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Highland Conservation: An Examination of Civil Society Actors in Galapagos

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I. Introduction

Picture iguanas lazily munching on seaweed at your feet, blue-footed boobies plunging into the ocean around you, and sea lions playfully inspecting you as you snorkel: these are the images that come to mind when the Galapagos Islands are mentioned. But try and imagine a mountainside grazed to the stumps with empty tortoise shells littering the landscape, long-line fishing buoys stretching for miles on end, and a \$3 million war against invasive goats on just one island: these are the images that have become an unfortunate reality in the Galapagos over the past twenty years as the human element, which was absent in the island archipelago for millions of years, begins to take over.

The islands, located roughly 600 miles off the coast of Ecuador, were isolated from humankind for 5 million years. Rising up from the ocean, the volcanic archipelago evolved under this isolation. The Galapagos ecosystems were able to progress without the limitations of human presence until the 16th century, resulting in an island ecoregion that is unlike any other on Earth. The physical location of the island archipelago accounts for the astonishing number of species that are found nowhere else on Earth; endemism occurs at 59% in terrestrial vertebrates, 48% in terrestrial invertebrates, and 32% in vascular plant species¹. The islands have long been valued for their prehistoric nature, with 95% of their pre-human diversity still intact. The Galapagos Islands are among the few remaining regions of the world that have yet to see complete ecological distortion via anthropogenic intervention. Unfortunately, however, these numbers are changing. Invasive species, such as *mora* (a relative to the raspberry), guava, and quinine, have devastated the highly sensitive island ecosystems. Feral goats once roamed Pinta (5940 ha) and Santiago (58,465 ha) Islands as well as the northern part of Isabela Island (approximately 250,00 ha) in numbers approaching 100,000.² These feral goats completely stripped the island vegetation, creating a landscape similar to that of Mars. The native populations of Galapagos tortoises suffered dramatically from the lack of vegetation. Threats of this nature have pushed Galapagos ecosystems

¹ Tye, A., H.L. Snell, S.B. Peck and H. Adersen. 2002. Outstanding terrestrial features of the Galapagos archipelago. In *A Biodiversity vision for the Galapagos Islands*. By Charles Darwin Foundation and World Wildlife Fund, Puerto Ayora, Galapagos .

² <http://www.Galapagos.org/2008/index.php?id=48>

into a previously inconceivable state (the number of invasive plant species now outnumber the native species).³

The risk of further environmental degradation in the archipelago should be considered one of the most pressing issues of conservation in the world for several reasons. The islands represent the last hope for an intact oceanic archipelago with 95% of the original species still in existence, setting the standard for all other research concerning ecosystem integrity. Also, the species persisting in Galapagos constitute several ecosystems that can be found nowhere else on Earth.

The most significant factor, however, for this paper and for social-based research is the local population's complete economic dependence upon the natural systems of the archipelago. Visitors come to the Galapagos to see firsthand glimpses of pre-human ecological systems. The islands are far too isolated and inhospitable for permanent human settlement to exist for any other reason than ecotourism. Thus, if environmental degradation were to continue to the point of complete collapse, the Galapagos economy would simply not survive. This has led to increasingly difficult management and governance of economic growth and the local population. The ecotourism industry is constantly being forced to expand and evolve in response to increasing visitation demands. Recent research, however, in the field of sustainable economics and conservation biology is indicating that ecosystem integrity is already severely threatened by the current state of Galapagos society, let alone the threats that would be created through further growth.

Though it has become clear that the Galapagos Islands have the potential to enter into a more sustainable and beneficial state of existence, the need for more suitable socioeconomic developments persists. The challenge for the Ecuadorian government and the people of the Galapagos is to conceive a way in which the needs of the people and the needs of the environment can be satisfied without sacrificing too much of the other. Many agree that the future of the Galapagos is being decided at this very moment; that the islands are in the process of a change that will ultimately determine whether or not conservation in the archipelago will be looked upon as a

³ Tye, A. (ed.) 2003. Plant research for conservation in Galapagos. Report for the years 1998–2003. Charles Darwin Foundation for the Galapagos Islands, Puerto Ayora, Galapagos, Ecuador.

success or a failure.⁴ In the struggle for sustainability, the role of civil society could very well be the determining factor. Ultimately, the people of the Galapagos will need to decide if their future will be one of compatibility with the natural world or one of conflict.

It is thus the object of my research to examine some of the innovations that civil society is currently achieving in order to assist the government in its quest to reach a more sustainable existence, specifically in the rural highlands of Santa Cruz Island. I examine what I consider to be the three most important sectors that this change is occurring in: tourism, agriculture, and education. I will argue that the political atmosphere in the Galapagos has created a situation of interdependence and cooperation between organizations and communities that is helping to facilitate improvements in these three sectors.

II. A Brief History of Humans in Galapagos

The Galapagos Islands have long been perceived or approached with a frontier-like mentality, one that persists to this day. Since the first human contact on the islands, the less-than abundant resources have been exploited without any serious consideration of ecological consequences. Upon discovery, the islands became a source of food, fuel, and supplies for inhabitants and travelers alike.

Discovered in 1535 by Tomás de Berlanga, the bishop of Panama, the isolated ecosystems were irrevocably damaged by human presence in the ensuing 400 years. Long considered inhospitable, whalers, pirates, and all manners of seafaring vessels used the Galapagos Islands as a port of sorts to gather whatever food or supplies could be found. In the three centuries prior to permanent colonization, over 200,000 giant tortoises were removed and used as a source of fuel (tortoise flesh contains an oil that is comparable to that of whale species) and food (a single giant tortoise, weighing up to 400 kilograms, can survive without food or water for months on end, ideal for year-long ocean voyages)⁵. These island visitors altered ecosystem dynamics not only through the direct extraction Galapagos wildlife, but via introduced foreign species as well. Most notably, rats and domestic ungulates were first introduced during the explosion of the Galapagos whaling operations. With the absence of major predators, rats thrived on the islands, wreaking havoc upon tortoise

⁴ González, Jose A., Carlos Montes, José Rodríguez, and Washington Tapia. "Rethinking the Galapagos Islands as a Complex Social-Ecological System: Implications for Conservation and Management". *Ecology and Society* 13.2 (2008).

⁵ Stewart, Paul D. *Galapagos: The Islands that Changed the World*. New Haven, CT: Yale UP, 2006.

eggs. Domesticated cattle, goats especially, effectively and efficiently out-competed tortoises for the fairly limited vegetation. With dwindling populations and intense invasive disturbances, the Galapagos tortoises suffered heavily. Three distinct populations of giant tortoises have subsequently been driven to extinction and 9 out of the remaining 11 populations are considered to be endangered or vulnerable⁶.

In 1832, Ecuador gained possession of the islands, marking the beginning of a period of colonization and permanent human presence. Settlements were established on four of the major islands and an 1885 Ecuadorian law promoted colonization of the islands, similar to the United States Homestead Act of 1862. The *Ley Especial de Galapagos* of 1885 explicitly stated that the colonization of the archipelago was to be considered a top priority.⁵ Despite the massive appeal of an Eden untouched by humans and the promise of bountiful marine life, permanent human settlements struggled to take hold. The isolation of the islands made life in Galapagos a brutally harsh endeavor for colonists. Among the principle obstacles was the lack of fresh water. The porous volcanic rock that supports all terrestrial life on the islands holds very little rainwater. In fact, the only naturally occurring body of freshwater in the Galapagos is located on Floreana. Despite the relative failure of human occupation, permanent human presence did have a drastic effect on the island ecosystems. Agricultural development in the higher humid zone cleared and altered native forests. Exotic plants and animals were introduced as a source of food for the growing populations. Many of these species (i.e. goat, guava, blackberry, etc.) continue to plague highland ecosystems to this day.⁶

The arrival of the HMS Beagle and naturalist Charles Darwin to the Galapagos Islands in 1835 would have a different, yet equally profound, impact on the islands. Darwin's experience in the Galapagos provided him with the inspiration and observations to create his theory of evolution. His *Origin of Species* would completely rework the way the modern, scientific world perceived life. Consequently, the Galapagos Islands and the unique ecosystems that inspired the work of Charles Darwin would become a topic of great interest among the international scientific community. The popularity and renown of the archipelago created massive interest and incentives for research and

⁶ IUCN 2010. IUCN Red List of Threatened Species. Version 2010.2. <www.iucnredlist.org>. Downloaded on **27 August 2010**.

environmental protection throughout the 19th and 20th centuries, before environmental conservation was ever considered a popular alternative to the traditional extractive exploitation.

III. Conservation and the Economy

The environmental conservation movement arrived in the Galapagos in 1959 with the creation of the Galapagos National Park and the subsequent protection of 97% of the land mass. This designation coincided with the emerging tourism industry, as both Ecuadorian and international experts declared that “nature tourism represented the economic activity that was by far the most compatible with conservation of the archipelago’s biological diversity, evolutionary and ecological processes, and environment.”⁷ According to the World Conservation Union (IUCN), ecotourism is “environmentally responsible travel and visitation to natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features, both past and present), that promote conservation, have a low visitor impact, and provide for beneficially active socioeconomic involvement of local people.”⁸ The Islands’ potential for economic growth and the subsequent implications of that growth, however, was not accurately anticipated. The idea that ecotourism would actually become the leading force in *opposition* to the conservation movement was never considered.

As the tourism industry grew, word quickly spread about the truly prehistoric nature of the Galapagos environment. In 1978 the United Nations Scientific and Cultural Organizations (UNESCO), declared the Galapagos Islands as one of the first World Heritage Sites. This designation signified for the islands that international stardom had officially arrived. With this distinction came a drastic increase in the desire to both visit and protect the archipelago. But by the 1990’s, unrestrained economic growth, particularly in the tourism sector, began to threaten the conservation of the islands. The total population in Galapagos had tripled between 1974 and 1998, with two-thirds of that growth attributed to immigration.⁹ It was becoming more and more apparent that the ecotourism industry model that was once supported and encouraged by conservation advocates

⁷ MacFarland, C. *An Analysis of Future Tourism in the Galapagos Islands*. Charles Darwin Foundation. Falls Church, VA. 2001

⁸ IUCN. 1997. Resolutions and Recommendations, World Conservation Congress. Montreal, Canada. Oct. 11-23. IUCN. Gland, Switzerland.

⁹ Epler, Bruce. 2007. *Tourism, the Economy, Population Growth, and Conservation in Galapagos*. Charles Darwin Foundation, Puerto Ayora, Galapagos.

was not as sustainable as what was previously conceived. This realization launched conservation in the Galapagos into a new phase of development; balancing conservation and the economy.

This new era in the archipelago initiated the move towards island-wide sustainability, beginning with the passing of the 1998 Galapagos Special Law. Sustainable development is defined as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs.”¹⁰ The Ecuadorian government thereby acknowledged the fact that the island economy was growing at uncontrollable rates in a region that was ill-equipped to accommodate such growth. The Special Law served several functions: strict regulation of immigration, special protection status for the islands’ natural processes, a proactive quarantine system (SESA-SICGAL), and economic incentives to hire local residents.⁵ The Galapagos Special Law also added the Galapagos Marine Reserve to the Galapagos National Park, creating a 40 nautical-mile boundary of protection. The most noteworthy and significant result of the Special Law, however, was its contribution to local autonomy within the economy and the conservation movement. In 2007, UNESCO responded to increasing concern among the international conservation community about the degradation of the Galapagos environment. The World Heritage Committee added the Galapagos Islands to the List of World Heritage Sites in Danger, citing as justification for enlistment “inadequate implementation of the Special Law on Galapagos and lack of enforcement, poor governance, inadequate regional planning, inadequate and ineffective quarantine measures, illegal fishing, instability of Park Director’s positions, high and unregulated illegal in-migration and resulting impacts on development on biodiversity, unsustainable tourism development, and education reform not implemented.”¹¹ These relatively recent developments in environmental policy, as Taylor et al. (2006) argues, have pushed the Galapagos Islands to the very forefront of the international conservation community. The results of these institutional and

¹⁰ Harris, Jonathon M. 2000. “Introduction: An Assessment of Sustainable Development,” in *Rethinking Sustainability: Power, Knowledge, and Institutions*. Ed. Jonathon M. Harris. Ann Arbor: University of Michigan Press. Pp. 1-10.

¹¹ United Nations. Educational, Scientific and Cultural Organization. 33rd Sess. *World Heritage Committee. State of conservation of the properties inscribed on the List of World Heritage in Danger*. 30 June 2009. <<http://whc.unesco.org/en/sessions/33COM/documents/>>. Downloaded on 10 February 2010.

legislative changes will likely determine the effectiveness and appropriateness of local-based economic development and conservation across the globe.¹²

Despite the government's attempt to promote sustainable development in the islands, the economy continues to grow and evolve at an astounding rate. A small, isolated economy such as the Galapagos encounters several difficulties in establishing localized sustainability and therefore becomes dependent on exogenous sources of income. Smaller markets decrease the viability of establishing economies of scale, which in turn contributes to inefficient organizational framework. Additionally, smaller populations invariably reduce the capacity to provide skilled and competent labor. The Galapagos economy, therefore, has necessarily organized itself in a unique manner to account for these developmental limitations. The tourism industry, by and large, is the greatest contributor to the island economy. Between 1999 and 2005, the total income of the archipelago increased from \$41.1 million to \$73.2 million, a 78% increase. This staggering growth rate can be largely attributed to the tourism industry, which contributed 67.8% to the change in Gross Island Product (GIP). These results indicate that the Galapagos Islands are home to one of the fastest growing economies in the world, with an average annual growth rate of 9.6%.¹³ Additionally, Taylor et al. (2006) argues that examining only *direct* injections into the local economy will underscore the overall economic impact of money spent in the Galapagos. The direct impact of increases in income will in turn increase the spending capacity of those receiving the income injections. And when overall spending increases in even a small percent of the population, the incomes and expenditures of secondary agents in the economy increase as well. The multiplier effect that results from market linkages and the interconnectedness of a small island economy can have a drastic impact on one's understanding of the Galapagos. For example, Taylor et al. (2003) argues that the GIP estimated in a 1995 study was in fact four times lower than in reality, simply because the multiplier effect was unaccounted for.¹³

While these numbers may seem promising, the framework of the tourism industry and the ever-increasing immigration rates serve to dilute the annual per-capita income increase to a relatively

¹² Taylor, Edward J., Jared Hardner and Micki Stewart. "Ecotourism and Economic Growth in the Galapagos: An Island Economy-wide Analysis." Department of Agricultural and Resource Economics, University of California, Davis. 2006.

¹³ Taylor, J. Edward, Antonio Yúnez-Naude, George Dyer, Sergio Ardilla, and Micki Stewart. "The Economics of 'Eco-Tourism': A Galapagos Island Economy-wide Perspective." *Economic Development and Cultural Change* 51.4 (2003).

meager 1.8%. Profits from tourism are concentrated in mainland Ecuadorian or international operations (i.e. travel agencies, island cruises, airline companies). Astonishingly, only 7.6% of the average costs per trip were collected in Galapagos and over 90% of the profits were collected by the two major airline companies (TAME and Aero Galapagos) and by cruise ships that were operated locally but owned by mainland Ecuadorians.¹³ This dilemma is confounded by the ever-increasing population in Galapagos. The total population grew by a staggering 470%, from 4,078 in 1974¹⁰ to 19,184 in 2006.¹⁴ Mainland Ecuadorians are lured to the Galapagos in large numbers by the promise of work. When the unemployment rate rises to 10.6%, as it did in 2006 in mainland Ecuador, the desire to migrate to the islands becomes irresistible. Even if local inhabitants are excluded from the bulk of the profits of tourism, there will always be a demand for cheap, imported labor.

While tourism is easily the largest contributor to the island economy, there are other significant sources of revenue. In 2006, total public expenditures reached \$25.6 million in Galapagos, with a large portion of that money, \$10.5 million, being supplied by the \$100 park entrance fee for international visitors.¹⁰ Public spending, as Taylor et al. (2006) estimates, contributes to 20% of income growth for the islands. An additional 8% of income growth is attributable to conservation and research spending. The scientific community in Galapagos not only supports the Ecuadorian government with continually updated information and advancements, but it also injects millions of dollars annually into the local economies. The Charles Darwin Foundation has been working with the Ecuadorian government and the Galapagos National Park since its inception in 1959. The foundation strives to “provide knowledge and assistance through scientific research and complementary action to ensure the conservation of the environment and biodiversity in the Galapagos Archipelago”.¹⁵ It has become one of the largest and most influential contributors to the Galapagos community. Operating on an annual budget of nearly \$5 million dollars, the foundation contributed 83.7% to the total percentage of conservation funding in 2006.

IV. Methods

For eight weeks, I lived in the parish of Santa Rosa on the island of Santa Cruz with the family of Miguel Moncayo, the director of *La Escuela Delia Ibarra*. I was fortunate enough to have the

¹⁴ Watkins, Graham, Susana Cárdenas, and Washington Tapia. 2007. Introduction. In *Galapagos Report 2006-2007*. Puerto Ayora, Galapagos, Ecuador.

¹⁵ <http://darwinfoundation.org>

opportunity to work on various conservation and development projects throughout the islands. My goal was to acquire a deeper understanding of the various difficulties that arise when one attempts to foster both economic opportunities and environmental protection. The work I was involved in consequently had a heavy impact on the structure and design of this paper.

The heavy presence of tourists on Santa Cruz led to the invariable presence of English, especially in the port town of Puerto Ayora. Tourism, however, was less influential in the highlands and thus so was English. Working and living in the agricultural zone of Santa Cruz forced me to develop my Spanish-speaking skills. At first, I had to struggle through conversations but my abilities inevitably improved. A difficulty that I had not anticipated was the Quechua influence in the islands. The indigenous dialect was very prevalent in the agricultural zone and I often found a sort of hybrid language. Many individuals, especially farm workers, mixed Spanish and Quechua phrases into conversations. By the end of my time in Galapagos, however, I was able to hold and maintain intelligent conversations with local Galapagueños. This process of enculturation was aided, interestingly, by the World Cup. At first, I was having difficulties connecting with my friends and host-family, but the World Cup provided us with a common interest; *fútbol*. Watching games on TV and discussing them later helped me to both build relationships with Galapagueños and practice Spanish.

For the first six weeks, I worked with the Foundation for Alternative and Responsible Development in Galapagos (FUNDAR) at *Reserva Pájaro Brujo*, their sustainable farm in Santa Rosa. I worked under Ivan Aldez, a former botanist at the Charles Darwin Research Station, on the farms reforestation effort. *Pájaro Brujo* was conceived as a demonstration center, serving as an example of progress in sustainable agriculture for the disadvantaged farm owners of the highlands. My time was spent observing and contributing to various phases of existing projects to improve the level of sustainability at both *Pájaro Brujo* and other farms involved with FUNDAR. I completed interviews, observed FUNDAR staff members, and initiated casual conversations with the local Galapagueños. In doing so, I was able to acquire an insider's perspective of FUNDAR's involvement in the highland agricultural communities and the steps being made in the agricultural sector to advance the conservation effort in Galapagos.

For the final two weeks, I worked with Emily Pozo, the founder of Galapagos ICE, a social-based NGO in Santa Cruz. We initiated an environmental and agricultural education program at *Delia Ibarra* and an ecotourism development project at a local farmstead in the highland community of Bellavista. Upon completion, the education program will provide the students of *Delia Ibarra* with hands-on experiences with sustainable agricultural techniques and practices. The project was a very progressive idea, requiring contributions from many different individuals in several different phases of work. I was thus able to observe and contribute to the coordination between the various groups involved in the project, providing compelling evidence of cooperation and mutual interdependence within Galapagos civil society. My experiences with Galapagos ICE and the Green School Project led to my conclusion that the most promising advances in environmental conservation, economic progress, and civil society efficiency and effectiveness will occur in the education sector. Emily Pozo was an invaluable tool for my research in Galapagos. I was able to extract large amounts of information about the *actual* status of Galapagos society through countless in-depth, intelligent conversations with Emily. Her knowledge of the conflicts surrounding social development in the islands contributed greatly to my paper and my general understanding of the island culture.

Throughout my eight weeks in Santa Cruz, I frequently worked with Emily Pozo and Galapagos ICE on another development project in the highlands. We were helping a local family convert their coffee farm into a small-scale tourist attraction. The experience working at *Finca La Fortuna* with the Carniagua family provided me with a completely localized perception of tourism as well as localized understanding of sustainable agriculture. The most valuable and enduring result from my time at their farm was the opportunity to witness first-hand the level of intimacy and care that existed between many Galapagueños and the environment. The Carniagua family lived primarily off of the coffee harvest and had developed a very inspiring love and appreciation for their small portion of land in the highlands.

V. An Examination of Recent Developments in Conservation and Sustainability

The promotion of sustainable development and conservation in the Galapagos requires a holistic, interdisciplinary approach that cannot be achieved by looking individually at economics, politics, or the natural sciences. It is a deep and profound issue that transcends all social and economic boundaries. I will argue that conservation in the Galapagos highlands has created

significant opportunities for the contributions of civil society in three main sectors: tourism, agriculture, and education. The innovations and advancements that are underway right now in the highland communities on Santa Cruz island are forging relationships among civil society actors and creating significant contributions to the conservation of the island ecosystems.

a. Tourism

Tourism in the archipelago has had the single greatest impact on the island economy and Galapagos society. The tourism industry contributes nearly three-fourths of household income growth. The estimated total revenue of the island tourism industry from June 2005 to July 2006 was \$143.3 million.¹⁰ And the industry is continuing to grow, experiencing a 13.1% increase in international visitors, placing the Galapagos among the top five fastest growing tourism destinations in all of South America.¹⁶ Since 1985, the number of international visitors has grown by nearly 135,000, an increase of 833%.

The growth of the tourism industry is primarily responsible for the continually increasing Galapagos population. The National Institute of Statistics and Census (INEC) of Ecuador records a 400% resident population increase in Galapagos, from 4,078 in 1974 to 19,184 in 2006.¹⁷ And the current figure, though only an estimation, puts the island population at nearly 25,000 people. This type of rapid and uncontrolled growth is far from the vision of a sustainable island economy that conservationists supported in the 1960's. Increasing demand for goods and services has put an even greater stress on the local communities and the underdeveloped Municipal governments. SESA-SICGAL, the Galapagos quarantine and inspection agency, is severely understaffed and overworked. From 2001 to 2006, the number of flights arriving in the two Galapagos airports increased by 193%, the number of cargo vessels carrying goods to the islands increased by 94%, the number of tourists arriving in the islands increased by 83%, and the number of residents increased by 6.2%. All the while, the number of SICGAL inspectors responsible for the checking of all these new arrivals decreased by 20%.¹⁸ These statistics

¹⁶ Proaño, María Eugenia, and Bruce Epler. 2007. Tourism in Galapagos: A Strong Growth Trend. In *Galapagos Report 2006-2007*. Charles Darwin Foundation, Puerto Ayora, Galapagos, Ecuador.

¹⁷ <http://www.inec.gov.ec/>

¹⁸ Zapata, Carlos E. 2007. Evaluation of the Quarantine and Inspection System for Galapagos (SICGAL) after Seven Years. In *Galapagos Report 2006-2007*. Charles Darwin Foundation, Puerto Ayora, Galapagos, Ecuador.

highlight the alarming increase in the islands vulnerability to new invasive species and diseases, a major risk to ecosystem and human health in the Galapagos.

These increasing threats could potentially be overlooked or justified if the local economies were experiencing an equally dramatic surge in growth, but that simply is not the case. As stated earlier, the total revenue stream into the Galapagos grew by 78% from 1999 to 2005, but the per-capita income of residents yielded only a growth of 1.8%.¹³ These figures are attributable to the framework of the tourism industry.

During the 1960's, conservationists supported a "floating-hotel" model of ecotourism that was believed to place a lesser degree of strain on the sensitive island ecosystems. Visitors to the archipelago were housed on cruises and yachts with only brief day trips onto the various islands. But as the resident population and the complimentary need for additional sources of income grew, the exogenous "floating-hotel" model of tourism continued to alienate local income growth. This form of ecotourism has persisted and created a rather porous industry. From 2005 to 2006, the total income for all tourist vessels in the islands was \$120.5 million. Yet as shown in Taylor et al. (2006), only 7.6% of visitor costs made it in to the local economy. The remaining income was collected by the Ecuadorian and international investors that owned and controlled the larger, cost-heavy operations. The imposing figure of \$120.5 million appears even more insignificant due to the fact that the eight largest vessels (out of 83) collect 49% of the total revenue.¹⁹

In the late 1970's and early 1980's the resident population reacted to the growing tourist demands and began to develop a relatively small land-based tourism industry, consisting of mainly restaurants, gift shops, and hotels. This model of tourism allowed for greater local participation but ultimately could not compare to the established "floating-hotel" model. While the latter collected \$120.5 million in 2005-2006, the land-based tourism industry gathered a relatively meager \$10.7 million in revenue. As Epler et al. (2007) states, hotels collect 7% of the tourist expenditures, with 77% going to vessels and 8% going to other tourism services (i.e. guides, shops, etc.) and the public sector.

¹⁹ Epler, Bruce, Graham Watkins, and Susana Cárdenas. 2007. Tourism and the Galapagos Economy. In *Galapagos Report 2006-2007*. Charles Darwin Foundation. Puerto Ayora, Galapagos, Ecuador.

The statistics provided do not point towards a very compatible model of ecotourism as defined by the World Conservation Union, nor do they indicate that the Galapagos economy is evolving under the tenets of sustainable development. They do express, however, the immediate need for locally-based economic opportunities. Too many tourists leave the Galapagos Islands after a stint on a cruise ship without ever once realizing that people actually live on the archipelago. If long term conservation is to be achieved, local inhabitants must have greater access to the resources within the tourism industry.

In the small, rural community of Santa Rosa, on the island of Santa Cruz, Galapagueños have lived with the problems of economic exclusion for years. Upon arrival on the islands, tourists have a general list of sites they need to visit or species they need to see. For the majority of visitors, the Galapagos tortoise is one of them. And by far the most popular and easily accessible place to see this species in the wild is at *Rancho El Chato*, in the highlands of Santa Cruz, just beyond the community of Santa Rosa. Emily Pozo explained to me that every year, 70,000 tourists ride on buses through Santa Rosa on their way to see the iconic Galapagos tortoise, but not one of those buses ever stops. For residents of Santa Rosa, the access to tourism revenue is painfully close yet there remains little opportunity for the community to reach out. I learned from a conversation with Miguel Moncayo that community leaders have spoken of creating a stopping point for these busses, equipped with botanical gardens, cafés, and gift shops. Proposals have been written and NGOs have become interested, yet the lack of funding and resources continues to elude the project.²⁰

For the slightly larger community of Bellavista, 15 kilometers below Santa Rosa, this problem is beginning to be addressed. Several smaller cafés and shops have been opened up to cater to the occasional adventurous tourist that wanders through town and the handful of Galapagueños that already have tapped into revenue streams from tourism. *Finca La Fortuna*, a family-owned coffee farm, has recently begun working with Galapagos ICE, one of the few strictly-social non-governmental organizations in Galapagos, on one such development. Together, they have broken ground on the adaptation of their farm to accommodate a light load of tourist visitations. The principal objective of the project is to “to create an ecotourism

²⁰ Conversation with Miguel Moncayo, Director of *La Escuela Delia Ibarra Velasco* in Santa Rosa.

destination that is managed and operated by local residents only, thus channeling much needed economic resources directly into the local population.”²¹ The owners of *Finca La Fortuna*, the Carnigua family, are primarily interested in opening up a consistent, secure market to sell their coffee. The farm will continue to be productive and the inexpensive conversion will only serve as a supplementary income at first. The role of Galapagos ICE is to provide financial and technical support, as well as the creation of a marketing campaign directed towards local tourism agencies in Puerto Ayora.²²

Small-scale, localized tourism operations such as *Finca La Fortuna* are beginning to appear in the islands as more and more individuals and organizations seek new and innovative ways of tapping the tourism market. With increasing international interest in sustainability and locally-based ecotourism ventures, the market for independently run tourism in Galapagos is growing. The role of civil society has become an essential part of these developments. In a Province that has an annual, per-capita income of under \$3000, the inclusion of non-governmental organizations, commercial cooperatives, and micro financing organizations in economic development becomes a necessity. As Watkins and Graham (2007) suggest, “Without available credit, training and market analysis, local residents will be unable to take advantage of the ownership of tourism.”²³ Otherwise, it is likely that the growing opportunities for expansion in the tourism market will be taken by those that have previously held access and social equity will continue to elude the islands.

b. Agriculture

At first glance, it is easy to assume that the terrestrial ecosystems of the Galapagos are far from threatened by environmental degradation, considering that 97% of the land mass is undeveloped and under the guise of protected National Park land. But this number is often misinterpreted or simply misunderstood. The Humid Zone of the Galapagos can be found on only 7 of the 128 islands, 4 of which are inhabited. Occurring in the highest altitudes of the oceanic

²¹ Pozo, Emily. 2010. Ecotourism Development Project for Finca La Fortuna. *Galapagos ICE*. Puerto Ayora, Galapagos, Ecuador.

²² Conversation with Emily Pozo, Director of Galapagos ICE, and José and Marina Carnigua, owners of *Finca La Fortuna*.

²³ Watkins, Graham and Felipe Cruz. 2007. *Galapagos at Risk: A Socioeconomic Analysis*. Charles Darwin Foundation. Puerto Ayora, Galapagos, Ecuador.

archipelago, the Humid Zone is the most desirable land for human use due to the availability of water and fertile soil. Consequently, the majority of the 3% of the developed land in Galapagos occurs in the Humid Zone.²⁴

Unfortunately, these higher-altitude ecosystems support the greatest diversity of terrestrial species. Additionally, species endemism is most heavily concentrated in the Humid Zone, with iconic species such as the Vermillion Flycatcher, scalesia and miconia forests, and of course the Galapagos tortoise. These diverse ecosystems are under heavy attack from anthropogenic interference. On Santa Cruz Island, nearly all of the scalesia forests have been lost to habitat destruction or invasive species. According to Snell et al. (2002), 10% of all endemic flora are critically endangered, 50% are classed as endangered, and the remaining 40% are considered vulnerable.

The species-rich Humid Zone has experienced heavy declines in ecosystem integrity primarily because of agricultural land use. The inhabited islands were originally chosen for human settlement because each had its own Humid Zone to be converted into productive land. Humans simply would not have survived on the islands if these lands were not put to use. Of the 118 km² of the Humid Zone on Santa Cruz, 74% has been converted into agricultural land. Today, much of the land cleared for agriculture lies fallow due to its marginal viability as an economic activity. However, an employee of the Charles Darwin Station explained to me that there is no concrete information regarding the actual amount of unproductive agricultural land in the islands. The task of addressing these concerns is therefore improbable at this moment, but a current transnational project, named SIGTIERRA, is providing that exact information. SIGTIERRA is a federal program to gain an accurate understanding of the status of agriculture in Ecuador, utilizing GIS mapping technologies. It will provide the Provincial Government of Galapagos and conservationists with a map of the agricultural zones that identifies what land is presently being farmed and what form of farming is presently taking place.²⁵ SIGTIERRA will undoubtedly have an immediate and significant impact on conservation in the Galapagos and will hopefully contribute to a more productive and sustainable island economy.

²⁶Snell, H.L., A. Tye, C.E. Causton, and R. Bensted-Smith. 2002. Current Status of and Threats to the Terrestrial Biodiversity of Galapagos. In *A Biodiversity vision for the Galapagos Islands*. By Charles Darwin Foundation and World Wildlife Fund, Puerto Ayora, Galapagos .

²⁵ Conversation with Roslyn Cameron, Development Officer at Charles Darwin Research Station

As the tourism industry grows and becomes more profitable, the need and desire to maintain productive land decreases. Unfortunately, the abandonment of agricultural land leaves a perfect conduit for the introduction of exotic species.²⁶ Introduced species have become the number one threat to the Galapagos ecosystems as species such as *mora*, guava, cascarillo, and quinine outcompete native and endemic species. There are currently 600 introduced species in Galapagos with an estimated annual increase of 10%.²⁶ If left to recover naturally, abandoned agricultural land will experience an even greater vulnerability to invasive species.²⁷ Maintaining productive land, therefore, is essential to the prevention of further introductions of species.

Agricultural productivity, however, has become a major difficulty for many property owners in Galapagos. Production continues to be limited at a basic level by lack of agricultural development, scarcity of water, poor credit options, and lack of technical assistance.²⁸ The closure of farmsteads impacts conservation not only through the establishment of exotic species, but sustainability in the islands becomes less of a reality as well. In a small, isolated economy, such as in Galapagos, the reliance upon imported goods is unavoidable. Yet, the number and imported goods can be somewhat reduced if domestic agricultural production remains viable. Increased agricultural activity in the archipelago would invariably reduce the number of foreign diseases and invasive species that are introduced, as well as reducing the load of cargo vessels.

Agriculture has thus become an important sector for improvements in conservation, providing unique opportunities for the participation of civil society in Galapagos. As mentioned earlier, one of the most significant impediments to agricultural feasibility in the Highlands is technical capacity. With limited financial resources, the majority of farms in Galapagos utilize collected rainwater for irrigation and organic compost for fertilizer. The capacity to increase productivity via improved irrigation or improved fertilizer simply does not exist for the average Galapagueño farmer. Additionally, the initiation of non-organic agriculture would likely receive significant opposition by conservation advocates.

²⁶ Watson, James, Mandy Trueman, Marta Tufet, Scott Henderson, and Rachel Atkinson. "Mapping terrestrial anthropogenic degradation on the inhabited islands of the Galapagos Archipelago." *Oryx* 44. (2010).

²⁷ Cramer, Viki A., Richard J. Hobbs, and Rachel J. Standish. "What's new about old fields? Land abandonment and ecosystem assembly." *Trends in Ecology and Evolution* 23.2 (2008).

²⁸ Conversation with Carlos Zapata, Director of FUNDAR Galapagos

An environmental non-profit organization, The Foundation for Alternative and Responsible Development in Galapagos (FUNDAR), has begun to address these issues at their highland farm, *La Reserva Pájaro Brujo*. Operating on a \$2 million grant from the European Union, FUNDAR Galapagos has created a sustainable demonstration center for the agricultural communities of Santa Cruz. FUNDAR bases its work off of the assumption that “the social and environmental problems in Galapagos, and principally those of the highlands and its inhabitants, can be transformed into more sustainable alternatives through research, training, and above all, leading by example.”²⁹ The farm was created with the same characteristics as other farms in the highlands, but is managed and operated for the sole purpose of sustainability.

A major component of *Reserva Pajaro Brujo* is frequent community workshops. FUNDAR provides updated information and training on agricultural innovations that could be easily applied to other local farmsteads. For example, a training workshop was held at the farm of FUNDAR to teach local farmers the efficient use and maintenance of weed-whackers in order to increase the efficiency and longevity of motor-life as well as personal safety. These *Días de Campo* provide quality opportunities for FUNDAR to work directly with the local communities. Often times, other non-governmental organizations active in the Galapagos, such as Conservation International, use *Pájaro Brujo* and FUNDAR’s workshops for the same purpose. In a social and political climate that is supposedly too much at odds for interorganizational cooperation³⁰, FUNDAR’s sustainable demonstration center strives to increase social cohesion and interdependence.

c. Education

The Galapagos education system lacks in both resources and technical capacity to properly address the growing needs of the island communities. In the past decade, the total number of students in Galapagos has increased by 1,883³¹, an increase of nearly 150%. These figures correspond to the general growing trend in the island population. A work force of 500 teachers and

²⁹ Zapata, Carlos. 2004. “Guide to the Creation of the Management for the Sustainable Lifestyle Demonstration Centre.” *Foundation for Alternative Responsible Development for Galapagos*. Puerto Ayora, Galapagos, Ecuador.

³⁰ United Nations. Educational, Scientific and Cultural Organization. 31st Sess. *World Heritage Committee. Convention concerning the protection of the World Cultural and Natural Heritage*. 23 June 2007. <<http://whc.unesco.org/en/sessions/31COM/documents/>>. Downloaded on 10 February 2010.

³¹ Mendieta, Marcela, and Kory Falconí. 2008. The current status of the educational system in Galapagos. In *Galapagos Report 2007-2008*. Charles Darwin Foundation. Puerto Ayora, Galapagos, Ecuador.

administrators work in the islands in 18 primary schools and 9 secondary schools; there are no options for a university level education on the islands. The Ecuadorian government, the Provincial Government of Galapagos, and the international conservation community have all recognized the need for improvement within the educational system.

The Government of Ecuador initiated educational reform at the national level in 1992 through a general shift in curriculum from memorization to active learning as well as the integration of environmental education.³² Article 32 of the Galapagos Special Law (1998) addressed specified issues for the archipelago, expressing the need for specified educational training, the incorporation of conservation and preservation into environmental education, increased local autonomy over education, and ongoing teacher evaluations, among others. The Organic Law for the Special Regimen for the Conservation and Sustainable Development of Galapagos initiated the Integral Educational Reform (REIG) in 1998. But, according to the 2007 UNESCO Mission Report, the REIG had yet to be implemented. Additionally, the Charles Darwin Research Station states environmental education as one of their primary objectives as a member of Galapagos society. CDRS provides several opportunities for study in the environmental sciences, including a program for Ecuadorian and Galapagueño university students to conduct research. Despite these significant efforts to reform the educational system, more is still needed.

Education in the Galapagos offers civil society quite possibly the most promising opportunities to enact meaningful and enduring change to conservation of the islands. While regulatory enforcement, quality scientific research, and sustainable economic development are necessary components of conservation in Galapagos, only education has the capacity and potential to create new visions of the future. Many organizations recognize this fact and are actively working to make improvements.

La Escuela Delia Ibarra Velasco, in the highlands community of Santa Rosa, is currently working on the creation of an Environmental and Agricultural Education Program. In an agricultural community such as Santa Rosa, the opportunity to begin lessons in sustainable agriculture offer major benefits for future generations' positive participation in conservation and agriculture. The ambitious project involves student participation in the growing of crops and native flora. A small

³² Overview of education in Galapagos. 2007. *Galapagos Conservancy*. Falls Church, VA.

piece of land (roughly 50m²) has been designated for the building of a greenhouse, compost system, water-tank, and garden plots. The idea is for individual groups of students to be assigned small plots of land and to be walked through the growing process from beginning to end. When ready, the students are able to bring home their finished product (mature plants) to eat or to begin their own native garden.

Several organizations have been included in the planning and construction processes. Emily Pozo, director of Galapagos ICE, has been working on a proposal with the director of *Delia Ibarra* for several months, spearheading the project. The Ministry of Agriculture (MAGAP) has provided equipment as well a technician to give logistical support and technical advice during the construction and growing periods. FUNDAR Galapagos is lending their expertise in sustainable agriculture and native ecosystems through technical support and educational lessons for the students. And the Charles Darwin Foundation has promised to provide volunteers to run workshops and educational activities for the students as well. Miriam, a CDRS staff member, explained to me their enthusiasm for the project, “we [CDRS and Galapagos ICE] have the same goal and vision: to provide help for the Galapagos Islands.” This project exemplifies the form of unity and cooperation that exists within civil society in the archipelago. In a political atmosphere that lends support based off of personal relationships, this form of progress and development has almost become a necessity. It also creates a much brighter picture to contrast the generally morose literature published concerning conservation in the highlands.

The potential for education in the Galapagos is incredible and the impacts that major improvement would have on Galapagos society and ecosystem is undeniable. As Carl Stepath (2009) expressed at the Galapagos Symposium, quality education in the Galapagos will address “(1)increasing natural process understanding to promote more conservation based lifestyles, (2) conservation understanding, participation, and collaboration to strengthen social organizations and encourage integration and participation in regional conservation programs, and (3) environmental education in the formal education system to change awareness, attitudes, and beneficial actions to promote sustainability...”³³ The younger generations of Galapagueños control the future of the

³³ Stepath, Carl M. (2009) “Environmental Education in Galapagos: Where do we go from here?” In Wolff, M and Gardener, M. (Eds.) (2009) *Proceedings of the Galapagos Science Symposium 2009*, Galapagos Islands, 20-24 July 2009.

islands and unless they develop an environmental and social ethic that is connected to the archipelago's ecosystems, effective conservation and sustainable economic development will continue to elude the Galapagos Islands.

VI. Conclusion

The economic model of development that has dominated the Galapagos Islands over the past 20 years has clearly pushed the archipelago towards its carrying capacity. Population growth and invasive species continue to threaten the delicate ecosystems, potentially destroying the uniqueness and endemism that occurs in such staggering numbers. Though it was once considered a sustainable alternative for economic growth, ecotourism has become the source of the problem for the Galapagos Islands. The ever-increasing demand for exotic, pristine, nature-based tourist destinations has placed an incredible demand on the Galapagos ecosystems, economy, and government. It has become widely-accepted that further uninhibited growth in ecotourism threatens the future of both the archipelago's ecosystems and economy, but effective management has become increasingly difficult to achieve.

Non-governmental actors, however, have become more and more influential as the awareness of the Galapagos Islands has increased and global support for sustainable development has grown. Based on my observations, civil society has become increasingly active within the local communities and is supporting a more sustainable vision for the archipelago. The agricultural zones of the highlands, specifically, have significant opportunities for NGO's and local entrepreneurs to make immediate and significant impacts on the grassroots conservation movement. The tourist, agricultural, and education sectors of the highland communities of Santa Cruz have begun to turn to civil society rather than the government to make improvements. For example, the provincial government of Santa Cruz funded the paving of a two-mile trail to Tortuga Bay, a popular beach for visitors. The majority of roads in the highland communities, however, remain unpaved. It is this preference for the dominant tourism industry that has local populations discouraged, thus increasing the accessibility for civil society actors.

Conservation will not endure in the Galapagos, however, until the local populations are fully supportive of a sustainable future. It is the decisions of the current residents that will have the greatest impact on the future of the archipelago. Currently, there is significant support for

environmental legislation, but there is still a dominant opposition to restrictions on the annual number of tourists allowed in.³⁴ Until the majority of Galapagueños recognize that their livelihoods are dependent upon the integrity of the island ecosystems and that further growth in the tourism industry threatens that integrity, it will be difficult for any lasting conservation to be achieved.

³⁴ Barber, Hugo, and Pablo Ospina. 2008. Public acceptance of environmental restrictions. In *Galapagos Report 2007-2008*. Charles Darwin Foundation. Puerto Ayora, Galapagos, Ecuador.