, the organizations would have to provide information about their own history, previous programs that they since discontinued, projects and research programs they are currently implementing, and any upcoming events that they are planning.

Not only could this information be located on separate organizational web pages, but it also could be located in central directories that allow viewers to search all of the information according to the topic for which they are looking. Some directory suggestions would include Participating Organizations, Current Research, Past Research, Recent Funding Opportunities, Upcoming Events, and International Contacts. The Participating Organizations directory could have information on the organizations that are involved with the web page. The Current Research directory could have information on particular areas of research in which participating organizations are involved. For example, if a viewer were looking for research being done on frogs, he/she could look in the Current Research directory and then type "frogs" which would allow him/her to search only through the current research projects that involve frogs. The Past Research directory could have information about research that has already been completed and any

conclusions or recommendations for people interested in that area of research. The Recent Funding Opportunities directory could be a directory of foundations that award grants in relevant areas, which would enable organizations participating in the web page to increase their funding chances. This section of the page would allow the organizations to hear about more opportunities and to learn which foundations have granted money to similar organizations in the past. The Upcoming Events directory and the International Contacts directory could be directories that consist of calendars of information and links to other web pages, respectively.

Directories would save time and create less confusion for the viewers of the web page. These directories could be updated by each organization. The updates would occur by the organizations submitting changes every month to a hired web master. The changes and additions would have to conform to a particular information pattern so that it could be organized efficiently as part of the page. There could even be the option of having password access to certain directories. This could ensure that only participants in the web page could learn about funding opportunities. The general public could have access to information regarding history of the organizations, current research, and upcoming events. This way, the organizations would still obtain publicity, but the other benefits of the web page could be reserved for those who have officially agreed to participate in the web page.

Another suggestion for the web page includes an Email newsletter, which could be composed on a regular basis by whomever tends to the web page. The newsletter could include information about any new participators in the web page and any up coming events, research opportunities, or funding opportunities. It could act as a preview

of any new changes to the web page and anyone interested in what they read in the newsletter could see the web page for more detailed information. This method could make it more time efficient for participants and increases the chances of finding interested parties in fields of research. The newsletter could be sent out either once a week, once a month or even biannually depending on the amount of current information that is added per issue. The newsletter could be sent through regular mail, but Email is faster and less expensive, therefore, more efficient and practical.

The benefits of a web page to increase communication in the environmental protection community in Costa Rica go beyond the fact that many features of a web page are inexpensive. The major advantage of a web page is that it can be accessed by all member organizations from almost anywhere. No transportation or costly meetings are necessary, yet communication could be drastically increased. For this reason, we recommend the creation of a communication web page for the Rain Forest Aerial Tram Foundation.

5.4 Funding

We understand that the Rain Forest Aerial Tram Foundation must find funding in order to execute any, or all, of the above recommendations. We recommend, based on our background research, contacting the following organizations for potential funding: the W.K. Kellogg Foundation, the MacArthur Foundation, the National Science Foundation (NSF), the William and Flora Hewlett Foundation, the Tinker Foundation, and the Woodrow Wilson National Fellowship Foundation (WWNFF).

The W.K. Kellogg Foundation's main goal is to help communities help themselves. They have also funded Latin American projects. Our recommendations are very much oriented towards the Costa Rican environmental protection community helping itself.

The MacArthur Foundation has been funding projects in environmental education and new partnerships. All of these aspects would, in one way or another, be included in our recommendations for the Rain Forest Aerial Tram Foundation.

The National Science Foundation, which has already been contacted by our professors as a potential funder of the Rain Forest Aerial Tram Foundation, is a strong supporter of environmental protection. All of our recommendations are vehicles to specifically increase communication for overall environmental protection. The NSF currently funds the OTS, through Duke University. A meeting with the NSF and our professors is being arranged to take place in August 2000 to determine the possibility of the Rain Forest Aerial Tram Foundation receiving financial support. The NSF specially requires a U.S. component in a proposal to award a grant. In this case WPI and the Rain Forest Aerial Tram Foundation will work together to receive NSF funding.

The William and Flora Hewlett Foundation, which requires a U.S. partner, provides funding for the creation of partnerships that enhance each organization. The partnerships they have typically funded are between the United States and Latin America yet we still believe that this foundation is worth researching for the Rain Forest Aerial Tram along with a U.S. partner.

The Tinker Foundation, which primarily funds projects in Spanish and Portuguese speaking regions of the world, encourages the creation of environmental policies, creative

problem solving, and the formation of alliances. Also the Tinker Foundation commonly funds conferences. All of these commonly funded activities are present in our recommendations. This foundation seems like a very likely source of a grant for Environmental Conference 2001.

The Woodrow Wilson National Fellowship Foundation has specifically funded many conferences. The WWNFF supports educational programs as well, which is why we believe they may be interested in funding a conference that involves environmental education.

The above list that we recommend the Rain Forest Aerial Tram Foundation investigate is solely based on previous research that we conducted. Many of the foundations require a United States partner for funding programs in Latin America. The extent of this should be researched by the Foundation. The Foundation should also be aware that both of our advisors, professors Arthur Gerstenfeld and Susan Vernon-Gerstenfeld, are interested in helping the Foundation receive grants from donors that require a U.S. counterpart. Also, other departments of WPI may be contacted for interest in joint programs for mutual benefit.

5.5 The Communication Solution

We strongly suggest that our above recommendations of a conference, consortium, and web page be all combined into one plan of action that the Rainforest Aerial Tram Foundation initiate by applying for funding from the most likely funders that we have provided. The link between all three of our primary recommendations is a very natural one. The conference could be used as a tool for the creation of operating

procedures for the consortium. This is ideal because the members of the environmental protection community, who would ultimately implement and contribute to the consortium, would all be present at the conference. The development of a consortium could have a more lasting effect on communication than just a conference alone. The creation of a web page would naturally follow from the existence of a consortium. The web page could serve as a method to further increase communication between members of the consortium. This logical flow of activities would greatly increase the current communication between the environmental protection organizations in Costa Rica. Therefore, we recommend that the Rain Forest Aerial Tram Foundation work towards the design and creation of the initial conference and be heavily involved with the implementation and upkeep of the consortium and web page. These actions will help the Foundation meet its own goals as well as increase the communication, and productivity, of the Costa Rican environmental protection community.

5.6 Justification of Recommendations

All of the above information is a set of recommendations to the Rain Forest Aerial Tram Foundation. Since the Foundation is relatively young, one of its recent goals has been to establish itself in the environmental community in Costa Rica. By implementing the recommendations we have provided, the Foundation can reach this goal. By continuing these programs the Foundation can reach its long-term goals of promoting conservation and environmental awareness.

The recommendations we have made are clearly aimed at solving the problems of communication in the environmental protection community. It is our belief that if these

communication issues among the various organizations in Costa Rica can be solved, then the organizations can work together and more efficiently solve the other more specific environmental problems either present today or that will arise in the future.

6.0 Conclusions

Although we feel very comfortable with our data, we would like to present the limitations of our project. Although we would have liked to conduct more interviews, as each interview brought out more issues that needed further exploration, our interview schedule was limited to the eight-week period we were in Costa Rica. We also had trouble contacting everyone we would have liked to meet. Finally, we occasionally had difficulty overcoming the language barrier between English and Spanish during our interviews. This may have resulted in some miscommunications between the interviewees and us.

Since our project is making suggestions for future events and programs, we feel that our project very naturally leads to three more projects. These projects are the research for implementation and planning of our three recommendations, a conference, consortium, and web page. All of these could individually be enough to constitute an entire project, as long as they include exploring the societal effects of the implementation of each recommendation. These societal effects are part of the proposed projects because in determining how all of these recommendations are implemented, a project group would need to examine how any one of the programs relates to the environmental issues of Costa Rica.

Appendix A: Mission and Organization

The information provided in this appendix was collected from a variety of sources. Information was obtained from articles published in Ski Area Management (1995), the Rolex Award for Enterprise Journal (1995), and in the Historical Summary of the Rain Forest Aerial Tram. Further historical background was also obtained from interviewing Ignacio Ocampo and Dennis Durán, both from the Sales and Marketing Department, and Luis Sánchez, the Manger of the Rain Forest Aerial Tram Foundation.

The creator of the Rain Forest Aerial Tram, Dr. Donald Perry was a pioneer in researching the tropical rain forest canopy in 1974. In 1983, he received his doctorate degree from the University of California Los Angeles in ecological pollination. By utilizing a modified system of rope climbing, he was one of the first scientists to be able to study the rain forest canopy. To further his research in the canopy, Perry collaborated with a fellow explorer and inventor John Williams to build an experimental tram.

The tram, called the Automated Web for Canopy Exploration (AWCE), consisted of a cage suspended from a cable reaching 800 feet into the treetops and was able to elevate scientist into the canopy to conduct research. In 1984, for the construction of AWCE, Perry won the $50,000 Rolex Award for Enterprise. This award then led to the general public displaying an interest in canopy exploration, and in 1991 Donald Perry and John Williams established a company called Dosel S.A. with two other partners. The creation of Dosel S.A., according to Dr. Donald Perry, was directed toward "educating tourists and students about the mysteries and values of the canopy."

To construct the tram, Micheal Skelly, a bilingual Harvard Graduate and Peace Corps Volunteer was selected to be on-site general manager, and Ligia Fernandez, a native Costa Rican with an MBA and bachelor's degree in biology, was selected to be the marketing director. Calderon and Company was selected to be the contractor for the construction of the tram, Ericksen Associates in Vermont was selected to be the tramway engineering firm, and Superior Tramway in Spokane, Washington was selected as the equipment supplier and fabricator.

The actual construction of the tram began in 1992 on 354 hectares of rain forest bordering the north side of Braulio Carillo National Park. The land was purchased from several individual landowners. Of the original land that was purchased, eighty percent of it was primary forest; the other portion had previously been used for agricultural purposes. In subsequent years, the company has continued to purchase more of the land surrounding the Tram property and currently owns 475 hectares.

The Rain Forest Aerial Tram officially opened in October of 1994 as a tourist business with the intent of educating the public. The administration of the company is divided into four main branches with Teresita Aguilar as the President of Dosel S.A. Jeffery Carrete is the current General Manager of the Rain Forest Aerial Tram, and Eugenia Solano is the Operations Director. Denis Durán is the Sales and Marketing Manager, Adrián Gonzalez is the Financial Manager, Guy Vincenti is the New Projects Manager, and Luis Sánchez is the Manager of the Foundation. The owners of the company comprise the Board of Directors. Conservation Tourism Limited (CTL), a tourism company who funded much of the construction of the Tram, now owns ninety

two percent of Dosel S.A. A Panamanian organization and private shareholders now each own an additional four percent of the company.

Upon arriving at the Rainforest Aerial Tram, visitors are shown a brief video on the construction of the tram. Twenty four cars, each able to hold six people, carry visitors along a 2,600 meter long, ninety minute tram ride that reaches forty meters in altitude. Visitors are then given a 45-minute guided walking tour. The tram is open seven days a week to the public and students. The price of touring the canopy is $49.50 for adults, $24.75 for students, and is free for children who have participated in environmental programs such as cleaning up riverbeds, beaches, town centers, areas bordering national parks and reserves, areas surrounding plantations, and areas along highways and near rest stops. The Tram is also active in promoting school wide recycling programs, reforestation projects, and wildlife protection.

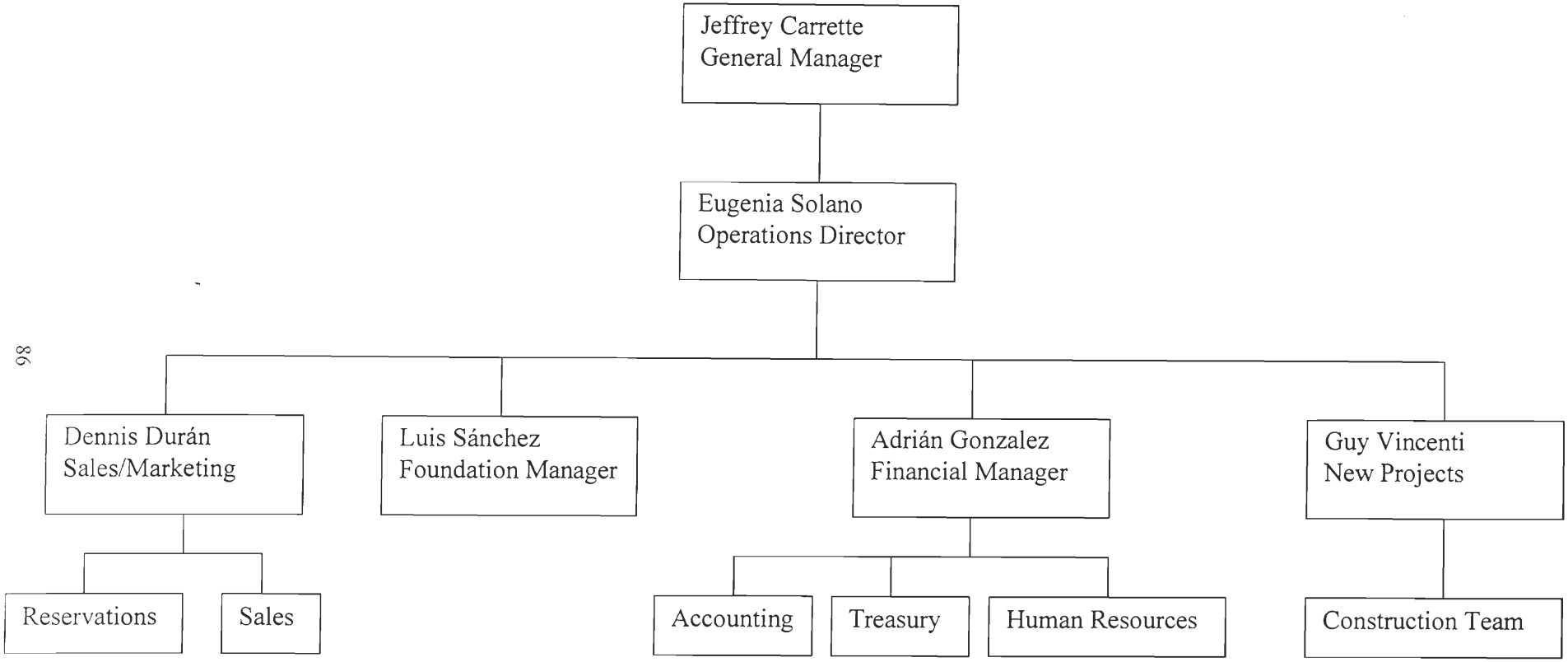
The mission of the Rain Forest Aerial Tram, taken from their web page is a quote from Jeffrey Carrette, the general manager of the company. He states that the mission of the company is, "to promote environmental awareness in saving rain forests through innovative ecological solutions, education, and exciting research to create a world class tourist experience" (May 22, 2000; <http://www.rainforesttram.com>).

Having similar intentions of promoting environmental awareness, the Rain Forest Aerial Tram Foundation was created in May of 1999, to further promote the original educational intentions of Dosel S.A. The Foundation is composed of a separate Board of Directors and has a different legal standing than the Company. Alvaro Umaña, the President of the Inspection Panel of the World Bank, is the President of the Foundation, and Luis Sánchez is the general manager. Other positions within the foundation include a

legal representative, treasurer, and secretary. Through environmental education, communal programs, and scientific investigation, the Foundation's goal is to benefit present and future generations by increasing environmental awareness, conserving ecosystems of tropical rainforests, and promoting sustainable development.

Our project is directed toward creating solutions to environmental problems present in Costa Rica. This project provides useful information to the Rain Forest Aerial Tram Foundation that may help them further their mission of increasing environmental awareness through environmental education and research. By developing ideas that encourage communication among the environmental groups, we intend the Foundation to be able to form alliances with other organizations and through these alliances the environmental problems present in Costa Rica can be alleviated.

Company Overview



Appendix B: Interviews

Pablo Calderón

Consultor, Estado de la Nación, UNDP

June 2, 2000

Upon inquiring of Pablo Calderon which problems he felt were the most pressing issues in Costa Rica, he responded with regard to several different areas. He believes that there is a strong need for better education in public schools, that communities should be better involved in environmental protection, and that there are current warranted questions about emissions trading.

He informed us that over 75 percent of the student population of Costa Rica attend public schools. And, of the 3,800 public schools, only one woman is in charge of the environmental education programs. He feels that the lack of environmental education in public schools will have a serious detrimental effect on efforts to conserve the environment. He thinks that the lack of environmental education will result in a continuing lack of respect for the environment. To help instill the importance of the rain forest in children, Sr. Calderon thinks that they need to experience the reality of the rain forest in person. He believes that the children need to be brought there to fully understand its importance, and that then, with education, will the true value of the rain forests be internalized. In contrast with public schools, he stated that most private schools in Costa Rica have very good environmental education programs.

Sr. Calderon commented that there is a need for the communities to be involved with environmental conservation and regulations. In order for the people to follow the rules that have been set, he believes that the people need to be a part of making them. Because communities are not involved in forming the rules that have been set, he believes that many of the people are angry. They are not only being told they can not use their natural resources the way they want, but they are also suffering the repercussions economically from not being able to use their land. As a result, Sr. Calderon commented that an entire project could be done solely on determining what it is that the people want as environmental regulations.

He thought that through educating the people of the importance of the environment, they could be assisted in beginning a more environmentally conscious means of economically sustaining themselves. He offered examples of ecotourism such as, butterfly farms, and charitable plant growing, which is when organizations grow plants that the public can pay for to be planted in their names. And, rather than import tour guides, the people of the area should be utilized, especially since most are very knowledgeable about the areas of Costa Rica. His main point was that communities need to be involved with receiving the benefits.

The next topic we asked about was the emissions trading of CO_2. Sr. Calderon informed us that there is a major problem present with emissions trading because, currently, reforestation plantations are receiving more subsidization for CO_2 fixation than primary and secondary forests. The plantations, having faster growing wood than the natural forests, claim that in order for their trees to grow faster they are using more of the CO_2 from the air and are entitled to more economic benefits. So, the plantations are now

not only profiting from the reforested trees, but they are also receiving more subsidization than owners of preserved primary forests. As a result, owners of primary forests have been cutting them down in order to receive the benefits of replanting the forests and receiving more money for CO_2 fixation. He also informed us that in 1998, two-hundred million dollars was brought into Costa Rica from emissions trading.

We then asked him about the recent commission of one million dollars that Merck paid INBIO for research rights. Although he was not against research in the rainforests, he did not think it was entirely fair that INBIO and the Ministry of Environment were receiving all the subsidization rather than the indigenous people of Costa Rica. He also commented that several other pharmaceutical companies have also begun research projects in Costa Rica.

Upon telling Pablo Calderon of possible conference ideas, he felt that a conference on orchids and fungi in a symbiotic relationship would be a suitable idea, along with any project involving environmental education in schools or the community. He also offered that a project involving Braulio Carrillo would be a good idea, especially since the view and species at the aerial tram are somewhat dependent on the park's existence.

He also recommended we speak with Sr. Gamez, the director of the nature conservancy at INBIO, Jose Miguel Molina, Vivienne Solis, and Vilma Castillo, at the Ministry of Education.

June 27, 2000

Since we had interviewed Pablo Calderon early in the project, we decided to interview him again to inform him of our findings and current ideas regarding a conference, consortium, and web page. In the interview, Sr. Calderon gave us some interesting pointers on implementing our ideas and also gave us some contacts to recommend to the Rain Forest Aerial Tram Foundation.

When we told him of our suggested solutions to the problem of communication in Costa Rica, he was enthusiastic but warned us of some problems the consortium might face in the future. The first problem that he brought up was the problem of uncommitted organizations. He explained that frequently organizations will show lots of enthusiasm for proposed ideas, but then they will back out when the ideas need to be implemented. He says, to make sure that we obtain many organizations that will actually join the consortium, we need to invite as many people to the conference as possible. Using a conference as an example, he explained that typically out of two-hundred invitations sent, about one-hundred and fifty confirmation replies are received, and only about fifty of those organizations will actually attend.

The second problem that he warned us about in our interview was the future of the consortium. He believes that the best way to implement a consortium is to make one organization assume the responsibility of controlling the consortium, and then he suggests that that organization ask for help from the others participating. For example, he wants the Aerial Tram Foundation to control the consortium and delegate jobs to other organizations within the consortium. He explains that if all organizations in the consortium have the same position, in a few years they will all start fighting for power over control of the consortium. This fighting will completely negate the purpose of

having a consortium in the first place. He adds that he thinks that larger organizations will still be willing to participate even if the Rain Forest Aerial Tram Foundation takes control of the consortium.

The third problem that he brought to our attention was the idea of a consortium being used for something other than just increasing communication. He says that consortia lose their focus after years and fight for the wrong things. He used FECON as an example. He explained that FECON began as the first consortium to bring together organizations in Costa Rica. He said that they lost their focus on conservation when they began to band together and compete for funding against all other organizations in Costa Rica. This is why no one else wants to take part in their consortium. For this reason, he wants us to maintain the focus of the consortium on communication and not on funding.

He believes that increased communication is necessary and feasible. He says that it is important to obtain 15 to 20 large organizations involved first in order to gain credibility, then, he adds, more organizations will be interested in joining later. He suggests that OTS, Neotropica, and FECON be urged to participate. He also says that EARTH University has implemented a small consortium as a result of the Rio Conference so they would be interested in the idea of a nationwide consortium. He also says that Fundecor would be interested because they have been wanting a consortium in Costa Rica for awhile now. He also mentions that UNDP has a small grants program that has a small consortium. He suggests we talk to Ana Carmona at the UNDP about this consortium. He also agrees that it is important to have the press invited to the conference because they can have important things to add regarding communication. He suggests that the Foundation contact Zuniga at the Costa Rican newspaper La Nacion, and

Mariano Rodriguez from the television station Canal 13. He also agrees with Isabel MacDonald that we invite the journalist Juan Carlos Cruz for more input from the press.

Eric Vargas

Course and Workshop Director – INBio

June 2, 2000

After taking a two-hour tour of INBio, we interviewed Eric Vargas, who informed us about the goals of INBio. He told us about the programs they participate in that are directed towards children through several different courses.

He told us about four environmental services that may be used as a way to generate economic profit. These services have been provided by the environment and have been recognized by the Government. They exist without intervention, and are CO_2 fixation, water purification, scenic beauty, and biodiversity. He expanded on that thought, explaining that 70 percent of the drinking water is filtered and purified by Braulio Carrillo and, at INBio, 10 percent of their initial income from projects goes directly to the Ministry of the Environment, which is put into the national parks. He thought that some sort of program supporting Braullio Carrillo might be a good idea, possibly through helping guides.

Upon asking him more about specific areas we should research further, he informed us about a law enacted in 1998 that is a mandatory biodiversity law. He also suggested that we talk to the Conservation Area Headquarters, and to Olga Duran from the Cordeara educational program.

Rodney Vargas

Coordinador de Desarrollo en Costa Rica – OTS

June 6, 2000

When we met with Rodney Vargas from The Organization for Tropical Studies (OTS), he recommended that we focus our concerns on three main topics. One topic is creating alliances between the main environmental groups in Costa Rica and one of the others is to educate people about how to create better funding situations for themselves. He also informed us that these two issues have direct connections to each other. The third issue that he feels is important to concentrate on is community involvement in environmental programs.

Some of the ways that he said that OTS is involving the community in their environmental programs include allowing school children to visit La Selva, a research community run by OTS. By bringing children to La Selva, OTS can educate them about current environmental issues and make them more aware of their surrounding environment. Currently La Selva hosts programs for school children between the grades of three and five from 15-20 schools around the area. As a recommendation, Sr. Vargas told us to contact Carlos Barquero who runs the children's program at La Selva to learn more about community involvement and more about the work that La Selva does within the environmental community. Sr. Vargas also recommended the use of Environmental Rural Appraisal as a tool for involving the community. This involves identifying leaders in the community and working with them to solve environmental problems on a local scale. Another contact that Sr. Vargas suggests we speak to is Dr. Claudia Charpentier

who works at the University Nacional and is part of the National Committee on Environmental Education. She works on programs with several communities trying to get them involved in environmental education.

The other important problems in Costa Rica involve fundraising. He informed us that a lot of organizations are having trouble finding funding because they do not have experience with fundraising techniques. Rodney Vargas suggested that it would be beneficial to organizations to form alliances because it could help increase the possibility of funding. He explained to us that most of the funding comes from the private sector in Costa Rica and that almost all of the environmental organizations compete for the same money, which decreases the chance of funding for everyone. He expands his information by telling us some areas that organizations could be educated in order to help them gain better access to funding. One these areas that needs some help is cultivating relationships between organizations and funding agencies. Many organizations do not know how to promote good relationships with funding agencies and therefore long-term relationships do not result. He gave us an example that some organizations do not construct simple things like annual reports to give to their funding agencies regarding their progress. This lack in communication can result in decreased funding opportunities in the future.

He also suggests that organizations can make alliances in order to inform each other about the trends in current environmental issues or trends in funding. He suggests that we possibly have a conference that deals particularly with fundraising and educating organizations about these important issues so that more Costa Rican organizations can be funded. He also points out that since Costa Rica is the most developed country in Latin America, when competing with other countries, funding usually goes elsewhere. He

believes that an alliance or communication between such important groups as OTS, INBio, EARTH, and the Aerial Tram Foundation can drive funding possibilities in the right direction.

In order to learn more about the issue of fundraising, Vargas suggests we contact Franz Tatenbach from Fundecor to gain more knowledge about the problems with funding. He also suggests Oscar Brenes from the World Wildlife Federation because Vargas says that he has also expressed interest in learning more about funding opportunities and educating organizations about funding trends. He also suggests that we talk to Jesus Cisneros at the International Union for the Conservation of Nature and Vera Vanera from the Fundacion Neotropica to talk about environmental education and funding issues.

Jesus Cisneros

Coordinador Unidad de Enlace de Membresia – IUCN

June 8, 2000

Jesus Cisneros, of the International Union for the Conservation of Nature, believes that there are three needs that have to be addressed in Costa Rica. He explained in his interview that Costa Rica has a good image in the eyes of the world but in practice they are falling behind in conservation of nature. In order for this situation to change, NGO's or governmental organizations need to make better connections with non-profit organizations so that research opportunities can be pursued. There also needs to be a general organization of information between organizations in Costa Rica, which, in turn, will result in sharing of important knowledge and experience. This shared knowledge and experience would consequently generate enhanced environmental programs.

He informed us that by sharing knowledge and experience, organizations would have a better chance of receiving funding. Alliances would improve this situation because it is a way to inform others of funding opportunities, or to make it easier to apply for funding by reducing the risk of doubling up on applications by groups with similar interests. He says that organizations are willing to work together they just don't have the opportunity to get together and do it yet.

He also believes that the organizations of Costa Rica need to be more innovative in the area of conservation in order to attain more funding. Sr. Cisneros says that there needs to be more incentives for the private sector in order for conservation efforts to improve. He says that the private sector also needs to more socially aware and view

funding programs that support the environment as a social responsibility and investment, instead of offering funding as a charity for tax-exempt purposes. By promoting the attitude that funding is a national investment, he thinks that it would create a positive national image of contribution. He believes that the community will respond better to social investment from the private sector rather than charity.

Jose Miguel Molina

Director - Omar Dengo Foundation

June 8, 2000

When we interviewed Jose Miguel Molina from the Edward Dengo Foundation he informed us of the idea behind the important concept of the New Technology of Communication and Information (NTCI). This is a concept that explains how technology of communication will effect education, sustainability and globalization.

Sr. Molina explained to us that traditional education is academicist, meaning that students are taught with conventional classroom techniques. He further explains that education should move towards a more constructivist learning approach, which involves educating students by allowing them to experience what they are learning about, rather than just hearing about it from a teacher. Although constructivist education is unconventional, Sr. Molina believes that constructivist education styles will improve the educational system in Costa Rica, especially in terms of environmental education. He rationalizes this notion by explaining that environmental education is best done constructively because environmental issues have to have active involvement and interaction in order to be effectively.

Sr. Molina believes that environmental education can be improved in schools through the use of technology. Some examples of useful technological tools to be used in schools include the Internet and multimedia stations. These tools can give students an opportunity to constructively learn through interaction and involvement with topics in their curriculum. He adds that the reason he thinks that Costa Rica has such a problem

with pollution, garbage and deforestation is because people do not believe that there is a connection between themselves and the environment. He feels that by teaching students using interaction with technology, it will help them see a connection between themselves and the environment. This may help them to conserve the environment in the future.

Sr. Molina concluded by telling us that technology will improve connections within Cost Rica as well as improve the quality of life and make education and learning more exciting. He suggested we talk to Selmort Papert at the Massachusetts Institute of Technology to learn more about current technology.

Carlos Barquero

Director of Children's Program at La Selva – OTS

June 12, 2000

The interview with Carlos Barquero from the La Selva children's program, which is run by the Organization for Tropical Studies, he provided us with information regarding environmental education. He also gave us his opinion about the communication issues in Costa Rica.

He started by explaining details of the children's program at La Selva. La Selva has had a children's program for three years aimed at students between the ages of nine and twelve. Each class makes four to five visits per year, which continually build upon each other and becomes more advanced, allowing the students to have a cumulative education. By visiting La Selva, students also have a chance to learn about biodiversity and conservation through more hands-on educational techniques. Sr. Barquero believes that education in the field is more informational than education in the classroom because it allows children to get involved with the environment and it brings environmental education into a local perspective.

He agrees that we should create a program that increases communication between organizations in Costa Rica. He adds that it is people do not have the money or time available to go to small meetings in different parts of the country in order to meet other people working on similar research. He also agreed that it would be a good idea to use the Internet to transfer information within groups in Costa Rica. He suggested that we talk to Doug Parson, who had previously mentioned implementing and information

system on the Internet, to learn more about technology for enhancing communication over the Internet.

Oscar Brenes

Oficial de Programa-Centroamérica Programa para América Latina y el Caribe – WWF

June 14, 2000

Oscar Brenes Gamez from the World Wildlife Fund (WWF) gave us information on programs on which WWF is currently working. He informed us that the WWF office at the Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE) is the main office for Central America. He also informed us that they are currently working on a project named the Mesoamerican Corridor Program, which is aimed at integrating governmental, non-governmental, and private-sector organizations and the private sector. Laura Vilnitzky is in charge of the communication within the project in terms of and publicity using TV, video, and documentary. He proposes that we use this as a possible topic for workshops at the proposed conference. He also suggests that there should be links between the community, the government, non-governmental organizations, and other non-profit organizations in Costa Rica, which could also be done through a conference. This type of collaboration could allow communication in Costa Rica to improve. He named Isabel MacDonald at the Costa Rican Federation for the Conservation of the Environment (FECON) as a good contact for information on alliances.

Eduardo Carillo

Areas Protegidas – CATIE

June 14, 2000

Eduardo Carillo is an expert in Internet communication and he brought up some interesting questions for us to think about if we plan to implement an Internet program. He also informed us that there is nothing being executed on the Internet in terms of connecting organizations in Costa Rica.

He feels that the main problem for organizations is the issue of money. He also feels that it is necessary to have some way to know what other organizations are doing, and, according to him, the best way to handle this is to use the Internet. The only concerns he has are involving implementing an Internet program for organizations to use. Some of the questions he wants us to think about involve implementation of the Internet program. He asked us about issues such as who will organize the website and who will maintain it. He asked us about the same issues regarding implementing a consortium.

Jorge Warner

Executive Director – Lankester Gardens

June 16, 2000

When we interviewed Jorge Warner, the executive director of Lankester Botanical Gardens he talked to us about the Garden itself and also about a possible alliance with the Rainforest Aerial Tram Foundation. He also talked a small amount about the issues present in Costa Rica.

Sr. Warner informed us that Lankester's mission is to promote conservation, especially in the area of horticulture, research, and environmental education. He explained to us the different ways that Lankester is working on environmental education of the public.

First, he said, they have constructed field courses that utilize the expertise of professors at the University of Costa Rica, which is affiliated with Lankester Garden. One example is their course on orchid biology, orchids being one of the strong areas of research at the Garden. They bring in guest lecturers from the biology department at the University, and different people from the Garden speak at different lectures throughout the duration of the course.

Second, the Garden has also implemented programs for visiting school children so that they can use the Garden as a "living lab". About fifteen thousand students of all ages from schools around the Central Valley come to visit the Garden every year. To make themselves more accessible to public schools around the area, the Garden only charges

US$1 per student. Because they are a non-profit organization, the low price is only to assure that the Garden breaks even on their finances.

In terms of alliances, Jorge Warner explained what the Garden expected to get out of an alliance with the Rainforest Aerial Tram Foundation. The Garden would be interested in an alliance in order to increase possibilities of more studies and to increase the number of tourists that visit each year. Sr. Warner also informed us of what benefits they could offer the Aerial Tram through an alliance. They can assist the Aerial Tram mainly through sharing their knowledge and expertise. Since the Garden has numerous experts in the areas of taxonomy, cultivation, propagation, and horticulture, they would be willing to help the Tram in those areas. Sr. Warner also explained that the garden is usually cautious about agreeing to alliances. He says that many times organizations only want to form alliances with Lankester because they want to be associated with the University of Costa Rica in order to obtain more funding.

Jorge Warner agrees that communication is a big issue in Costa Rica. He believes that there is a large lack of organization of information between groups, and there needs to be someone in a government office who will try to coordinate the efforts of all the environmental groups in Costa Rica. Sr. Warner suggested the Universidad Nacional Estantal Distancia (UNED) as a possible contact. He told us that the UNED provides education at long distances and that they have files documenting previous organizations that have worked on certain fields. They also provide programs for students in environmental education.

Isabel MacDonald

Executive Director – FECON

June 21, 2000

When we met with Isabel MacDonald from the Costa Rican Federation for the Conservation of the Environment (FECON) she informed us about the organization and what services they provide the community.

FECON is twenty years old and has twenty-four members in its federation. Sra. MacDonald considers this to be a small amount since there are about 200-300 environmental concern groups in Costa Rica. Since FECON is a federation of environmental groups, it can allow groups to share information among the participating organizations.

FECON also helps society in other ways than just congregating fellow organizations. Although FECON may be small compared to the total number of organizations in Costa Rica, they have a considerable amount of members for a federation. Because they have several members they can use their numbers to sway environmental law making with petitions. She explains that this can be very helpful to communities who need to have environmental action taken on a particular issue.

Sra. MacDonald clarifies how the community makes use of FECON by explaining to us how FECON assists the public with environmental issues. In order to gain publicity FECON puts adds in local papers throughout Costa Rica informing communities that they can help them with environmental problems. If members of the community feel that there is a problem with environmental issues in their area, they call up FECON and

inform them of the situation. FECON then either gives them the phone number of participating experts in the federation who can give them suggestions on ways to improve their circumstances or gives them a list of organizations which can provide the same service, only on a larger scale.

Sra. MacDonald gives the example of one community in Northern Costa Rica who called FECON and told them about a situation in which wealthy companies were removing rocks from local rivers using large machinery. In the process of removing rocks from the river, they were destroying the habitat and environment surrounding the river. FECON informed the members of the federation and contacted a member of the Ministry of Environment and Education (MINAE). The representative from MINAE met with people from the town and heard their concerns and told them that within fifteen days the situation would be cleared up. By networking organizations in Costa Rica, FECON was able to react quickly to this environmental situation and generate a solution within days of notification.

Sra. MacDonald also agrees that communication is a problem in Costa Rica and thinks that a conference would be an interesting solution, and could be very helpful if done correctly. She explains that if the conference does not have a concrete agenda before it is begun, people will be discouraged from coming. She explains that she would be hesitant to come to a conference such as the Open Space conference because she would be afraid that the topics that she wanted to discuss would not be considered. She says that we need to make sure that our recommendations are concrete and practical instead of idealistic because otherwise they will not be helpful.

Sra. MacDonald concurs that the theme of the conference could be communication and she hopes that a regular bulletin may be a byproduct of the conference. One of her concerns is that there will be no one to maintain the ideas that result from the conference. She wants us to make sure that our recommendations make room for ideas that are sustainable so that organizations do not lose anything that came out of the conference.

She suggests that we talk to Coproalde which is another federation of environmental groups in Costa Rica. Their main focus is on alternative technology. She also suggests that we contact Juan Carlos Cruz who is a journalist that works on the Forest, Trees, and People project. He headed a workshop on communication among environmental groups years ago and she said that he might have some ideas for us.

Carlos Araya

Afiliaciones – Fundación Neotropica

June 22, 2000

In our interview with Carlos Araya from Fundacion Neotropica, he told us the history behind Neotropica and the current projects on which they are working. He explained that in 1985 there was only one conservation foundation in all of Costa Rica and it was the National Park foundation. Some of the board members of this foundation observed some problems with the community and the environment and separated themselves from the National Park foundation and formed a new foundation that focused on everything except reserved lands of the national parks. This foundation was called Fundacion Neotropica.

He also explained that there are two types of environmental organizations in Costa Rica. One type is large public organizations, like Greenpeace, that take public action, such as chaining themselves to trees in protest. The other type is research and study organizations such as organizations like Neotropica. He says that organizations like Neotropica give scientific basis to the problems that the other organizations simply protest against.

The four programs on which Neotropica is currently working are explained in a pamphlet that Sr. Araya gave to us. The first is Natural Resource Management, which promotes environmental activities based on the sustainable use of natural resources. The second is Community Self-Development, which strengthens self-development and participation of communities in environmental issues. The third is Environmental

Education and Dissemination, which promotes environmental improvement therefore effecting individual attitudes towards the environment. The fourth, and final, program is Policy and Institutional Action, which promotes change in environmental laws and implementation of these laws by coordinating environmental development.

When we informed Sr. Araya about the concerns of other organizations that communication was a problem between organizations in Costa Rica, he agreed but added that Neotropica is informed of most programs in Costa Rica. He believes that other organizations in Costa Rica need to communicate with each other about current programs and he agrees that the internet would be a useful way for all organizations to share information. He explains that Neotropica has internet communication within itself, but he believes that the internet communication needs to be on a national basis. In order to implement internet communication, he suggests that we identify the major people in the environmental conservation community and set up a chain of information which ends at the person in charge of maintaining the web page.

When we informed him of our idea for a conference he showed interest in the idea. He added that he would prefer for the conference to have a structured format rather than an open format and he feels that more people would attend if they knew the agenda before they arrived. He added that another way to entice organizations to attend is to invite the press to the conference. When organizations hear that they will receive publicity for going to the conference, they will most likely send a representative.

Appendix C: Foundation Contact Information

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MacArthur Foundation
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The National Science Foundation
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Tel: 703-306-1710
FIRS: 800-877-8339 ~ TDD: 703-306-0090

The William and Flora Hewlett Foundation
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