



Environmental Conservation in Nicaragua: Strategies to Incorporate Women and Girls

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April 2010

PASO  PACÍFICO
Making connections for conservation

ACKNOWLEDGEMENTS

First and foremost, I offer my sincere gratitude to Sarah Otterstrom for helping me complete my project and teaching me so much about conservation efforts in Nicaragua, answering all of my questions about Paso Pacifico and their wonderful programs, brainstorming with me, and for supporting and guiding me throughout the whole process. She has been a pleasure to work with and made the semester extremely enjoyable and meaningful. Additionally, I would like to thank Professor Jeanine Braithwaite for her constant advice, recommendations, and encouragement throughout the whole semester. I also thank Angela McCracken for reading my paper and giving me advice, particularly related to gender empowerment in Nicaragua. Finally, for their unending support, brainstorming, and editing, both this project and in all aspects of my life, I thank Meredyth Haas, Nancy McCormack, Maria Li, Caitlin Bailey, Tallie Faircloth, Frank Grace, Sam Dreiman, and Declan Tansey.

Disclaimer: The author conducted this study as part of the program of professional education at the Frank Batten School of Leadership and Public Policy, University of Virginia. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgments and conclusions are solely those of the author, and are not necessarily endorsed by the Batten School, by the University of Virginia, or by any other agency.

University of Virginia Honor Pledge:

On my honor as a student I have neither given nor received aid on this assignment.

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ABBREVIATIONS

AMIFANIC: Asociación de Mujeres para la Integración de la Familia en Nicaragua

AIIESEC: The Association Internationale des Etudiants en Sciences Commerciales et Economiques

CANTERA: Centro de Comunicación y Educación Popular

CEDEPAS: Centro Ecuménico de Promoción y Acción Social

CENZONTLE: El Centro para la Participacion Democratica y el Desarrollo

FEMUPROCAN: Federacion Agropecuaria de Mujeres Productoras del Campo Nicaraguense

GBM: Green Belt Movement

IPCC: Inter-governmental Panel on Climate Change (IPCC)

OMESP: Women's Environmental Organization of the Sierra of Petatlan

RN-RAI: Rainbow Network – Red Arco Iris

UN: United Nations

UNCED: United Nations Conference on Environment and

UNFCCC: United Nations Framework Convention on Climate Change (held in Morocco from 10/29 – 11/10/01)

WAA21: Women's Action Agenda 21

WEDO: Women's Environment and Development Organisation

WWSD: World Summit on Sustainable Development in Johannesburg in 2002

EXECUTIVE SUMMARY

Paso Pacifico, a non-profit organization, works to protect and restore the Nicaraguan environment. To best accomplish this goal, Paso Pacifico must more intentionally incorporate women into these efforts and empower women to take a formative role in environmental policy-making. Climate change increases women's responsibilities and their direct interactions with the environment give them knowledge about sustainable practices that should be taken into account when determining environmental policies. Currently, Paso Pacifico has many programs that work with Nicaraguan communities to increase their knowledge about the environment and help them protect and rehabilitate devastated areas and species. Although some women are involved in its programs, Paso Pacifico does not work to target or increase women's involvement or provide women with services to empower them to take a role in policy-making.

Paso Pacifico could engage women in *entrepreneurial opportunity through environmental conservation*, helping them to earn an income through environmental protection. Microenterprise systems targeted at women have been shown to greatly reduce poverty and lead to gender equality (Fairley, 1998; Hays-Mitchell, 1999). Microenterprise systems that successfully empower women also provide critical support, such as vocational and business training. Paso Pacifico could also enhance gender equality by establishing women self-help groups, teaching leadership skills, helping women interact with local politicians, and establishing literacy programs (Fairly, 1998; Strier & Abdeen, 2009). Through empowerment and skills learned about environmental conservation, women will develop the resources and confidence to work towards further environmental protection and teach these practices to future generations.

Another option is to *start outdoor education programs for early adolescent girls* that give them a connection to and experience with nature, while developing skills such as leadership, problem solving, and teamwork. Children who participate in outdoor education programs learn about science concepts and increase both environmental behavior and attitudes (American Institutes for Research, 2005). Participating girls would bring these attitudes and behaviors to their families, and may be more likely to tackle environmental problems in the future.

Finally, *Paso Pacifico could enhance its community garden program*. Community gardens have environmental benefits (The Multiple Benefits of Community Gardening, 2006), serve as an educational facility, and foster interpersonal connections between women (Glover & Parry, 2005). Paso Pacifico could create more community gardens and incorporate workshops about how the community gardens help environmental protection, teaching women the relationships among their work daily activities, agriculture, and climate change.

Ultimately, *Paso Pacifico should establish environmental microenterprise opportunities* by partnering with women-focused organizations, such as Pro Mujer, to ensure they are providing appropriate business, leadership, and personal development activities to properly empower women. These supplemental activities, in conjunction with the income women will make as they help the environment, will increase women's standing in society and help them partake in environmental policy-making. Providing women with targeted ways to help the environment and encouraging them to make their voices heard will allow Paso Pacifico to best help the environment in the long and short term.

I. EXPLORING THE PROBLEM

Paso Pacifico fails to effectively utilize women in environmental protection efforts. Paso Pacifico's mission is to "restore and conserve the natural ecosystems of Central America's Pacific slope by collaborating with landowners, local communities and involved organizations to promote ecosystem conservation"¹. Although women are involved in Paso Pacifico's programs, men have more free time that they can devote to environmental protection efforts; while women do most of the work, men still make the most decisions in the community. To best help the environment, women need to take a more active role in environmental protection efforts and policy-making. By using women's expertise and changing their behaviors, as well as empowering them to speak up in climate change discussions, Paso Pacifico can further their mission and better protect the Nicaraguan environment.

Climate change mitigation (preventing further global warming) and adaptation (accommodating one's lifestyle to the changing climate) are increasing concerns, particularly in developing countries that are ill equipped to address these challenges. This is a crucial step when addressing climate change mitigation and adaptation (United Nations Women Watch, 2009) because women, particularly those living in developing communities, are arguably the group most impacted by climate change (Denton, 2001) and women are in a unique position to combat climate change (Makhabane, 2002).

Developing countries are most affected by climate change (Dankleman, 2002; Skutsch, 2002; Simms & Reid, 2006). Because women in these areas are largely responsible for household tasks – such as providing food and water for their families – their responsibilities become much more difficult due to global warming (Denton, 2001). For example, some areas will be increasingly plagued by increased drought while others will be prone to excessive hurricanes and flooding (Simms & Reid, 2006). This, along with rising temperatures, makes it more challenging to grow nutritious crops, collect water. It also increases the occurrence of infectious diseases (Simms & Reid, 2006), placing a greater time and physical burden on women to provide for their families and fully complete daily tasks.

Largely because of this division of labor, women are constantly connected to the physical environment. This gives them much knowledge about sustainable practices (Makhabane, 2002) and natural resource management strategies that should be fostered, built upon (Ekman, 1994) and used to create policy. Particularly in rural communities in Nicaragua, where Paso Pacifico works, women, not men, do much of the daily work and are most likely to implement change (See *Table 1*). Therefore, involving them in conservation work and teaching them more ways to live sustainably will increase Paso Pacifico's environmental achievements (Dankleman, 2002).

Women have demonstrated they can organize themselves and make substantial contributions to combat climate change – on a large and small scale. In 1991, 1,500 women from 83 countries assembled for the first Women's Congress for a Healthy Planet and created a guiding document on how gender should be a driving force at all levels of decision-making to create a healthy planet. In the charlands of Bangladesh, women's indigenous knowledge and environmental

¹ S. Otterstrom, personal communication, April 16, 2010.

management skills have helped to manage these flood prone areas (Dankelman, 2002). But women are often not given a voice in policy-making, and therefore their needs and knowledge are not taken into account (Denton, 2002; Dankleman, 2002; Makhabane, 2002). Women tend to have little ownership over land and resources, giving men policy control over areas tended by women (Denton, 2002) and leading to ineffective policy-making (Dankleman, 2002; Wamukonya & Skutsch, 2001).

By using women's determination and devotion to environmental protection, as well their knowledge about natural resources, incorporating women into climate change policies and programs will improve environmental conservation efforts. It is imperative that women are provided with the skills and knowledge about ways to maintain a sustainable lifestyle, as well as feel empowered to partake in environmental protection efforts and policy-making.

II. BACKGROUND

A. Human Activities Have Led to Climate Change

The United Nations (UN) Inter-governmental Panel on Climate Change (IPCC) concluded that the warming temperatures experienced over the last decade are largely the result of human activities (IPCC, 2001; Dankleman, 2002; Simms & Reid, 2006). Greenhouse gas emissions, including carbon dioxide, nitrous oxide, and methane, greatly contribute to atmospheric warming. Greenhouse gases increase the amount of solar radiation emitted through the atmosphere and prevent thermal radiation from escaping, thus trapping heat and warming the Earth (IPCC, 2007). Human activity greatly contributes to increasing levels of emissions, with 2005 carbon dioxide levels 35 percent higher than before the Industrial Revolution in the 1700's (United States Environmental Protection Agency, 2009).

The increase in transportation and agriculture, the destruction of forests, and industrialization all contribute to this rise in greenhouse gas emissions (Denton, 2002; Nelson, Meadows, Cannon, Morton, & Martin, 2002). Burning fossil fuels accounts for almost 75 percent of carbon dioxide emissions, with the rest contributed by agriculture and deforestation. Raising cattle and certain crops, such as rice, releases large amounts of methane into the atmosphere. Methane is also released from landfills (Dankleman, 2002). Not only does deforestation contribute to pollution and greenhouse gas emissions, but fewer trees are also available to process carbon dioxide. Trees take in carbon dioxide for photosynthesis; thus less trees leads to more carbon dioxide in the atmosphere (Boyd, 2002). Population growth further stresses land use and intensifies climate change by increasing greenhouse gas emissions (Denton, 2002; Nelson et al., 2002). As more people are born, more food must be produced, more fresh water collected, and more forests destroyed to build houses – all processes that stress already scarce resources and increase reliance on fossil fuels.

Climate change has profound effects, including increasing temperatures, changing weather patterns, increasing the occurrence of natural disasters, and changing the earth's topography. As global temperatures increase, seawater temperatures will likewise increase, causing many devastating changes. The 2005 hurricane season was ranked one of the most active and devastating in history, with increased seasons like this expected to be on the rise. *El Nino* years

typically followed by *La Nina* years, which cause extreme cyclones, floods, and droughts, are also projected to be more frequent, both of which profoundly affect Latin America (Simms & Reid, 2006) and are driven by the rise in sea temperatures. Increasing temperatures will accelerate the melting of glaciers and snow in mountainous regions, causing flooding and sea level rise (Simms & Reid, 2006). Sea level rise will profoundly impact coastal areas, which are also the zones most impacted by intense storms (IPCC, 2001). Coastal villages in particular will lose land and biodiversity, placing these residents' homes and livelihoods in danger (Simms & Reid, 2006). Climate change is also projected to greatly impact natural resources by destroying habitats and altering both terrestrial and aquatic ecosystems, changing soils, decreasing biodiversity, and harming coastal zones (Denton, 2002). Other anticipated impacts include decreased crop yields endangering food security, increased water scarcity, and increased flooding in some locations and drought in others (Dankleman, 2002).

Further, climate change leads to devastating health consequences. Heat related illnesses will increase and the ability to grow sufficient amounts of nutritious food will decrease. Latin America will also see an increase in the rate of infectious diseases due to climate change, since surface and water temperature increases will change the life cycle of insects, such as mosquitoes, thereby increasing the prevalence of illnesses like malaria. Water borne illnesses will also grow; for example after Hurricane Mitch, cholera increased six times in Nicaragua. Higher temperatures will also exacerbate the effects of pollution, increasing in respiratory illnesses (Simms & Reid, 2006).

Although the majority of greenhouse gasses are emitted from developed countries such as the United States, developing countries are most impacted by climate change (Dankleman, 2002; Skutsch, 2002; Simms & Reid, 2006). Thus, those countries with the least economic and physical resources to adapt to a changing environment are those most affected. For instance, it is estimated that Latin America as a region has only contributed about four percent of the increase in human-caused green house gas emissions in the last 50 years (Simms & Reid, 2006).

As warming has accelerated in the last 30 years, severe storms have increased in Nicaragua. According to the 2009 Global Climate Risk Index, Nicaragua was rated the third most vulnerable country to extreme weather events and was the third country most affected by extreme weather events from 1998-2007. When looking at Nicaragua, the 2004 IPCC's Assessment Report predicts that droughts will be more prevalent in the southwest and sea surface temperatures and sea levels will increase. This will be especially harmful for coastal communities (Margrin, Garcia, Choque, Gimenez, Moreno, Nagy, Nobre & Villamizar, 2007).

B. Women are Most Vulnerable to Climate Change

Of people living in developing countries, poor women are most affected by climate change (Ekman, 1994). Approximately 1.3 billion people who live in developing countries live below the poverty line, 70 percent of who are women. Due to traditional divisions of labor, women are most responsible for tasks impacted by global warming (Denton, 2001). Approximately two-thirds of women in developing countries work in agriculture, an industry greatly impacted by climate change. Projections show that climate change will decrease crop yield and strain agriculture in Latin America, which is what 30 to 40 percent of the population relies on for

income (Simms & Reid, 2006). Many families depend on small cash cropping and agricultural systems, primarily maintained by women. Unfortunately, these systems are greatly devastated by extreme weather and these citizens who depend on them lack access to the resources needed to overcome these damages (Medelsohn & Dinar 1999).

Additionally, women are primarily responsible for finding and transporting water and firewood for their families (Simms & Reid, 2006; Denton, 2002; Dankleman, 2002; Villagrasa, 2002; Nelson et al., 2002) – a very labor intensive and time-consuming process. Women in developing areas often have to travel five to ten kilometers to access sanitary water. This is particularly harmful when women are pregnant or during the rainy season when roads are muddy and dangerous. Women with young children must take their children along, placing these children at risk as well. Water is used for drinking, cooking, cleaning, and bathing as well as agricultural purposes. As climate change continues, water will continue to become scarcer and safe drinking water will be more challenging to find (Reid & Simms, 2007). Thus, women must allocate more time and physical energy towards water collection for their families, taking away time they may spend on other activities, such as education and income-generating endeavors. Due to the lack of resources and division of labor, as resources become scarcer, young girls often must help collect water, giving them less time to spend in school (Denton, 2002; Reid & Simms, 2007). When water is more challenging to find, women and children must often collect water from unsanitary resources, such as dirty ponds, placing them at a much higher risk for waterborne diseases (Denton, 2002).

When scarce resources, such as food and water, are allocated in a household, women tend to prioritize men and children, placing their own nutrition in danger (Nelson et al., 2002). Compared to men, women typically have less access to medical care, making it less likely that they will seek medical attention when injured during a natural disaster or when sick due to water and food diseases or malnutrition. Due to limited fuel resources, women are often make less nutritious meals for their families (Denton, 2002). When children or the elderly need care, such as after a natural disaster or due to poor nutrition, again women are responsible for providing this care, another role increases women for women as a result of climate change (Nelson et al., 2002; Delaney, 2000).

Women are more impacted by natural disasters and have less access to mobility (Nelson et al., 2002; Delaney & Shrader, 2000). Biologically, pregnant or nursing women have limited mobility and need more food and water. Additionally, since women have less access to income, transportation, communication, and education, they have less knowledge about evacuation warnings and less access to shelters. They are also less likely to leave their homes during emergencies because they are not allowed to leave without their husband's permission (Delaney & Shrader, 2000).

Additionally, when women are unable to work, it further increases dependency on their husbands, decreasing their ability to help with decision-making. Lastly, when women help adapt to climate change or manage areas after a disaster, their efforts frequently go unacknowledged (Dankleman, 2002). Often, it is assumed that because women work more in the natural environment, it is their responsibility to help conserve nature and therefore it is not necessary for them to get paid for this work (Nelson et al., 2002).

C. Hurricane Mitch

The devastation caused by Hurricane Mitch in Nicaragua, which hit in 1998, demonstrates the impact of a natural disaster on Nicaraguan women. In Nicaragua, this storm caused \$987 million in damages and impacted over 850,000 people directly. Of those harmed from this disaster, the poor were affected the most, and women were particularly adversely affected (Delaney & Shrader, 2000).

Economic Impacts

The agriculture sector was most affected by Hurricane Mitch; 46 percent of people surveyed replied that crop damage was their biggest loss. In Jinotega, 69 percent responded this way and in Boaco 70 percent. Women also tend to have smaller pieces of land and were more likely to leave the agricultural industry after Mitch (Delaney & Shrader, 2000). Further, 32 percent of women-headed farms were not able to return to farming the year following Hurricane Mitch, as opposed to only 23 percent of male-run farms (Bradshaw, 2004).

Reentering the formal labor market after Mitch proved much more challenging for women than men, particularly due to the numerous roles women had to take on after the storm. Women in Somotillo, Nicaragua could not leave their new, extra responsibilities to find outside work. Further, 60 percent of temporary employment opportunities went to men (Delaney & Shrader, 2000). Of women who were not heads of household, those working in the informal sector dropped from 48 to 27 percent. In female-headed households, this number decreased from 66 to 46 percent (Bradshaw, 2004).

Increasing Responsibilities

After the hurricane, women took on several roles in addition to maintaining the household with water and food production, which became much more challenging after the storm. They mobilized the community, collectively finding shelters for their families and others. Women also worked to help their family economically by seeking positions in the formal and informal sector, although those proved much more difficult to come by for women than men. In addition to running their household, women also remained the primary caregivers to both children and the elderly. After the hurricane, reports show that 12 percent of children younger than 12 years old and 19 percent of individuals over 60 were injured from the disaster, adding to the already growing list of women's responsibilities (Delaney & Shrader, 2000; Bradshaw, 2004).

Benefits to Women

Women worked in many non-traditional roles to help with hurricane recovery – often helping with efforts to clear roads and do physical labor traditionally left to men. At the community level, women organized relief efforts. They mobilized women's groups to run temporary shelters and worked for over a year to help people recover from the hurricane. After taking on these new roles, some women found that men were receptive to this change in social structure and some women felt empowered to take on greater societal roles (Delaney & Shrader, 2000).

D. Women Should be Involved in Climate Change Policy

Since women are impacted by climate change, it is important for them to help mitigate further changes as well as adapt to irreversible changes (Reid & Simms, 2007). Women have different societal roles from men, providing them with great knowledge about sustainable practices (Makhabane, 2002) that men may not be able to contribute to the conservation discussion. They are informed about and skilled in natural resources management, knowledge that can easily be expanded (Ekman, 1994). In Latin America and the Caribbean, women are responsible for 45 percent of cooking for a family, yet women have little share in decision-making or land ownership. For example, women know the importance of and ways to foster biodiversity through conserving wild edible plant seeds. And in El Salvador, women have stopped selling firewood to help protect mangrove forests. Not only do they want to keep these forests from being destroyed, but they also know that the mangroves prevent devastating floods, floods that will only be exacerbated as climate change continues (Simms & Reid, 2006). Currently, women's indigenous expertise is rarely fostered. For example, over time, women have learned a great deal about the medicinal uses of plants – but if this knowledge is not further developed to ensure it is learned and passed on, it may be lost (Agarwal, 1992).

Women have a close connection with their children, since they are the primary caregivers (Nelson et al., 2002). Because mothers spend so much time with their children, particularly when children help them with household tasks, teaching women about sustainable practices ultimately teaches these habits to children as well (Ekman, 1994). Additionally, women have proven to work well together (Ekman, 1994) and countless women-run organizations have successfully changed the climate change agenda to be focused more on involving women, through rallying and lobbying, despite all the challenges they have had to overcome, such as lower status in society (Women and the Environment).

Agriculture and other activities women partake in contribute largely to greenhouse gas emissions. Thus, teaching women about alternative techniques to limit their environmental impact can allow women to play a crucial role in environmental conservation (Dankleman, 2002). In Peru, Ines Rivasplata learned techniques to improve her farm through working with the Centro EcuMénico de Promoción y Acción Social (CEDEPAS), a non-profit organization that work to bring people together to improve irrigation techniques and create water management training and brings people together. CEDEPAS works hard to include women and children, not just men, into training programs because in practice, women and children primarily manage water resources. Working with women such as Ines has been extremely successful in combating Peru's drought. As droughts become more frequent, more groups, such as CEDEPAS, need to include women into resource training programs, particularly since they tend to be the ones who work daily with resources and therefore can best implement change (Simms & Reid, 2006; S. Otterstrom, personal communication, April 5, 2010).

Finally, a major problem is that women are not involved in policy-making and therefore their voices and needs are not taken into account (Denton, 2002; Dankleman, 2002; Makhabane, 2002). Although people are beginning to acknowledge the importance of using indigenous women as a resource when establishing environmental policies, few efforts have actively attempted to incorporate this knowledge into policy-making (Denton, 2002). Often, it is challenging to involve women in efforts, such as tree planting programs, when they have little ownership and control over land (Denton, 2002). Typically a discrepancy exists between those

who manage resources at home and those who make the policy decisions and programs. For example, although women tend to manage household energy, male run organizations have the power to control energy policy. This disconnect does not lead to effective policy-making (Dankleman, 2002; Wamukonya & Skutsch, 2001). To help give women more power in the policy-making realm, redistribution of roles and resources is imperative and would improve women's conditions, giving them the ability to have more of a say in environmental policy (Dankleman, 2002).

Thus, including women in environmental efforts helps create the most effective policy-making and leads to the greatest environmental benefits. It is crucial to give women the tools to appropriately help mitigate future climate change, as well as to adapt to the devastating consequences climate change has caused and will continue to cause.

II. ALTERNATIVES

When assessing the best way for Paso Pacifico to incorporate women more into their programs, it was important to look at current opportunities for expansion and ways to produce the greatest environmental benefits. Thus, the alternatives analyzed to increase women participation in Paso Pacifico Programs are as follows:

- A. Status Quo
- B. Environmental Microenterprise
- C. Outdoor Education
- D. Community Gardens

Building on Paso Pacifico's current environmental microenterprise programs, environmental education programs, and community gardens both expands upon successful programs and capitalizes on opportunities that show room for growth. Paso Pacifico already has some programs that use environmental microenterprise to help community members earn an income through environmental conservation efforts. Currently, these programs do not focus intentionally on incorporating women or providing support to enhance women's empowerment and their success at these endeavors. Likewise, Paso Pacifico already works in schools to enhance environmental education, but they do not take girls on outdoor educational trips to work to change attitudes and behavior through exposure to the environment. Lastly, Paso Pacifico has started to work with community gardens, but to make a more notable impact, these should be expanded and potentially work with schools as well. Since some facets of these programs are already established and have shown success in Paso Pacifico's implementation and through empirical studies of similar programs elsewhere, they were determined to show the most potential to enhance environmental protection and empower women to have the knowledge and confidence to become involved with these efforts.

A. Maintain the Status Quo

Paso Pacifico currently has many projects to conserve Nicaragua's natural environment and mitigate climate change. In 2007, Paso Pacifico partnered with carbonfund.org and worked with local Nicaraguan communities to plant about 250 native trees. This program successfully reforested about 1,000 acres. The carbon sequestered from these trees is sold by carbonfund.org

for people to offset their carbon emissions and minimize their carbon footprint. Julie, Paso Pacifico’s community educator works with school children and teaches around 500 students about the environment. For one program, Paso Pacifico partnered with Optics for the Tropics to teach children about the harmful affects their slingshots have on the environment. Many children in Nicaragua play with slingshots; to prevent children from further harming the environment, 105 children exchanged their slingshots for binoculars. Another successful Paso Pacifico program has been their sea turtle program. There is not enough government funding to protect sea turtle nests on all beaches in Nicaragua. To help protect more beaches, Paso Pacifico created this program to incentivize former poachers to protect species by paying them to protect a nest and paying them again for each turtle that hatches and makes it to the ocean. Through this program, six beaches, 438 sea turtle nests, and 30,000 sea turtles were protected in 2009.

Continuing with these programs will continue to help protect and rehabilitate the environment, as the programs have proven successful thus far. Therefore maintaining and building these programs will not decrease the amount of environmental conservation Paso Pacifico will achieve. It is also the most feasible option – monetarily and logistically. Monetarily, Paso Pacifico already has the expertise and staff to continue to run their conservation programs. Logistically, it is more convenient and easier for Paso Pacifico to run programs within their own organization than through partnerships with other NGOs and non-profit organizations in Nicaragua.

Unfortunately, continuing the programs does not strategically incorporate women into Paso Pacifico’s environmental protection efforts, which perpetuates the cycle of women lacking a role in environmental protection. Currently, Paso Pacifico programs are not targeted to work specifically with women or men. Although both men and women participate in programs, women still do not receive recognition or gain status in society for participating in such programs. Additionally, women have much more responsibility, in charge of child rearing and household tasks, such as cooking and cleaning, which allows men to have more time to undertake jobs outside of the home. Since women have so many responsibilities already, increasing their workload by giving them conservation responsibilities, without addressing other societal constraints such as the lack of women involvement in policy-making, would not as effectively help the environment or women.

Below is a chart of a typical day for a rural Nicaraguan man and woman, gathered from observations from Paso Pacifico staff.

Table 1: Daily Responsibilities of Men and Women in Nicaraguan Communities

Adult Male		Adult Female	
Time	Activity	Time	Activity
4:30 a.m.		4:30 a.m.	Wake up
5:00 a.m.	Wake up	5:00 a.m.	Start cooking/ fire and start to make corn tortillas; cook breakfast
5:30 a.m.	Eat breakfast; move and water livestock (i.e. dairy cows)	5:30 a.m.	Serve and eat breakfast
6:00 a.m.	Begin work day in the field: planting, clean plants, milk cows	6:00 a.m.	Retrieve water from well

6:30 a.m.		6:30 a.m.	Begin working in the home: washing dishes, cleaning the house and pigs; feeding pigs, chickens, and goats; wash clothes at river or stream and hang them to dry; water plants
9:00 a.m.		9:00 a.m.	Gather firewood; prepare lunch: cook beans, rice, banana and tamarindo juice
11:00 a.m.		11:00 a.m.	Serve lunch
11:15 a.m.	Eat lunch; rest	11:15 a.m.	Eat lunch
11:30 a.m.		11:30 a.m.	Pick up children from school
12:00 p.m.		12:00 p.m.	Serve lunch to children
1:30 p.m.		1:30 p.m.	Do homework with children
2:00 p.m.		2:00 p.m.	
3:00 p.m.	Tend to livestock; chop large firewood	3:00 p.m.	Tend to garden, purchase food, slaughter chickens, or retrieve stored food
3:30 p.m.	Public meetings or visit with friends	3:30 p.m.	Retrieve water from well
4:00 p.m.		4:00 p.m.	Prepare dinner
5:00 p.m.	Eat dinner	5:00 p.m.	Serve dinner and eat dinner
6:00 p.m.		6:00 p.m.	Set corn and beans to soak
7:30 p.m.	T.V., bedtime	7:30 p.m.	T.V.; Prepare family for rest
8:00 p.m.		8:00 p.m.	Praying the Rosary or only Praying

Source: J. Martinez, personal communication, April 5, 2010.

Looking at the daily workloads, a few observations become evident. First, women have a much greater range of tasks and responsibilities to fulfill compared to men. This makes it more challenging to involve them in conservation-related tasks because they already have so many roles in society. Second, men have a greater amount of leisure time while women have hardly any, making it easier for them to do activities outside of the home. Third, women are the primary caregivers for children, making them more influential in their children's attitudes and behaviors. Although it is easier to find time in a man's schedule to include conservation efforts, since women are the people who have such a strong work ethic and really are the "doers" of the society (S. Otterstrom, personal communication, April 5, 2010) it is important to involve them more deliberately in conservation work.

Keeping programs as is does not allow for as many long-term environmental benefits. Including women in climate change efforts teaches women about sustainable living as well as their family. When women are involved in conservation efforts and work outside of the home, they serve as a model for their daughters that this is acceptable, encouraging them to do the same. It also demonstrates to sons that women can have roles outside of the house. Further, since women are the primary caregivers, they can teach their children about the importance of sustainable living and communicate to them the information they have learned as a result of participation in Paso Pacifico programs. Since women are not as actively involved if Paso Pacifico maintains the status quo, there is less of a chance that women will have the knowledge to transfer to their

children. With increased valuing of environmental protection passed on to each generation, there will be more climate change mitigation in the future.

Along those same lines, when children see their mothers participate in policy-making, it communicates to them that women can play this role, combating unequal gender norms. Without actively involving women, men continue to maintain their roles in society as the policy-makers and as the primary income earners, perpetuating this cycle of women depending on men (Servon & Bates, 1998). This will only continue to make it more challenging in the future for women to become involved in policy-making.

Women have great practical knowledge about sustainable agriculture. Therefore, not using half of the population's expertise may not allow these programs to protect the environment to their full potential. Because women have differing roles than men, they typically have knowledge that men lack, such as which plants can be used for medicinal purposes (Agarwal, 1992), ways to increase edible wild plants, and techniques to minimize flooding (Simms & Reid, 2006). By only capitalizing on half of the population's skills and knowledge, only changing half of the population's attitudes and behavior, and only utilizing half of the population's physical abilities, a lot of room for environmental protection remains underutilized.

There are several examples of successful female mobilization and organization to address environmental sustainability. In 1991, the first World Women's Congress for a Healthy Planet was held in Miami, with 1500 women in attendance coming from 83 countries. They then developed the *Women's Action Agenda 21*. This document outlines how to incorporate gender at all levels of decision-making to create a healthy planet. Created internationally from women's actual experiences, the document allowed for more of a gender-focus at the United Nations Conference on Environment and Development (UNCED). The document was endorsed by notable environmental policy makers, including both Maurice Strong, the Director General of UNCED and Bella Abzug, the founder of the Women's Environment and Development Organisation (WEDO). Yet a more regional focus may have increased other groups' sense of ownership, thereby increasing the document's impact. Regardless, the development of this notable document displays how women have proven their ability to successfully organize for environmental protection and the impact their collective engagement can make (Dankelman, 2002). Not intentionally engaging this portion of the population will greatly decrease the impact of Paso Pacifico's programs.

Maintaining the status quo, therefore, allows Paso Pacifico to continue helping the environment and in monetarily and logistically feasible ways. But the status quo does not enable Paso Pacifico's environmental efforts to grow to their full potential, capitalize on women's ability to help environmental protection, nor increase women's standing in society.

B. Environmental Microenterprise

Paso Pacifico already established successful programs where indigenous people earn money through environmental protection. Paso Pacifico could create new programs or restructure some programs to work only with women, enabling them to earn money through environmentally responsible rather than destructive activities. For instance, Paso Pacifico has programs that work

with farmers and hunters to monitor populations of various wildlife species, such as the endangered Geoffroyi Spider Monkeys. Additionally, there is a large market for poaching sea turtle eggs, so to protect these extremely endangered species, Paso Pacifico has hired local people to be park rangers who monitor eggs and give visitors eco-tours of sea turtle nests. These programs could be restructured to intentionally recruit women to participate in these protection efforts and create programs that give women needed support to be successful entrepreneurs and participate in policy-making.

Microenterprise has been shown to greatly reduce poverty and lead to gender equality in developing areas (Fairley, 1998; Hays-Mitchell, 1999), particularly enabling women to take part in more decision-making (Grasmuck & Espinal, 2000). Microenterprise programs are most effective when they offer support programs, such as business training, to clients and support for women entering male-dominated fields. Particularly, programs that allow women to have a role in income generation are important to increase the status of women (Servon & Bates, 1998). As women are more incorporated into business activities and properly trained to thrive in this area, discrimination decreases, improving the quality of life for women (Fairly, 1998).

In addition to providing business skills, other important support systems aid the success of programs and enhance gender equality. These support systems include establishing women self-help groups, helping women interact with local politicians, providing family counseling, and establishing literacy programs (Fairly, 1998; Strier & Abdeen, 2009). Self-help groups allow women to work together and build self-esteem. Through environmental conservation empowerment and knowledge, women will have the resources and confidence to apply these skills towards further environmental protection.

Giving women an ability to earn income also increases their decision-making role in the home. When both men and women make large contributions to household income, homes are found to be more egalitarian in their decision-making processes and resource allocation (Gasmuck & Espinal, 2000). Additionally, Blumber (2001) found that women are more likely to use money they earn to benefit their family, such as by increasing the family's nutrition, healthcare, education, and clothing. When women are more involved in earning money outside the house, they are more likely to involve men with childrearing and household tasks, further equalizing the role of men and women in society and breaking down gender norms.

Further, when women receive loans, they tend to be better clients than men because they are at least as good as, if not better, at saving. When women earn and save money, they use it to improve their business. Since women also put a significant portion of their earnings into their families, children's welfare improves (Blumber, 2001).

Case Studies

The following case studies look at the Green Belt Movement, the Women's Environmental Organization of the Sierra of Petatlan, and CARE, all organizations that have successfully targeted women in developing countries to participate in environmental conservation programs. Through each organization's efforts, the environment has benefited and women have gained

economic and social empowerment. Paso Pacifico should similarly work towards this goal to help create programs that will have the greatest environmental benefits.

The Green Belt Movement

Dr. Wangari Maathai started a tree-planting program in 1977 in Kenya to combat deforestation, soil erosion, and lack of water resources. Women work to plant native trees on farms and public land; for surviving tree seedlings, the groups earn money, giving them a financial incentive to participate in the program. These groups are currently organized into 600 networks to create and execute work plans (The Green Belt Movement, 2003).

Additionally, the program intends to raise awareness and knowledge about environmental protection and to empower communities, particularly to empower women. The program has evolved into the Green Belt Movement (GBM). To date, the program planted more than 40 million trees in Africa and mobilized more than 100,000 women. As intended this program has had profound environmental benefits - soil erosion decreased, forests replenished, and biodiversity increased. The decreased soil erosion improved water resources and assisted in combating crop failures that plague the region (The Green Belt Movement, 2003).

The GBM also works to create household food security, since many of their trees and plants produce native fruits and foods. To this end, the GBM works to preserve and facilitate the exchange of indigenous knowledge about these foods and promote their conservation. Through seminars, farmers may share seeds as well as learn sustainable farming techniques to increase their crop yield while decreasing run-off and soil erosion (The Green Belt Movement, 2003).

Seminar style civic education courses are also offered to members with the aim to increase environmental knowledge and skills and enhance environmental attitudes and values. They help communicate the responsibility citizens have towards environmental protection and empower women to fight corruption and participate in government. Because of these efforts, members have successfully mobilized the public, the local government, and church leaders to partake in environmental protection efforts such as planting trees and building dams (The Green Belt Movement, 2003).

Women for change is another program run by the GBM to help girls and women in three main ways: to gain knowledge about their reproductive health and HIV prevention, to help establish income generating activities such as tree planting and bee keeping, and to encourage economic empowerment and healthy eating of native foods. To do this, the GBM partners with many women groups, including the Kenya Girl Guides Association, Society of Women and AIDS in Kenya, the National Council of Women in Kenya, and the Kenya Association of University Women. Over 400 women and men attended these income-generating workshops (The Green Belt Movement, 2003).

This globally recognized program displays the success of a program aimed at empowering women to help with environmental protection. The GBM teaches participants and community members about their connection with the environment and how a healthy environment helps produce what they need to survive, encouraging sustainable environmental and resource

management practices. It further empowers the members, particularly women, by providing them with the skills and knowledge to lobby government officials to create environmentally sustainable policies (The Green Belt Movement, 2003).

The Women's Environmental Organization of the Sierra of Petatlan

On a smaller scale, the Women's Environmental Organization of the Sierra of Petatlan (OMESP) was founded in 2001 to protect the environment and promote sustainable living in Mexico. Their efforts focus on sustainable and organic agriculture, preventing forest fire, tree planting for reforestation, water and soil conservation, and recycling. Originally only having 12 members, the group now includes 90 women, with Celsa Baldovinos serving as the president (Paterson, 2007).

In 2003 and 2004 OMESSP planted over 175,000 red cedar trees. By selling tree seeds, some participants can earn an extra US\$3,000 each year, leading to economic empowerment. Other women participants keep family gardens and are establishing a tree nursery. There is great potential for expansion also through the creation of a beekeeping program. As the program expands, the younger generation is also getting involved, realizing that protecting the environment is important for their future (Paterson, 2007).

Although the organization has been successful, they have struggled with a lack of formal education in literacy and in mathematics. Especially in the beginning, funding and navigating through government bureaucracy was challenging. Mexico's director of National Forestry Commission, Salvador Anta Fonseca, committed to helping the OMESSP gain federal funding and helping them with strategic planning (Paterson, 2007). In Nicaragua, Paso Pacifico may encounter similar obstacles, which is why creating appropriate support and educational programs for women participants is critical to ensure any environmental microenterprise programs benefit the environment as much as possible.

CARE

From 2002 to 2005, CARE ran the Forest Resource Management for Carbon Sequestration project to empower women through carbon sequestration in Indonesia, with projects in 36 villages. The goals of the project were first to improve the livelihood of individual households and second, to increase carbon sequestration. The project analyzed the roles of both men and women and determined that the primary obstacles to the inclusion of women in sustainability efforts were early marriage, lack of education, demanding workloads, and the lower social standing of women (Reid & Simms, 2007).

CARE worked with other community groups to help combat the societal norms that kept the status of women lower than men. They also encouraged men to take on activities that were stereotypically designated for women. Additionally, CARE worked to improve the education levels of women through literacy training programs. To empower women, CARE promoted their leadership in community organizations working on projects such as taking an inventory of forest resources and planning village development (Reid & Simms, 2007).

Shown in CARE’s success, it is crucial to start with short-term projects that show more immediate benefits, such as vegetable cultivation. This helps establish the motives of the organization and gain trust. Without this base, it is hard to make substantial, long-term progress (Reid & Simms, 2007).

Support Systems for Women to Enhance the Success of Environmental Microenterprise

As demonstrated through the above case studies, to make the most of environmental microenterprise programs targeted towards women, it is important that, in addition to providing environmental training and business skills, other important support systems are established to aid women. These should be established to enhance gender equality and empowerment through means such as establishing women self-help groups, helping women interact with local politicians, providing family counseling, establishing literacy programs, and developing leadership training.

Pro Mujer, a microfinance institution in Latin America, specifically works with women to give them microloans and provide leadership and skills training. Primarily, Pro Mujer works to provide women loans, business training, and healthcare in hopes to fight poverty. Originally starting in Bolivia in 1990, Pro Mujer has expanded to now work in Argentina, Mexico, Nicaragua, and Peru. Nicaragua was the second country Pro Mujer expanded to in 1996, originally starting in Leon and Chinandega and expanding to Managua and Masaya (Pro Mujer).

Pro Mujer provides their clients with loans as well as access to health services including but not limited to gynecology, general medicine, family planning, counseling, and PAP exams as well as reproductive health education. Clients also receive business training, training about marketing, business leadership training, and basic accounting skills. Pro Mujer also helps clients attend fairs and exhibitions to expand their businesses and promote their products. Though these efforts and trainings in family planning, overcoming domestic violence, leadership, self-esteem, conflict resolution, interpersonal relations and children’s nutrition, women gain the skills and knowledge to become decision-makers in the community and help raise their status in society (Pro Mujer).

Seen below, other organizations in Nicaragua provide outreach and services aimed to empower women.

Table 2: Women Empowerment Organizations in Nicaragua

Organization	Location	Service Categories
Centro de Mujeres Xochilt-Acalt (Xochilt-Acalt Women’s Center) ¹	Malpaisillo	reproductive health clinic, literacy campaign , agriculture and construction program, scholarships for women, gender equality program , women's credit program, public speaking, sewing program, helping women form NGOs
CENZONTLE, El Centro para la Participacion Democratica y el Desarrollo (The Center for	Estelí	Self-esteem workshop, business skills training , encouragement to participate in civic participation

Democratic Participation and Development) ²		
Grupo Venancia (Venancia Group) ²	Matagalpa	literacy, women's health, domestic violence , community development
FEMUPROCAN, Federacion Agropecuaria de Mujeres Productoras del Campo Nicaraguense (The Farming and Agricultural Federation of Women Producers in Rural Nicaragua) ³	Managua	gender awareness , technical training, leadership , marketing, advocacy training on national and state issues, literacy training
Comité de Mujeres Rurales (Committee of Rural Women) ⁴	Léon	gender education , gender violence prevention, literacy training , technical training and empowerment for agriculture skills, workshops on women's rights, women's access to justice/ legal rights
IXCHEN ⁵	Masaya/Ciudad Sandino	psychological services, medical services, help for domestic violence victims, training about women's rights , peer health educators
Pro Mujer ⁶	Masaya	health and human development services; business training , family planning, domestic violence, leadership, self esteem , conflict resolution, interpersonal relations, children's nutrition, information about sexual and reproductive health
Asociación de Mujeres para la Integración de la Familia en Nicaragua (AMIFANIC) ⁷	Ciudad Sandino	vocational and technical education, assistance for victims of violence, legal assistance, self help groups, leadership , workshops for human rights
Centro de Comunicación y Educación Popular (CANTERA) ⁸	Ciudad Sandino	preschooler education; socio-cultural development; youth development; community workshops and outreach; women's empowerment and gender equality; health
Escuela Autónoma Nacional Bella Cruz ⁹	Ciudad Sandino	technology education, band, English, sports opportunities, community work, gardening and reading

Centro de Mujeres Masaya ¹⁰	Masaya	women's health care and health education, counseling and psychological services for domestic violence, legal aid, youth empowerment and peer education, community and rural health outreach, documentation center
Clinica de Atención Sicológica ¹¹	Ciudad Sandino	Social work, psychology, psychiatry
Rainbow Network – Red Arco Iris (RN-RAI) ¹²	Ciudad Sandino	medical assistance, public and community health care, community education, high school scholarships, economic development, housing development

Demonstrated above, there are many ways organizations support women, enhance gender equality, and promote empowerment. The most common services provided, not including technical training, include literacy training; increasing civic engagement; women’s empowerment; self esteem/ self help groups; leadership training; women’s medical health; psychological services, particularly related to domestic violence; and legal aid.

Paso Pacifico could partner with an organization, such as Pro Mujer or another Nicaraguan organization listed above, that help empower women and build leadership. This would enable Paso Pacifico to support women in multiple ways, not just provide them with environmental knowledge and training to conserve the environment. Partnering with organizations to create comprehensive programs will most effectively give women the skills and confidence to act in ways to protect the environment.

Although medical health and services related to domestic violence are not directly related to Paso Pacifico’s mission, they may be important to provide for women. When women are domestically abused, they will not feel empowered to speak-up against men in society and will not want to participate in policy-making. By providing women with psychological services and teaching them techniques to deal with and overcome domestic abuse, they may undertake more successful entrepreneurial endeavors, with more confidence and independence. Women’s entrepreneurial endeavors will be more likely to grow and succeed, thus benefiting the environment more. Before women can be expected to be self-confident, feel empowered to battle environmental degradation, and fight to have a say in policy-making, they must have control over their own bodies, be in good health, and not feel belittled in their own households. While these extra services and efforts to help and empower women are important, they are not directly related to Paso Pacifico’s mission of environmental protection, but they will indirectly benefit the environment.

C. Outdoor Education

Paso Pacifico believes in the importance of education to facilitate changes in environmental attitudes and behaviors. To this end, Paso Pacifico works with schools to help them incorporate environmental curricula into their programs. Working to establish more innovative ways to help instill environmental stewardship and empower girls to want to make a positive impact on the

environment will have profound long-term benefits to the environment. One option is that Paso Pacifico could start an outdoor environmental education program for girls in grade school to teach them about environmental connections and conservation as well as provide developmental benefits such as increasing problem solving skills, and improving self-esteem, (American Institutes for Research, 2005) and fostering personal growth (Davis-Berman & Berman, 2006).

The 1992 Earth Summit in Rio de Janeiro stressed the connection between economic well-being, cultural traditions and respect for the Earth's resources. Although it acknowledged the wide spread teaching of environmental "facts," it emphasized that students are rarely asked to ponder the connections between human action and ecosystem sustainability. To further sustainable development, it is imperative to create the link among social, economic, political and environmental concerns into the education system to create truly sustainable practices and values. In short, education curricula must instill in children sustainable values, behavior, and lifestyles (Fien, 2003).

Being able to practice decision-making in a low risk environment allows students to be more confident in making conclusions in the future. These decision-making activities may also increase students' self-esteem. The need for "whole person" or "student-centered" learning was also stressed, incorporating learning that goes beyond memorization and involves the body, mind, and spirit. Student-centered learning allows for discovery learning, problem solving, simulations and role playing as well as emphasizing learning skills such as critical thinking and learning how to learn. Within this new approach, the girls' education is crucial to end their marginalization and help create sustainable communities. It is important to women that their families have a high quality of life, so women have a particularly large stake in the creation of sustainable communities (Fien, 2003).

As explained at the 1992 UN Conference on Environment and Development, youth play a crucial role in the effort to achieve environmental sustainability. The future of the globe greatly impacts today's youth and with their unique perspective, they need to be empowered and educated enough to participate in sustainability efforts and decision-making, The Association Internationale des Etudiants en Sciences Commerciales et Economiques (AIESEC) is a student-led NGO comprised of university students who complete projects addressing sustainable development. AIESEC works to involve young people in all levels of policy-making and demonstrates the impact young people can make through projects and participation in conventions such as the 1992 Rio Summit. The Klampun Conservation Corps is another example of a youth-led group in Pap New Guinea that works to conserve the environment of rural villages. It is now an internationally known organization, winning the World Bank's YouthActionNet award. The Klampun Conservation Corps is known for creating agricultural entrepreneurship while protecting natural resources to allow for a sustainable future for the residents of rural villages in Pap New Guinea. Empowering and educating youth not only will create avenues for them to have future positive impacts on the environment, but also might enable them to have immediate impacts as well (Farmanesh, Neil, Kamping, Freeburg, Moody, Davila-Ortega, Ashton, Bah, Moraitis, Sagun & Marquez, 2004).

Outdoor education gives children an opportunity to interactively connect to and experience nature. Although many children in Nicaragua are surrounded by nature all the time, they still

may not feel as though they are part of nature. Research has shown that people may have greater pro-environmental attitudes after they take a hike or enjoy an outdoor picnic (Schultz, 2000). Thus, applied environmental education activities where people and children can learn about and touch animals, without seeing them in cages, will most effectively increase environmental connectedness – which is found to be important when understanding environmental attitudes (Schultz, Shriver, Tabanisco, & Khazian, 2004). By increasing the concern for living things and creating a connection with nature, people may be more likely to exhibit behavior that protects the environment. Outdoor education focuses on allowing students to experience and enjoy being in remarkable areas of nature, as well as witness environmental destruction. These types of programs will allow students to be more intrinsically motivated to participate in efforts to protect nature, more so than if they just learn and memorize environmental facts.

Outdoor Education Benefits

The YMCA Camp Greenville completed a five-year study of more than 1,000 student participants in Project Worth, an outdoor education program. This program stresses team building activities, character development, and adventure for students. Analyzing the effects of Project Worth, the study polled teachers about the benefits of the program on their students. Eighty-eight percent responded that their students were more confident and conquered their fears, 75 percent replied that their students learned how to work as a team, 63 percent that community building occurred, 50 percent that students were challenged and forced to take new approaches to problems, and 12 percent said that students gained increased environmental awareness and improved their leadership skills. When students were asked what they learned from the program, they cited many of the same things – teamwork, survival skills, the importance of challenging themselves, learning about other people, environmental stewardship, and environmental knowledge (Lien, 2007).

The American Camping Association looked at outdoor education programs run by summer camps. Upon looking at the benefits and changes to participants from this program, parents, staff, and students reported increased self-esteem, independence, leadership, friendship skills, social comfort, peer relationships, adventure, environmental awareness, values and decisions, and spirituality. Out of 200 randomly chosen, 80 campers participated. Parents, campers, and staff were asked to assess campers on multiple measures before camp commenced, immediately after camp, and six months later. Some of the camps were week-long programs and some were up to eight weeks; some camps were residential and some were day camps. Campers ages 8-14 were assessed and of the 15,000 families asked to participate in the study, 2,294 completed all three surveys, with the average age of children at 11.1 years (Burkhardt, Henderson, Marsh, Thurber, Scanlin, and Witaker, 2005).

Ten constructs were measured within four overarching domains: positive identity (self-esteem and independence), social skills (leadership, friendship skills, social comfort, peer relationships), physical and thinking skills (adventure & exploration and environmental awareness), and positive values and spirituality (values & decisions and spirituality). Growth was shown in all four domains and within almost every construct, with much of the changes remaining during the six-month follow-up surveys. Although improvement was shown in almost all categories, both the measurement of friendship skills and adventure levels showed increases immediately after

camp, but these levels fell off to about equal the pre-camp levels when the measures were assessed six months later. Environmental awareness also did not significantly increase but instead remained stable, according to campers' assessments. In contrast, parents reported a statistically significant increase in their child's environmental awareness after attending camp (Burkhardt et al., 2005).

The American Institutes for Research (2005) studied 5th and 6th grade at-risk students who participated in one of three week-long residential outdoor education programs in schools in California. Two hundred and twenty-five students participated from four elementary schools. At those schools 69-89 percent of the children are Hispanic and 81-100 percent are on free or reduced lunch, making the population similar to many of the girls attending school in Nicaragua. Students were surveyed before the treatment (with the treatment being that they attended an outdoor education program), immediately after the treatment, and six to ten weeks after the treatment. Parents and teachers were additionally surveyed both before the treatment and six to ten weeks after.

When looking at social and personal skills, six to ten weeks after participation in an outdoor education program, students who attended the program showed increased cooperation with other students as well and improved conflict resolution compared to the control group. Further, teacher ratings showed that students who participated in these programs exhibited statistically significant gains in self-esteem, conflict resolution, relationships with peers, problem solving, increased motivation to learn, and improved classroom behavior when compared with the control group (American Institutes for Research, 2005). These results mirror the personal development results found in other studies looking at benefits of outdoor education programs.

Children who participated in outdoor education additionally displayed increased knowledge and understanding of science concepts as well as more environmental stewardship. Those who attended these programs increased their science scores by three points (27 percent) both immediately after the programs as well as during follow-up evaluations. As for environmental stewardship, the control group showed decreases in two of these three measurements (attitude toward science and environmental behaviors) in the follow-up surveys, losses that those who were in outdoor education programs did not incur. Additionally, parent reports indicated that after attending outdoor education programs, children had increased positive environmental behaviors, such as recycling. Yet the control group showed no gains (American Institutes for Research, 2005).

These studies of outdoor education programs show that students who participate exhibit major gains from these programs in two major areas – personal growth and environmental awareness – both of which would greatly benefit girls in Nicaragua. Overall, outdoor education participants display increased interpersonal skills, academic achievement, environmental awareness, self-esteem, drive to try new things and overcome fears, leadership skills, technical skills, communication skills, and character development (Lien, 2007). The personal growth factors, combined with the increase in environmental awareness and connection will allow girls to take a greater interest in the environment as well as change their environmental attitudes and behaviors. The personal growth improvements are particularly useful in empowering these girls to feel as though they can both address and impact the environment.

Arnold, Cohen, and Warner (2009) explored the factors that influenced current young environmental leaders and inspired them to take leadership roles in the environmental movement. The study indicates influential people and meaningful experiences are the most important determinants. More specifically, parents, outdoor childhood experiences, friends, role models, teachers, and youth groups were the main factors consistently reported to be most influential. Similar results have been found in other studies that explore influencing life factors for environmentalists, with results that show time spent outside, time spent with important people in a person's life such as close friends or parents, and witnessing environmental degradation to be significant influences (Chawala, 1999). Additionally a study of high school students in Wisconsin, who partook in environmental protection, pinpointed time in nature and role models as the driving forces leading youth to engage in environmental behavior, with time spent outdoors as the most important factor (Sivek, 2002).

Experiences in nature was a major influencing factor – sometimes in the form of free play in nature as child, but also frequently from experiences at outdoor education camps. Some young environmental leaders indicated they did not become passionate about environmental protection until being “moved” during a significant outdoor experience. Thus, the results reiterate the importance of providing young people with access to outdoor experiences in the form of camps, youth groups, or extracurricular opportunities. In addition, participants did not cite traditional classroom learning as reason for environmental involvement – classroom learning was even sometimes thought of as stifling or irrelevant. These notable experiences largely occurred during early adolescence (Arnold, Cohen & Warner, 2009).

Outdoor education programs provide both of the overarching factors that led youth to be engaged in environmental protection activities – they give children experience spending time interacting with nature and provide role models, in the form of teachers or guides, who value environmental protection. Additionally, outdoor education programs can be tailored towards impacting students through the mentioned influential factors – for example they could incorporate exposure to environmental degradation and work to foster a cohesive group of girls who could later work together to help the environment. Giving girls an opportunity to bond and become friends, through forming a special tie and relationship during outdoor education experiences, would reinforce these pro-environmental attitudes and behaviors.

Paso Pacifico and Outdoor Education

Paso Pacifico could implement a program where they take girls around 10 to 12 years old on trips for three to five days. As indicated by Arnold, Cohen, and Warner (2009), this would be a prime age group to take on these trips to maximize the impact of the experience. Ideally, these programs would engage students in activities that may incorporate environmental education, but this would not be the main focus. Instead, outdoor activities should emphasize team building exercises and leadership opportunities. Additionally, experiences that would provide students opportunities to marvel at natural wonders and enjoy the products of nature (such as swimming near a waterfall, hiking, or rafting) should be included in the curriculum to help instill a desire to protect the natural world. Lastly, it would be ideal to contrast these experiences of environmental beauty with opportunities to see the consequences of improper resource usage and environmental

degradation, helping students to make the connection between this outcome and the human activities that caused it. It may even be useful to help empower the girls and show them ways they can make a difference by having an activity where students can help rehabilitate a damaged area. Seeing how they can work together to make a recognizable difference, even if small, would encourage the girls to organize and make an effort to make larger impacts after the program concludes.

Although outdoor education programs produce many benefits to the environment, these programs do not necessarily have great immediate environmental impact – an important component given the urgency of the climate change issue. Although in more developed countries youth can play an active role in forming groups to mitigate climate change, in areas of Nicaragua, where adult women struggle to break into climate change policy-making, it would probably be harder, although not impossible, for young girls to be able to make a notable impact. There is not as much time and money available to help young girls with projects and there is not a community structure that would easily allow their voices to be heard in policy-making. Thus, the benefits reaped from instituting this alternative would be realized more in the future. Since outdoor education works to shape girls attitudes and behaviors that will impact them as they grow up, these programs encourage girls to make sustainable decisions and want to conserve the environment in the future. Also, since outdoor education programs do not actually implement projects to directly mitigate climate change, this alternative would require Paso Pacifico to put a great deal of effort and money into a major project that may not have measurable environmental benefits for a long time.

Additionally, although studies suggest that children who participate in these programs bring these new attitudes and behaviors home, if families are not accepting of environmentally friendly attitudes and behaviors and willing to reinforce them, then it is unlikely the programs will have long lasting impacts on the program participants. Immediately after outdoor education programs, girls may feel more empowered and be more conscious about their environmental impact, but if these changes are brushed aside at home and in their community, it will be hard to maintain these gains. Thus, it might be necessary for Paso Pacifico to also create follow up programs for the girls to help reiterate what they learned and practiced in their outdoor education programs. These programs could additionally build upon their new skills by offering more trainings such as in leadership and communication skills. This would help to ensure that even if these new areas of growth are not fostered at home, they will not be lost once the programs end.

Since Paso Pacifico does not currently run outdoor education programs or have expertise in this area, it would be necessary to partner with another organization or hire someone to implement this program. If Paso Pacifico cannot find an appropriate partner in Nicaragua to help run such a program, they could talk to outdoor education organizations in the United States, particularly ones that run programs for at-risk populations or specialize in empowerment activities for adolescent girls. Even if these people are not completely qualified to work with the targeted communities in Nicaragua, they may be able to serve as consultants and work with the Paso Pacifico staff who already work in schools to create an appropriate curriculum to accomplish the goals of the outdoor education program.

D. Community Gardens

A community garden is a garden taken care of by multiple people within a community, typically with each participant owning a plot (American Community Garden Association, 2009). Paso Pacifico has done some work with community gardens as well as helping with school gardens intended for beautification. Paso Pacifico could focus more on these gardens and expand the program, helping to hone in on important skills for women and increase educational components to use them as tools to teach the women about their impact on the environment.

Community Garden Benefits

Environmentally, community gardens provide a number of benefits. They act as a green space similar to a parkland. Green spaces provide areas for community members to enjoy nature and serve as a place to retreat and meet each other, building neighborhood cohesion. They often decrease crime by cleaning up unused areas, increasing the number of people paying attention to an area, and provide another safe place for youth to interact with each other. Research even shows that areas with increased vegetation work to decrease crime as well. Ecologically, rain gardens have multiple benefits, filtering rainwater and thus decreasing water pollution; reducing soil erosion and therefore preventing flooding; and by increasing oxygen and decreasing air pollution. Community gardens can also serve as areas for composting which decreases trash. Finally, community gardens can be used as an educational tool to teach people about sustainable agriculture and nature. Therefore, community gardens are aligned with Paso Pacifico's mission to preserve and rehabilitate Nicaragua's environment (Community Garden Benefits: Articles; The Multiple Benefits of Community Gardening, 2006).

Community gardens foster interpersonal connections that expand beyond the garden (Glover & Parry, 2005; Schukoske, 1999). These relationships increase the likelihood that women will help each other in unrelated endeavors (Glover & Parry, 2005). Additionally, managing gardens provides women with important leadership skills and opportunities to capacity-build and manage an area (Twiss, Dickinson, Duma, Kleinman, Paulsen & Silveria, 2003). Paso Pacifico could create a community garden, incorporating education and skills building workshops about how the community gardens help environmental protection, delineating relationships between the work of the women and climate change, and teaching skills about how women can garden sustainably. Decisions about the garden should come from the women participants, which would allow them to feel ownership and practice decision-making skills (American Community Gardening Association, 2000).

Creating a place that is clean and visually pleasing gives people somewhere to retreat and enjoy nature (American Community Garden Association: Articles; The Multiple Benefits of Community Gardening, 2006). Community gardens increase people's awareness and appreciation for natural environments, increasing their desire to want to preserve and protect these areas (Community Garden Benefits: Articles; Schultz, 2000). Paso Pacifico must make sure that the garden is located in an area with enough water and light, the soil is tested and will properly grow the intending crops, and that it is in an easily accessible location for the whole community. It would be best if Paso Pacifico owns the community garden land to eliminate any disputes about ownership (Schukoske, 1999).

Expanding Paso Pacifico's Community Gardens

Paso Pacifico could incorporate community garden lessons as part of the educational programs in schools. As hands on learning, the program could be to teach students not only environment and sustainability concepts, but also math, healthy eating, and other sciences (such as the lifecycle of earthworms and the Earth water system). Practicing teamwork, students can help monitor the garden's progress and assist with general garden maintenance. Students working in the garden will also foster connection between the students and community members (Kirschbaum, 1999).

Involving schools in community gardens can be accomplished a number of ways, including a school plot or help with maintenance and monitoring – which could minimize the extra work for community women. Students can sell what they produce, or this food could help supplement or be used as their lunches, relieving the stress of families to send their students to school with lunch. Schools and students could also be responsible for developing and maintaining a composting system at a community garden, to learn about this sustainable practice and provide it for the community. Although many students help with agriculture responsibilities at home, this would ensure that they were learning sustainable agriculture skills and techniques. They can then take these new lessons home to teach their parents about ways to improve their practices and/ or implementation in future gardens (Kirschbaum, 1999).

To ensure the community gardens run smoothly, it would be imperative to set up participation guidelines to help instill in each member a sense of ownership and responsibility for the garden (American Community Garden Association, 2009). It may even help to require that all participants commit to a set number of hours per week or month dedicated to garden work. A potential source of problem with the gardens may be the classic tragedy of the commons problem – people may take more from the garden than they contribute. Also, if people do not feel responsible for the garden, they may just think that someone else will take care of problems that arise and not be proactive to preserve it. Gardens require a great deal of upkeep and ensuring that the desire to want to help the garden as a whole is instilled into every member may prove challenging. Since these women are so busy with other aspects of their lives, they may not be willing to put in extra effort when they feel as though it is not solely their responsibility.

Since Paso Pacifico already has a couple of garden projects, this alternative would not require that Paso Pacifico conduct as much research and development as with environmental microenterprise or outdoor education. Most of the experts, such as those who could determine suitable soil, how to properly plant seeds, native and sustainable plants, and other technical aspects about gardens, can be found within the Paso Pacifico staff. Paso Pacifico might still have to hire or consult with someone about educational workshops, but even these may be able to be run by current staff members who already work to help advance educational environmental knowledge in schools. Expanding programs is easier than starting from scratch, so in that regard this alternative would not be as challenging as some of the others.

Additionally, it may be hard for Paso Pacifico to find land they can buy and manage for the community gardens. To be able to give enough women an adequate piece of land where they can build knowledge and skills, the garden cannot be too small, but if the gardens are too large, it

may cause an undo burden on women and lead to fewer participants. Also, the garden needs to be centrally located and environmentally ideal, as mentioned above (Schukoske, 1999), to maximize potential agricultural growth.

As previously mentioned, one of the greatest benefits of community gardens is that they give people an opportunity to interact with the land as well as a place to experience nature. While this is largely beneficial, particularly in cities, most of the populations that Paso Pacifico works with live in rural areas. Thus, they already spend a large amount of time surrounded by nature and these programs will probably not do much to foster and improve their connectedness to nature (S. Otterstrom, personal interview, March 17, 2010).

Further, most of the women that would participate in the program are responsible for a large portion of agriculture and food production for their families already. This may make it difficult to recruit women to participate in a program that would require them to devote more of their time to agricultural-type activities because they may feel that they will receive little benefit from more of these activities. Additionally, it is easier to convince people to learn about and become involved with a program where they feel as though they will learn something. But if women already feel as though they are gardening as well as they can, there will be little incentive for them to come to any workshops held by Paso Pacifico to teach them more about sustainable gardening practices. Although recruiting might be challenging for these reasons, women currently involved in the community gardens could help recruit friends and advise Paso Pacifico staff about ways to improve both the program and outreach processes.

III. CRITERIA

To evaluate the alternatives, there are three overarching sections of criteria. First and foremost are the environmental protection measures to determine to what extent the environment is helped by each alternative. Secondly, it is important to look at the positive extraneous effects, such as how women are helped by each option. Thirdly, there is a section to determine the costs of each program, which need to be weighed particularly when looking at trade offs.

Each criterion is rated on a 1 to 3 scale (with a 3 being the highest score possible). This standardized ranking system allows for the easiest comparison of alternatives. After assigning points to each measure, the points are summed to see which alternative receives the highest ranking.

A. Environmental Protection

Since Paso Pacifico is primarily an environmental protection organization, the most important goal is to protect the environment. The below criteria were established to help measure which alternative best protects the environment by looking at different environmental protection techniques.

Mitigation or adaptation to climate change: Does this alternative work to mitigate climate change, adapt to the impacts, or both? Mitigation and adaptation to climate change are each important, so an alternative that accomplishes both will receive 3 points, an alternative that

accomplishes just one of the two will receive 1 point, and if neither are achieved, the alternative will receive 0 points. If the alternative achieves one of the two, and has the potential to achieve both, then the alternative will receive 2 points.

Amount of land or species protected/ rehabilitated: One way to protect the environment is to physically protect or rehabilitate land or water resources, for example, through tree planting or watershed restoration or through protecting endangered species, such as sea turtles. An alternative will receive 1 point if little land or few species are protected and will receive 3 points if this is a primary benefit from an alternative.

Transmit environmental knowledge and/or skills to women: Do women learn either information or techniques to help them protect the environment? For example, they may learn how to grow native, sustainable crops that thrive best during different times of the year or how to plant trees. An alternative may also teach women about how their degradation of the land makes an actual impact on climate change and how they can be benefited through environmental protection efforts. Women may learn that changing their behavior will not be that challenging but may still produce large benefits. This may make them more inclined to make environmentally conscious decisions. Through transmission of this type of knowledge, women will be made more aware of what they can do to help the environment, as environmental knowledge often is a predictor of environmental behavior (Gamba & Oskamp, 1994; Vining & Ebreo, 1990). An alternative that transmits little information or skills will only be awarded 1 point while one that places a lot of energy on this will be given 3 points.

Change women's environmental attitudes and/ or behaviors: Programs will not be effective, particularly in the long term, if they do not work to change attitudes and/or behaviors. Attitudes often drive behaviors and people are more likely to have greater pro-environmental attitudes after they take a hike or enjoy an out-door picnic (Schultz, 2000). Even when facts and statistics are not involved, affect, feelings or emotions, can still largely predict environmental attitudes (Petty & Wegener, 1999; Millar & Millar, 1996; Pooley & O'Conner, 2000) and predict environmental behavior (Ulrich, 1983). Thus, alternatives that give people opportunities to enjoy nature should help change their environmental attitudes and behavior. An alternative that does little to change attitudes and behavior will receive 1 point and one that greatly impacts attitudes and behavior will receive 3 points.

The environmental protection criteria are doubly weighted. Since Paso Pacifico's ultimate goal is to protect the environment, these criteria are among the most important for consideration. Placing more weight on these will ensure that this is taken into account when assessing the alternatives.

B. Positive Extraneous Effects

Skills/ opportunities gained by women that will translate into other aspects of life: Some alternatives will have positive benefits to help empower women, which will help improve women's lives in ways not related to the environment. For example, women may become more literate and business savvy through microenterprise training that will allow them to become better consumers and informed individuals in society. Additionally, leadership activities will

help women feel empowered to have a voice in policy-making, such as environmental policy decisions, and may help them gain higher standing with men. These benefits can help the environment through improving their ability to fight for environmental protection, particularly in ways that will allow them to be able to have an impact, but also generally help improve women's quality of life. Alternatives that provide women very few skills or opportunities outside of those to protect the environment will be awarded 1 point and alternatives that provide many ways for women to benefit will be awarded 3 points.

As with the environmental protection criteria, this measure is doubly weighted, as it is a very important evaluation criterion. As discussed above, these extraneous effects, particularly the empowerment of women, are important because if women feel as though they can make a difference, they are more likely to get involved in environmental protection efforts. Additionally, by learning skills, such as business and leadership skills, it helps to alleviate poverty in the communities, making the communities more sustainable and enabling people to focus more on environmental protection, not just working to meet their basic needs for survival.

Costs

Paso Pacifico recently received grant money to incorporate women into environmental conservation efforts. Because of this money, in addition to other grant money they have for environmental protection, Paso Pacifico has resources to devote to this effort. Therefore, this analysis estimated the costs of alternatives relative to each other.

Need to hire expert: Paso Pacifico has great expertise in running environmental programs and working to conserve and rehabilitate the environment, but has little background working in other areas, such as leadership training for women. Thus parts or whole alternatives may require Paso Pacifico to reach out to other organizations for support and/ or hire experts to execute part of or the entire program. It is less expensive and easier for Paso Pacifico to select an alternative that does not require them to work with an outside expert, so if an expert is needed, the alternative will receive 1 point and if an expert is not needed, the alternative will get 3 points.

Program costs: The cost of implementing each alternative is another consideration as an alternative with a higher cost will be more difficult for Paso Pacifico to implement. Therefore, an alternative with a high projected cost will only receive 1 point while one with a lower cost will receive 3 points.

Opportunity for program expansion/ program scalability: It is also important that an alternative can grow once it proves to be successful. As a program grows, more people become involved, thus making a larger positive impact on the environment. Thus, a program with little room for expansion/ scalability will receive 1 point while one that has great potential to grow will receive 3 points.

Feasibility: Some alternatives are easier to implement than others for various reasons. For example, it may be easier to access girls in school than older women who have less time to devote to environmental protection. Or an alternative that is more in line with social norms may be easier to effectively implement than one that goes against these norms. Additionally, an

alternative that already has a base of people to work with or an alternative that creates a program that is similar to a program Paso Pacifico has already established may be more feasible to create than one that is completely new. An alternative that is not very feasible only receives 1 point while one that is very feasible receives 3.

IV. DECISION MATRIX

	Environmental Protection (x2)				Positive Extraneous Effects (x2)	Costs				Total Points
	Mitigation or Adaptation to Climate Change ³	Amount of Land or Species Protected/ Rehabilitated ⁴	Transmit Environmental Knowledge and/ or Skills to Women ⁵	Change Women's Environmental Attitudes and/ or Behaviors ⁶	Skills/ Opportunities Gained by Women that will Translate into Other Aspects of Life ⁷	Need to hire Expert ⁸	Program Costs ⁹	Opportunity for Program Expansion/ Program Scalability ¹⁰	Feasibility ¹¹	
Status Quo	1 (x2)	2 (x2)	1 (x2)	1 (x2)	1 (x2)	3	3	2	3	23
Environmental Microenterprise	3 (x2)	3 (x2)	3 (x2)	3 (x2)	3 (x2)	1	2	3	2	38
Outdoor Education	3 (x2)	1 (x2)	2 (x2)	3 (x2)	3 (x2)	1	1	3	2	31
Community Gardens	3 (x2)	1 (x2)	2 (x2)	1 (x2)	2 (x2)	2	2	2	2	26

³ 1 = mitigation or adaptation, 0 = neither, 3 = both

⁴ 1= little area protected, 3 = lots of area protected

⁵ 1= disseminates little knowledge, 3 = disseminates a lot of knowledge

⁶ 1= little attitude/ behavior change, 3 = a lot of attitude/ behavior change

⁷ 1= few skills and opportunities, 3 = provides a lot of skills and opportunities

⁸ 1= yes, 2 = maybe, 3 = no (because not hiring an outside expert is easier for Paso Pacifico therefore it gets more points)

⁹ 1= high cost, 3 = low cost (because a lower cost is beneficial for Paso Pacifico)

¹⁰ 1= little room for expansion/ unsustainable, 3 = a lot of expansion/ sustainability possible

¹¹ 1= not very feasible, 3 = very feasible

V. EXPLANATION OF MATRIX RATINGS

A. Status Quo

Environmental Protection

Currently, Paso Pacifico is focusing primarily on climate change mitigation, not adaptation to climate change, giving the status quo only one point for this category. The status quo alternative received two points for the land and species protection criteria because the main focus of many of the programs is direct protection or rehabilitation of land or endangered species, for example through the sea turtle and Spider Monkey conservation projects and forest restoration. Although direct efforts focus on physical environmental improvement, since primarily only men are involved in these activities, the status quo only received two points since the programs would have greater impact if women were more involved because it would increase the number of people participating. For both the criteria measuring how much knowledge and skills were transferred to women and the criteria measuring how much women's environmental attitudes and behaviors were changed, the status quo only received one point. Since women do not heavily participate in current Paso Pacifico programs, some women are learning information and skills as well as changing their attitudes and behavior, but this is minimal since men are the main participants.

Positive Extraneous Effects

Likewise, the status quo only received one point for the "skills/ opportunities gained by women that will translate into other aspects of life" criteria. Again, these programs do little to foster any development of skills and opportunities for women. Although it could be argued that some of the conservation related skills might prove helpful to women, none of the Paso Pacifico programs supplement conservation skills and knowledge with other empowerment activities, such as leadership training or self-help groups. Current programs neither directly benefit women nor increase their standing in society. Programs are needed to give women the confidence to truly work together to become actively engaged in both substantial environmental protection and policy-making.

Costs

The status quo received a three for the "need to hire an expert" criteria because Paso Pacifico has demonstrated their expert staff is capable of running and managing all of their current programs. This alternative also received a three for "program costs" because just keeping with current programs would not require any additional funding than what Paso Pacifico is already receiving. The status quo only received two points for program expansion/ scalability because although these programs have grown and continue to grow, they will not be as scalable only involving men who make up half of the population. If the current programs were to actively attempt to incorporate women, they would be able to expand at a greater rate. Lastly, the status quo received a three for the "feasibility" criteria because since these programs are already implemented, they are feasible logistically, culturally, and monetarily.

B. Environmental Microenterprise

Environmental Protection

Environmental microenterprise programs can be both programs that help women adapt to climate change as well as mitigate climate change, giving this alternative a “3” for this first criteria. For example, a program that would involve and allow women to make a profit in watershed management and restoring mangroves would help prevent flooding, a natural disaster that will continue to occur more frequently as a result of climate change. Thus, this activity is a form of adaptation to a changing climate. A tree planting program, for example, would help sequester carbon and thus work to mitigate climate change. The criteria measuring the amount of land or species protected received three points because the primary purpose of the environmental microenterprise would be to create opportunities for women to earn money through environmental protection, therefore greatly benefiting the environment. The environmental microenterprise alternative would work hard to transmit a lot of knowledge about the environment to teach women about why it is important to protect it and how their actions may preserve or degrade it. It would similarly teach the women technical skills about how to implement these environmental protection efforts – such as how to properly plant trees or grow native, healthy, sustainable food. Thus, this alternative received a three for the “transmit environmental knowledge and/ or skills to women” criteria. Likewise, it received a three for the “change women’s environmental attitudes and/ or behaviors” criteria since giving them environmental knowledge and teaching them ways to protect the environment should work to change both their attitudes and behaviors (Gamba & Oskamp, 1994; Vining & Ebreo, 1990).

Positive Extraneous Effects

The environmental microenterprise alternative received three points for the “skills/ opportunities gained by women that will translate into other aspects of life” criteria. Since a major component of this alternative includes supplemental support programs, such as leadership training, increasing civic engagement, and literacy programs, women will learn many skills they can use in other parts of their lives. These programs will enrich the lives of women and empower them to be actively engaged in society, both to help the environment and hopefully to benefit other areas of society as well.

Costs

To successfully implement the recommended environmental microenterprise program, Paso Pacifico would have to either hire an outside expert or partner with another organization to run the parts of the programs not related to conservation. This would make this program more costly money than the status quo alternative; thus the “need to hire an expert” criteria received a one for the environmental microenterprise alternative. Additionally, although Paso Pacifico already works to create programs to give people opportunities to make money through conservation, they would alter their programs to allow them to adequately attract and meet the needs of women. Since this would not be completely new to them, but still require more effort than the status quo, the overall “program costs” criteria received two points. Because this alternative can start out small and continue to add more programs, such as additional environmental microenterprise programs and support and empowerment training and systems for women, it has a large potential for growth. Therefore, for the “opportunity for program expansion/ program scalability” the criteria received three points. Lastly, the “feasibility” criteria received two points because many

of the cultural networks are already established, for example through current environmental microenterprise programs that Paso Pacifico runs. Although these established programs make it easier than starting something anew, refocusing them towards women still make this alternative more challenging than the status quo.

C. Outdoor Education

Environmental Protection

The outdoor education program would give young girl participants knowledge about and motivation to both mitigate and adapt to climate change through the curriculum, allowing this alternative to receive three points for the “mitigation and/ or adaptation to climate change” criteria. It would show girls examples of environmental degradation, explaining to them how this can be prevented as well as help communicate what they can do to adjust to the changing environment. For the criteria measuring land and/ or species protected or rehabilitated, this alternative only received one point because the purpose of this alternative is not to directly change or help the environment, but instead to give girls the desire and skill to want to do this immediately or in the future. If there is a part of the program where the girls participate in a small scale rehabilitation or conservation project in a degraded area, to allow them to feel more empowered to take part in environmental conservation, then this would help the environment. But as a whole, direct environmental benefits would probably be minimal.

For “transmit environmental knowledge and/ or skills to women” the outdoor education alternative received two points. Because this is an outdoor education, not environmental education program, it is focused on exposing girls to the outdoors but not directly teaching from a textbook. Although the focus is not direct environmental education, some of this knowledge will still be disseminated to participants, even if indirectly. Depending on the design of the program, there may be more direct environmental knowledge components of the program. For the “change women’s environmental attitudes and/ or behaviors” criteria, the outdoor education program received three points, as this is one of the greatest strengths of this alternative. Since people are more likely to have increased environmental attitudes and behavior when they are in nature (Schultz, 2000) and affect is a large determinant of attitudes (Millar & Millar, 1996) and behavior (Ulrich, 1983), this alternative works to help the environment by increasing these environmental attitudes and behavior through exposure to and appreciation of nature.

Positive Extraneous Effects

For the “skills/ opportunities gained by women that will translate into other aspects of life” criteria, the outdoor education alternative received three points. Two of the primary goals of the program are to expose the girls to nature and to give them practice with skills that they can use in all areas of life – such as leadership experience and building their self confidence. It is the hope that these will be later used by the girls to help protect the environment.

Costs

The “need to hire an expert” criteria only received one point because to adequately provide the girls with all of the appropriate exposure and give them all the experiences to best empower them requires Paso Pacifico to hire an expert. Currently, Paso Pacifico works some with students and schools but primarily works to provide supplemental environmental knowledge. Therefore, to

create and execute the best outdoor education programs Paso Pacifico would not be able to do this with just their current staff. Similarly, the “program costs” criteria received only one point because, again, this would be all new to Paso Pacifico, not just an expansion of current programs. The outdoor education alternative received three points for the “opportunity for program expansion/ program scalability” criteria. Once the program begins, and is successful, more schools can be added, more trips can be taken, and more girls can participate without too much effort, making growth probable. Feasibility received two points because there would need to be some research and development completed to find appropriate experts and/ or partner organizations to help run and design the most beneficial outdoor education programs. That said, since Paso Pacifico already has relationships with schools, it will not be an impossible program to start because hopefully these schools will be interested in participating in the program.

D. Community Gardens

Environmental Protection

Community gardens help to mitigate climate change through increasing green space and teaching sustainable practices. They also help women adapt to climate change through teaching them about what they can plant and not plant, especially if there is a focus on what works better in extreme weather conditions such as droughts and floods. Thus, this category received a three. Community gardens only received one point for protecting land and species because little land is rehabilitated through planting gardens. For “transporting knowledge and/ or skills to women,” community gardens only got two points because the educational component may not be substantial. Women already spend a lot of time working with agriculture, and will not gain as many new skills or as much environmental expertise as they would with other alternatives. Likewise, for the “change women’s environmental attitudes and/ or behavior,” community gardens only received one point because women already spend a significant amount of time in these activities, and does not connect them to the environment in a new way. Without much novel environmental connectedness, it will be much less likely to truly alter their attitudes and behaviors.

Positive Extraneous Effects

The community gardens alternative received two points because it will give women some new skills, but not as much as some of the other alternatives, primarily because it reiterates already practiced skills. That said, this does provide women with an opportunity to capacity build and network with each other, increasing the ability to do this outside of the garden. Additionally, it gives women an opportunity to practice leadership skills and feel ownership over a project.

Costs

The “need to hire and expert” and “program costs” criteria both received two points. Paso Pacifico already has some experience with community gardens, but they do not have as much experience incorporating and fostering leadership skills and could enhance their educational components of their programs. Thus, they may or may not need to hire an expert to best implement this alternative. Along these same lines, the program would cost more than the status quo because they would need to make an effort to enhance these educational components as well as work to recruit willing participants. The “opportunity for program expansion/ program scalability” also received two points because this program can grow through increasing the size

or number of gardens and by increasing the number of women participants. But it can only expand as much as more women are willing to participate and depending on how much land Paso Pacifico can acquire for new gardens. Due to these participant and land constraints, expansion is not indefinite. Finally, community gardens received two points for the feasibility criteria. As mentioned for the other cost criteria, recruiting women to participate, ensuring they all put in equal effort into the garden, and making sure that the participants truly benefit might all prove challenging. Paso Pacifico might find that it is both hard to convince women to spend more time on agricultural activity, due to their busy schedule that requires them to spend a lot of time participating in these activities already, and hard to really change their environmental attitudes and behavior because this is not a novel interaction.

E. Tradeoffs

When looking at the environmental protection category, environmental microenterprise is the obvious winner. On all of the environmental protection criteria, it received three points, demonstrating that this alternative will best help the environment. The status quo does not enhance women's environmental knowledge or change their attitudes or behaviors. The community gardens alternative only minimally, if at all, increases knowledge and, in the instance of rural Nicaragua communities, would do little if anything to change environmental attitudes or behaviors. Although the outdoor education program received a three on both of these criteria, like the microenterprise alternative, it does not immediately work to conserve land or species. By teaching and empowering girls, it may do this on a small scale, but the majority of this will be done in the future with the outdoor education alternative. Thus, for the greatest and immediate action, the environmental microenterprise scores the highest.

The largest tradeoff is the costs of programs compared with their benefit to the environment and community residents. When looking at costs, the status quo is the least expensive compared to the other alternatives. The status quo does not require Paso Pacifico to hire an expert or to design and implement completely new programs. Instead, it allows them to maintain their already successful programs, not requiring the large amount of time, money, and effort to be put into researching, designing, and implementing new programs. Additionally, all of the expertise for the status quo can be found from current Paso Pacifico staff that already well-experienced working with the Nicaragua community to help conservation. In contrast, any of the other alternatives require Paso Pacifico to hire an expert and/ or work with other organizations, making them more challenging expense wise and logistically to implement.

Although program costs will increase if Paso Pacifico leaves the status quo and picks another alternative, Paso Pacifico programs are financed primarily through grant money. Since these new projects work with women and work to promote their empowerment, Paso Pacifico may additionally be eligible to apply for grants related to women empowerment, not just grants intended to finance conservation efforts. This may greatly increase the amount of money Paso Pacifico is able to raise to implement these new projects and therefore the development and restructuring of current projects may be more of a help than a hindrance financially. Any new program is still more challenging logistically than simply maintaining a current program, but the cost difference may not ultimately be as substantial as it seems on the surface.

Although the environmental microenterprise alternative would cost more, especially during the initial research and start up and require a great deal of research and development by Paso Pacifico, to find partner organizations and determine exactly how to structure it, it also yields the greatest environmental benefits, Paso Pacifico's ultimate goal. Additionally, this alternative is associated with a lot of positive extraneous benefits, particularly related to empowering women and providing them with skills that will allow them to partake in future environmental conservation and policy-making activities. Therefore, this alternative encompasses long-term benefits and growth in the environmental movement that would not be felt if Paso Pacifico selected to maintain the status quo, establish outdoor education programs, or pursue community gardens.

VI. RECOMMENDATION

Paso Pacifico should pursue environmental microenterprise to best protect the environment. This will capitalize on the skills and knowledge of women and empower them to partake in environmental decision-making within their community. Although fostering environmental microenterprise should be the primary focus for Paso Pacifico because it would yield the greatest short and long-term environmental benefits, outdoor education is also a strong alternative. Outdoor education does not necessarily have as many immediate benefits as the environmental microenterprise option, since there is not as much effort towards direct environmental protection. Instead more of a focus is placed on changing young girls attitudes and behavior, which should still have notable environmental benefits. Thus, it would also be beneficial for Paso Pacifico to pursue this as well, especially if the resources are available, but only after creating the environmental microenterprise systems.

A. First, Pursue Environmental Microenterprise

When establishing environmental microenterprise programs, Paso Pacifico should first figure out which of their conservation or rehabilitation programs they have already in place and that would be easy to restructure to best teach women new skills and build upon skills and knowledge that already exists. Tree planting programs have been successful for Paso Pacifico in the past as well as have shown great promise in other regions, such as Africa and Mexico (The Green Belt Movement, 2003; Paterson, 2007). With these programs, women have been able to plant a substantial number of trees. They have also helped to teach women about sustainable farming practices and helped women to adapt to environmental changes due to global warming, such as decreasing soil erosion. The Green Belt Movement also provides services and seminars to participants to empower women, which has enabled these women to make even more of a difference. Because of success in other areas, it suggests that a tree-planting program would also prove successful if implemented by Paso Pacifico, but almost any of Paso Pacifico's current programs could most likely be tailored towards working with women and adapted to meet their needs. If Paso Pacifico decides to implement a program that can be run by experts who already work for Paso Pacifico, it will allow the program to be most immediately effective and require Paso Pacifico to seek the least amount of outside assistance, keeping costs down and decreasing logistical concerns.

Outreach to Women

Once Paso Pacifico determines what type of program they want to create, they must recruit women to participate. Since Paso Pacifico already works with many communities in Nicaragua, they have gained credibility and earned trust. Regardless, women in Nicaragua are extremely busy with all their daily responsibilities. They have little extra time for outside activities, such as conservation (See *Table 1*). To help this, Paso Pacifico must ensure their programs do not create more stress for the women, but instead will offer women immediate benefits.

One way to convince women to come to learn and participate in these programs – both the environmental microenterprise activities and business and empowerment seminars – is to find a way to eliminate another activity from the women's day. For example, Paso Pacifico could offer women childcare services during the time they are participating in any of the program activities. This childcare service could not only watch and care for young children, but could also help children with their homework. During the afternoon, from 1:30 to 3:00 for example, women typically spend their time helping their children with homework and taking care of the kids (See *Table 1*), so having seminars for women to participate in during this time, while providing daycare and tutoring services for their children, would eliminate this activity from the women's day and instead replace it with an educational or income generating activity. By increasing their education and/ or earning an income, women will begin to increase their standing in society (Fairley, 1998; Hays-Mitchell, 1999). These services could also be beneficial because if women are not able to help their children complete their homework, the tutors would be specifically trained to aid them, furthering education for children.

Paso Pacifico could also decrease women's responsibilities at home by supplying them with food for their families. Approximately three hours each day are allocated towards food preparation. If there was a way for Paso Pacifico to provide pre-made dinners for women to serve their families on evenings when they attended microenterprise programs during the day, women could devote more of their day to earning money and attending business and empowerment workshops, not worrying about preparing dinner for their families. Additionally, if they complete microenterprise activities or attend seminars during the day, Paso Pacifico could provide lunch for the women and their families. Minimizing the stress of providing three meals a day for their families would help women focus on making the most out of the microenterprise ventures and enable them to be most effective at conserving the environment and earning an income.

Some organizations take the approach of giving women land or farm animals in exchange for their work, in addition to earning money, as an extra incentive for participating. Giving women ownership of land helps increase their decision-making, since currently men own most land (Denton, 2002). If women owned the land, they would have more control over how it is used and could implement sustainable practices as well as feel empowered by this control.

As the primary caregivers, women are particularly concerned with the wellbeing of their children (Nelson et al., 2002) and allowing them to take their children to doctor appointments and access medication when needed could entice women to participate in Paso Pacifico Programs. Additionally, giving women access to medicine and taking actions to prevent sickness would give women more free time by decreasing the time they must spend caring for sick family

members. As climate change continues to increase, heat related illnesses will grow and illnesses will spread more quickly (Simms & Reid, 2006). Although the need for medical attention will increase as global warming increases, the ability to access it will probably remain constant, so giving women and their children access to medical treatment may be a good way to encourage their participation in the environmental microenterprise program.

Incorporating Programs to Provide Women Additional Support: Partner with Women Empowerment Organizations in Nicaragua

The support programs that Paso Pacifico provides to women beyond their technical training will be crucial to maximize the success of this alternative and best serve the environment. Ultimately, Paso Pacifico needs to provide women with knowledge about the environment and the technical skills needed to partake in environmental microenterprise programs, provide women with business skills to run their endeavors, support women in gaining other skills to empower them to further environmental protection efforts, and provide women access to services such as literary training and health services. Since Paso Pacifico's mission focuses on protecting the environment in Nicaragua, to keep to their mission, Paso Pacifico should provide women with environmental knowledge and skills but seek outside partnerships to provide the remaining support systems.

First, it is critical that Paso Pacifico use these programs as a way to teach women about sustainable practices and the connection between women's action and climate change. Linking the ways women's daily behaviors further climate change and the negative ways climate change has and will continue to degrade their quality of life will make women more receptive to implementing changes into their daily lives. Teaching women how they can make a difference and why living more sustainably will improve their life and their children's lives will encourage them to actually implement new practices. It is also important that Paso Pacifico listens to the women to ensure that their knowledge about successful and unsuccessful sustainable techniques that they have grown up using are fostered and continually reinforced.

Additionally, teaching women these strategies will allow them to then teach these practices to their children. Since children, especially girls, often help their mothers with household tasks, they learn to be sustainable – or not to be sustainable – from observing these behaviors. If mothers make it evident that they value environmentally conscious decisions, they will instill these attitudes and behaviors in their children who will behave similarly in the future.

Beyond the environmental knowledge and skills, teaching women business skills is also important to incorporate into environmental microenterprise programs. For example, CENZONTLE's curriculum includes workshops on marketing, credit management, basic accounting, costing, budgeting, organizing, money management, and record keeping (Working Capital for Community Needs). Pro Mujer is similar, also training women in areas including marketing, basic accounting, and business growth (Pro Mujer). These skills need to be incorporated into Paso Pacifico's business curriculum to help women create sustainable, effective ventures through partnering with organizations in Nicaragua that already work to achieve this goal.

To supplement the business training and make it most effective, Paso Pacifico should partner with other organizations to provide women with additional skills – including leadership, literacy, self-esteem building, and civic engagement – to make this alternative most effective. Leadership skills will help women as they manage their entrepreneurial activities as well as by teaching them how to coalition build while increasing their self-confidence. Centro de Mujeres Xochilt-Acalt provides literacy training and works with women to improve their public speaking skills (Working Capital for Community Needs). Conflict resolution and interpersonal relation are additional trainings (Pro Mujer) that may further enhance leadership skills. AMIFANIC organizes self-help groups that focus on self-esteem development and empowerment (Foundation for Sustainable Development). CANTERA offers workshops on topics ranging from community organizing for social transformation to gender equity, power, and nonviolence (Foundation for Sustainable Development). Paso Pacifico may want to organize similar self-help groups to allow women to work through problems together and help build a sense of community among women. The more this is fostered, the more women are going to be likely to rely on each other and support one another in all their outside endeavors. With support from each other, the women will be more likely to take chances as well as stand up for their beliefs.

Some of these activities can be constantly worked into the program – such as opportunities for building leadership skills as women learn to manage areas and projects they are working on or by having weekly self-help group meetings for women involved in the projects. On the other hand, some of these trainings will need to be more deliberate. Many of the organizations mentioned previously transmit these skills through workshops, ranging from one day to several days long. Some organizations, such as with CANTERA (Foundation for Sustainable Development), offer 3 to 4 day-long workshops 3 to 4 times per year. For a skill such as leadership, which is pivotal in all parts of the women’s lives, both constant experience as well as intense training workshops would enable women with the most opportunities to practice and develop this art. To increase civic participation, Paso Pacifico should offer training seminars targeted towards enhancing strategies for women to make their voices heard as well as offer simulated scenarios so women can practice and build up their confidence in a low cost environment.

To encourage attendance at these seminars, Paso Pacifico could require that women participate in a certain number of skill building activities a month. For example, if Paso Pacifico hosts three workshops per month, each woman could be required to attend two. Paso Pacifico could again provide childcare and tutoring for children. Women who take most advantage of these extra services will be more successful in their entrepreneurial ventures, ultimately providing more protection and/ or rehabilitation to the environment. Therefore, it is imperative that a fair system, that is not too intrusive into the participants’ free time, is established to ensure that women take advantage of these workshops.

Many of the organizations that work with women in Nicaragua provide them with health and psychological services as well as literacy training. If resources allow, Paso Pacifico should also consider providing some of these services to the women. Health clinics are offered by organizations including Centro de Mujeres Xochilt-Acalt, IXCHEN, Pro Mujer, AMIFANIC, Centro de Mujeres Masaya, and Rainbow Network – Red Arco Iris (RN-RAI). Most of these organizations provide women with reproductive services and information as well as access to general medicine. Several of these organizations also provide psychological services, particularly

to help women deal with instances of domestic abuse. Psychological services are provided by IXCHEN, Centro de Mujeres Masaya, and Clinica de Atención Sicológica, sometime making legal services available to women in addition (Foundation for Sustainable Development).

Since climate change can lead to devastating health outcomes, such as increasing the spread and occurrence of disease and more water borne illnesses (Simms & Reid, 2006), working to provide women with better access to health care professionals would be greatly beneficial. When women, and their families, are in good health, then women are required to spend less time caring for others and can accomplish their own tasks more efficiently. For example, if a woman is sick, she is not going to be as able to take care of farm animals or collect water, making these activities more physically taxing and more time consuming. Psychologically, women will be more emotionally strong and want to participate more in policy-making when they feel confident around their own husbands. Women who are abused will have low self-esteem and also likely be less effective entrepreneurial leaders, decreasing their ability to help the environment. Through counseling, women can learn how to handle these situations and build up their self-confidence.

For Paso Pacifico to provide such a comprehensive program to participants, it must work with other organizations and capitalize on their expertises. To do this, Paso Pacifico has a couple of options. They could partner with an organization, such as Pro Mujer who already provides some health service on a small scale by helping women with entrepreneurial endeavors and then work together to provide health services. If Paso Pacifico decides that health services would largely enhance their empowerment of women, they could partner with two organizations, one for helping to provide business services and one for helping to supplement health services. Taking on both of these may be too large of a goal for Paso Pacifico immediately, so partnering with Pro Mujer, or another more business focused organization first would allow them to foster business development to help the environment. Later Paso Pacifico can determine how to best provide the health services that they determine the women need most.

B. Next, Pursue Outdoor Education

After assessing the benefits and costs associated with implementing outdoor education programs, it is evident this is another strong alternative. Although it does not produce the more immediate benefits of the environmental microenterprise alternative, outdoor education provides a very different set of benefits to communities that would complement the microenterprise option well. Therefore, Paso Pacifico should pursue creating an outdoor education program after the environmental microenterprise one is established.

Although it does not directly rehabilitate or protect land or species, changing environmental attitudes and behaviors remains extremely beneficial, particularly for the long term and when working with early adolescents. Since people are more likely to want to protect the environment after experiencing its beauty and appreciating it (Schultz, 2000), this change in attitude greatly predicts behavior (Ulrich, 1983) and therefore would ultimately lead to conservation efforts. Further, changing attitudes and behaviors in early adolescents, such a critical age (Arnold, Cohen & Warner, 2009), is instrumental to ensure that bad habits are broken early and these new attitudes and behaviors are more permanently ingrained.

An outdoor education program primarily targets changing the attitudes and behaviors of young girls, not adult women, as is the focus with the microenterprise alternative. These differences complement each other well - by changing the attitudes and behaviors of girls, girls will then take these new environmental attitudes and behaviors home to their families. And by changing the attitudes and behaviors of adult women through environmental microenterprise, these women will then teach these attitudes and behaviors to their children. By working with both children and parents, this desire to help the environment and knowledge about environmental protection will be reinforced at home and at school for children. This will help make long term, meaningful experiences for girls in outdoor education programs. As mentioned earlier, even if girls change their attitudes and behaviors after participating in these programs, if they are not supported at home it will be difficult to maintain these changes.

Because outdoor education programs work with children, this will allow for sustainability efforts to continue into the future. As these girls grow up, they will take these positive environmental attitudes and behaviors and translate them into actions. They will be more likely to implement sustainability efforts practiced by their mothers into their households as well as feel more empowered and prepared, both with leadership skills and environmental knowledge, to participate in decision-making.

Combining these two alternatives with the initial focus aimed at establishing environmental microenterprise systems and later developing outdoor education programs, Paso Pacifico will reach females of all ages, empowering them to use their skills and knowledge to help build more sustainable, environmentally conscious Nicaraguan communities.

VII. CONCLUSION

Paso Pacifico works to protect and restore the Nicaraguan environment. Currently, Paso Pacifico has many programs that work with Nicaraguan communities to increase their knowledge about the environment and help them protect and rehabilitate devastated areas and species. Although some women are involved in their programs, Paso Pacifico does not work specifically with women or to increase women involvement in their programs. Because women have so many responsibilities, it can be challenging for them to find time to participate in additional conservation activities. At this time, Paso Pacifico also does not provide services to women to empower them to take a role in environmental policy-making. Climate change increases women's responsibilities and women's direct interactions with the environment give them knowledge about sustainable practices that should be taken into account when determining environmental policies. By helping women gain greater standing in society and enabling them to take action, women's needs and knowledge can help Nicaraguans make better decisions about their environment.

To best help the environment, ***Paso Pacifico should engage women in environmental microenterprise.*** Paso Pacifico currently does not fully utilize the knowledge and skills of women to best protect the environment. Increasing women's participation in efforts to mitigate and adapt to climate change greatly benefits the environment and will further Paso Pacifico's mission. Particularly when incorporating supplemental programs and workshops, such as business skills and leadership training, Paso Pacifico can empower women to take a more active

role in environmental conservation efforts, especially through building women's skills, knowledge, and confidence in environmental policy-making. To best provide women with these skills, Paso Pacifico must partner with an organization that currently works in Nicaragua to further women empowerment. Also, although women do much of the work in a community, they have little, if any say in policy-making (Denton, 2002; Dankleman, 2002; Makhabane, 2002). As women gain more skills and knowledge about the environment through their microenterprise endeavors, men will hopefully begin to see more of their value in the decision-making process. With women both directly helping the environment - through activities such as planting trees, protecting sea turtles, or rehabilitating a destroyed area - and feeling empowered from the success of these experiences and from attending workshops, they will indirectly help the environment through teaching sustainable practices to their children and participating in environmental policy-making.

After the initial programs are established, they would be further improved through providing women with even more access to health care services. Depending on Paso Pacifico's initial partner, they may already be able to provide this to their participants on a smaller scale. Ultimately, partnering with an organization whose primary focus is trying to improve the physical and mental health of women in Nicaragua would be most effective to accomplish this goal. Physically healthy women are more efficiently able to complete their daily tasks and mentally healthy women are more confident and therefore more likely to participate in male dominated activities, such as decision-making.

Once the environmental microenterprise systems are established, ***Paso Pacifico should next consider outdoor education.*** Outdoor education programs would take adolescent girls on trips about three to five days in length to give them leadership and personal development skills as well as positive environmental experiences. Although girls living in rural areas are constantly around nature, they have few positive experiences where they truly can appreciate what the environment has to offer. These positive environmental experiences and seeing human caused environmental degradation are two of the biggest factors young environmentalists attribute to shaping their positive environmental behaviors. (Arnold, Cohen & Warner, 2009). By changing the attitudes and behaviors of these girls, they will be more likely to want to help the environment and introduce these new attitudes and behaviors to their families. If their mothers are participating in the microenterprise programs, this will increase the likelihood that these new attitudes and behaviors will be reinforced at home and therefore sustained.

Although Paso Pacifico has accomplished notable achievements in the area of environmental protection, these will grow by empowering and enabling women to play an active role in these efforts and participate in environmental policy-making. Environmental microenterprise systems, with support systems to empower women, will best accomplish this goal, and outdoor education programs for young adolescent girls will instill a desire and drive to protect the environment in girls and allow environmental conservation efforts to be sustained for future generations.

¹ http://216.146.212.222/womens_organizations.html#acalt, Accessed March 29, 2010.

² http://216.146.212.222/womens_organizations.html#cenzotle, Accessed March 29, 2010.

- ³ http://216.146.212.222/womens_organizations.html#venancia, Accessed March 29, 2010.
- ⁴ http://216.146.212.222/womens_organizations.html#femuprocan, Accessed March 29, 2010.
- ⁵ http://216.146.212.222/womens_organizations.html#mujeresrurales, Accessed March 29, 2010.
- ⁶ <http://fsdinternational.org/node/192>, Accessed April 13, 2010.
- ⁷ https://promujer.org/index.tpl?NG_View=66&NG_Id_Country=4, Accessed April 13, 2010.
- ⁸ <http://fsdinternational.org/node/177>, Accessed April 13, 2010.
- ⁹ <http://fsdinternational.org/node/180>, Accessed April 13, 2010.
- ¹⁰ <http://fsdinternational.org/node/183>, Accessed April 13, 2010.
- ¹¹ <http://fsdinternational.org/node/191>, Accessed April 13, 2010.
- ¹² <http://fsdinternational.org/node/211>, Accessed April 13, 2010.
- ¹³ <http://fsdinternational.org/node/179>, Accessed April 13, 2010.

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Appendix A

GBM's 10-Step Procedure in Establishing Tree Nurseries

The 10-step GBM procedure



Ms. Josephine Wangari (in front of group) and Benson Mathenge (back to the camera), consult with members of GBM networks, Nyeri District.

1. Staff members from the GBM office along with the field facilitators conduct sensitization and mobilization seminars to disseminate information on the importance of tree planting based on GBM goals and values. These seminars are open to anyone interested in starting a tree nursery. Following these seminars, individuals are invited to form groups to register with the GBM. The GBM does not register individuals because the objective is to engage as many people as possible within the shortest time.
2. GBM field facilitators assist interested persons in the formation and registration of groups. These groups are usually formed around women's social groups, church groups, farmers and schools.
3. Groups register (at no cost) as members of GBM with the assistance of the field facilitator and Green Volunteer (GV). This officially opens up communication and follow-up with the groups and GBM staff.
4. Once registered, the groups receive assistance on the preparation of tree nurseries and seed sowing. The group members collect seeds (indigenous, fruit, and exotic tree species) from the forest and plant them in their nurseries. GBM provides some initial seeds to get the groups started.
5. Once trees begin to grow, they are transplanted into individual containers or plastic bags in anticipation before distribution. GVs assist groups with the writing and submission of monthly reports to headquarters. The reports contain information on the status of the nursery (numbers of trees—exotic, fruit and indigenous), the numbers that are ready for distribution and any challenges facing the nursery.
6. Once seedlings are ready for distribution, the groups announce to their communities that seedlings are ready for issuing and ask those interested to dig and prepare holes. GVs assist in this activity as well. No trees are distributed to persons that are not ready to plant them. This reduces wastage since all trees at this stage are followed up to ensure that they are actually planted.
7. Group members check the holes to ascertain that they are properly dug (2 feet deep and wide, manure applied to holes where soil is poor before supplying seedlings).
8. Once holes are approved, seedlings are supplied and the report of seedlings distributed sent to headquarters in the monthly report. Seedlings are only issued to those with properly dug holes. A partial payment for the seedlings is made to the group by GBM. This payment is a small incentive in recognition of the women's input in raising the seedlings.
9. Group members conduct the first verification of seedling survival at one month and that information is sent to the headquarters. Verification involves inspecting the trees planted and determining that they are well taken care of.
10. A second verification of the same seedlings is conducted at three months. A report is sent to the headquarters. If the reports are acceptable to the monitors, GBM purchases the seedlings from the groups. By so doing, the groups get a small compensation for the number of trees surviving at the time of the second follow up. The survival of the trees is significantly increased if the seedlings survive the first three months.



Nancy Muthiani (left) hands over a cheque to compensate members of Kithoka GBM network for surviving trees in Kuuru forest, Meru District.