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EXECUTIVE SUMMARY

Shade-coffee in Achote: Investigating links between biodiversity, agriculture and tourism

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Introduction

In order to meet increasing demand, conventional agriculture has shifted towards input-heavy production through the use of agrochemicals. Furthermore, the outward expansion of the agricultural frontier into forested areas threatens many species. Agroforestry is a type of alternative agriculture that can reduce the pressure placed on these ecosystems, by preserving trees and planting crops beneath them. Shade-coffee production is a common form of agroforestry, that is associated with many environmental benefits including its potential to conserve biodiversity, especially avian diversity, through the provision of habitat and other ecosystem services. There are economic benefits associated with shade-grown coffee, including the potential for supplementing income through agrotourism.

Objectives

The goal of our study was to investigate the potential of linking the methods of farming shade-grown coffee with biodiversity and tourism in the community of Achote. We were interested in discovering if the relationship between these three ideas might permit them to act as a self-perpetuating beneficiary system, acting towards the social and economic development of the town. Our hypothesis is that tourism can indeed offer an income supplement to these organic coffee producers, which would bring stability to the system allowing the continuation of these practices. This system would ultimately be one in which the practice of sustainable agriculture would promote conservation, which would encourage an increase in the volume of agrotourism, the investments of which would be a cataclysm for the cycles continuation. It was not intended for the study to be a statistical analysis, but rather an opportunity to better understand the challenge that oppose the practice of organic agriculture in the first place.

To offer a more tangible source of aid to the community, we offered the residents three products which we hope will support the current efforts to augment the level of tourism in Achote:

1. A pamphlet to compliment the Ruta de Café by introducing various plant and animal species which are resident to the area surrounding area. The guide also provides a brief description of local coffee production.
2. A biographical exposition of various local coffee farmers, as a means of introducing to both the residents of Achote and its visitors some organic farmers in the area.
3. A number of recommendations which are intended to support the betterment of tourist infrastructure that is already present in the town.

Methodology

Throughout the 4 months of our work, from January to April of 2012, we reviewed a number of academic articles, and discussed in formal interviews the various obstacles that present themselves to coffee farmers in Achote.

Employing convenient sampling and open questions, we interviewed 11 local coffee producers regarding the agricultural methods they employ as well as the current challenges that arise from these. We asked the farmers to share with us their own personal understanding of biodiversity conservation and tourism, and later returned to these same farmers in order to eliminate all possible miscommunications between us.

Additionally, we supplemented our time in Achiote by a critical literature review of the current relationship between biodiversity and agrotourism.

Results

6 principle findings arose from our investigation of academic literature and the 11 interviews in Achiote:

1. Various studies suggest that there are many environmental benefits associated with the cultivation of shade-grown crops due to the role played by natural forest environments.
2. Due to the importance of land use in Central America, these environmental benefits have to potential to exist on an incredibly large-scale.
3. Farmers in Achiote think very positively of the idea of conservation of biodiversity and the environment. They describe conservation using words such as: *to care for*, *to coexist with*, and *to work with* the forest.
4. In theory there are many economic benefits of this type of organic agriculture. For example, organic certification can diversity revenues through agrotourism, as well as through the augmentation of prices received for certified produce.
5. The lack of organic certification in addition to the sales of coffee to intermediaries limits the prices farmers can receive for their organic produce.
6. Farmers in Achiote believe that tourists bring many benefits to the community through both the economic and social exchange. Generally, they desire higher levels of tourism.

Conclusions

Achiote has the potential to successfully enter the agrotourism industry. However, in order for this success a number of structural changes within the community are required. Some of these include:

1. Improvements in the infrastructure in the tourist trails, and constantly maintain the Casa Museo.
2. Increase the level of communication within the community. It would greatly benefit the community to identify a number of goals for the development of the town together, agree upon the most appropriate approach to these, and elect an individual responsible for ensuring continuous forward movement towards these goals.
3. Market Achiote as an attractive tourist location. More communication between the residents of the community and tourists would help the population prepare themselves better for the arrival of visitors.
4. Augment the level of spanish spoken in the town as a means to be able to better serve tourists who do not speak english.
5. Continue the investigation of the links which we have started, specifically in a scientific manner to complement the social study we have begun.

RESUMEN EJECUTIVO

Café de Sombra en Achiote: Una investigación de las enlaces entre la biodiversidad, la agricultura y el turismo

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Institución: CEASPA (Centro de Educacion y Acción Social Panameño)

Introducción

Para cumplir la demanda creciente, la agricultura convencional se ha cambiado a la producción de muchas entradas por el uso de agroquímicos. Además, la expansión de la frontera agrícola a las áreas forestales amenaza a muchas especies naturales. Por la preservación de los árboles por la cultivación de sombra, la agricultura forestal es una de las alternativas agrícolas que puede reducir la presión en los ecosistemas. La producción del café de sombra es un tipo de la agricultura forestal común que es asociada con muchos beneficios medioambientales. Estos incluyen la potencial de conservar a la biodiversidad, específicamente a la diversidad de las aves, por la provisión del hábitat natural y otros servicios de la ecosistema. Hay muchos beneficios económicos que son asociadas con la cosecha del café de sombra, incluyendo la potencial de suplementar los ingresos por el agroturismo.

Objetivos

El propósito del estudio fue investigar la posibilidad de enlazar los métodos del café de sombra, la biodiversidad, y el turismo en Achiote. Buscamos una relación entre estos tres conceptos que se puede transformar a un sistema de beneficios que perpetuarse, para el desarrollo del pueblo. Nuestra hipótesis es que el turismo puede dar un ingreso suplementale a los productores de café, que sirve como estabilizador necesario para alentar la continuación de sus prácticas orgánicas agrícolas. Sería un sistema en cuál la agricultura sostenible promueve la conservación, que a su vez alienta el agroturismo, lo que perpetúa el ciclo de continuar. El estudio no es un análisis estadístico, pero una oportunidad de entender mejor las dificultades que se presenten a los productores orgánicos.

Para ayudar el pueblo de una manera más tangible, producimos tres productos para apoyar los esfuerzos de crecer el nivel del turismo en Achiote:

1. Una guía para la Ruta del Café, que introduce unas especies locales y la producción del café en Achiote.
2. Una exposición de biografías de algunos productores del café en la comunidad, para que la población y sus visitantes pueden conocerlos mejor.
3. Algunas recomendaciones para mejorar la infraestructura turística que ya existe en la comunidad.

Metodología

Durante unos 4 meses, desde enero hasta abril en 2012, realizamos una revisión de la literatura y algunas entrevistas para descubrir los desafíos de la producción orgánica que se presentan a los productores de café en Achiote.

Por muestreos convenientes y usando preguntas abiertas, entrevistamos a 11 productores de café, de sus métodos agrícolas y los retos que se presenten por estos. Discutimos sus pensamientos sobre la conservación de la biodiversidad, y del turismo para entender mejor la potencial de enlazar estos tres conceptos. De igual forma, volvemos para verificar que entendimos bien las entrevistas para evitar todas faltas de comunicación.

Caminamos La Ruta del Café con Felipe Martínez, quien conoce bien las especies vegetales y animales local para construir la guía, y hablamos con algunos productores de café en Achiote de sus historias para crear la exposición biográfica.

Igualmente, suplementamos nuestro conocimiento de la relación entre la biodiversidad y el agroturismo por una investigación de la literatura académica al sujeto agroforestal.

Resultados

Por la revisión de la literatura científica, y las entrevistas con algunos productores de café de sombra, descubrimos 6 hechos principales:

1. Varios estudios sugieren que hay beneficios ambientales asociada con el café de sombra por su identidad de agroforestal.
2. La cosecha del café es un uso importante de tierra en Centroamérica. Por eso, una producción de café que utiliza métodos sostenibles podría tener beneficios ambientales de una gran escala.
3. Los productores agrícolas de Achiote tiene una idea muy positiva de la conservación de la biodiversidad y del medioambiente. Piensan en la conservación como: “cuidar”, “convivir”, y “trabajar con” el bosque.
4. En teoría, existen algunos beneficios económicos de la cultivación de café de sombra orgánica. Por ejemplo, la posibilidad de aumentar sus ingresos agrícolas con la certificación orgánica o la diversificación de ingreso en la forma del agroturismo.
5. La falta de certificación orgánica y la venta del café a los intermediarios limitan los precios del café que pueden recibir los productores.
6. Los productores agrícolas en Achiote creen que los turistas benefician mucho a la comunidad de una manera económico y por el intercambio social. Ellos desean los niveles del turismo más altas.

Conclusiones

Achiote es un sujeto potencial para una iniciativa de agroturismo; pero, para realizar esta industria, se necesita algunos cambios estructurales en la comunidad. Incluido son:

1. Mejorar la infraestructura en los senderos, e mantener la Casa Museo con frecuencia.
2. Aumentar el nivel de comunicación al nivel local. Sería una gran beneficia para la comunidad de elegir juntos algunos objetivos suyos, discutir el método de realizarlos y quien tomará responsabilidad de asurar el progreso.
3. Anunciar las oportunidades turísticas en Achiote para atraer visitantes. Más comunicación entre la comunidad y los turistas puede ayudar á la gente prepararse mejor para visitantes.
4. Crecer el nivel de inglés hablado en el pueblo, para ofrecer mejor servicios a los turistas quien no hablen inglés.

5. Seguir la investigación sobre los enlaces de que hemos explicado, específicamente de una manera más científica para complementar nuestra investigación del lado social.

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Finally, we cannot go without recognizing the incredible support provided to us from McGill University and the Smithsonian Tropical Research Institute. They have offered us a life-changing opportunity through the research we have been a part of.

ETHICS

Throughout our work in Achiote, we followed the McGill Code of Ethics. Three principles that are fundamental to this ethical guide include: the power relations, equality, and respect practiced in the relationship between the investigator and the subject of investigation. We have done our utmost to circumvent all influence we may have had on the answers of our interviews, to analyse the responses accurately, and to avoid all overgeneralizations of the varying opinions in the community based on the responses of a small sample.

I. HOST INFORMATION

The Panamanian Association of Studies and Social Action (CEASPA) is a non-governmental organization based in Panama City. The organization was founded in 1977 by Xabier Gorostiaga, Raúl A. Leis, and Charlotte Elton. Together, they envisioned a space, which encouraged not only a critical development discourse, but active social movements toward positive, forward-moving change for developing areas. CEASPA has been working in the village of Achiote since 2004. They have initiated various projects within the community, including initiatives to promote ecotourism in the region.

Today, CEASPA aims to support economic equality, democratic participation, and environmental sustainability through ecologically friendly development initiatives in marginalized areas of Central America. Focusing on social, political, economic and cultural development, CEASPA directs its efforts towards the integration of excluded communities into the national identity as a means to alleviate impediments to the equal distribution of the benefits of development. “La Asociación cree y trabaja a favor del desarrollo de todas las personas y de toda la persona humana” (CEASPA). This statement describes how the association believes in and works for the holistic development of every individual. The NGO emphasizes social justice and participatory development projects through a combination of participatory research, cooperative action and popular education. The work of the organization is centered on equality and sustainable development. In the last 30 years, CEASPA has initiated various projects including the introduction of formal education among communities of small-scale farmers, indigenous peoples, and women throughout various countries in Central America. Volunteers have supported the causes of the indigenous *comarcas* across Panama, focusing on teaching communities to identify their own development goals and determining appropriate routes for

actualizing them. Ultimately, CEASPA's purpose is to equip marginalized communities with the means to pursue their own sustainable development directive, to eventually continue without the external instruction of any organization.

II. STUDY SITE

Over a four-month period between January and April 2012 we conducted field research in Achioté (80.02, 9.22), a rural Panamanian village. Achioté is located in the province of Colón, the Costa Abajo. The town is situated in a mountainous landscape that serves as a buffer zone to the nationally protected Parque San Lorenzo, a region is renowned for its incredible avian diversity and has been marked as one of Panama's premier birding destinations. Multiple community development projects have been developed in Achioté, with support from various community groups and NGOs including CEASPA. Important projects include, training groups of residents on how to guide tourists through farms and birding paths, and coordinating with members of the community to arrange homestays for tourists. One of the most successful projects undertaken by the NGO was helping local farmers in a movement towards, sustainable agriculture, using organic practices. To facilitate the tourism industry, Achioté has built several walking trails that extend from the main road, including La Ruta del Café, located behind the Museo del Café, which enables visitors to stroll through a shade-coffee plantation. These trails are aimed primarily towards ecotourists.

III. INTRODUCTION AND BACKGROUND

Trends in Agriculture

Throughout history humans have manipulated their environment in order to extract from it their means of survival. Over time, their systems for food production have intensified in their use of both land and external inputs. Like much of the world, Central America's population is growing and agricultural production in the region is on the rise. Four main agricultural activities dominate land use. These include coffee, sugarcane and banana plantations as well as cattle ranching (Harvey et al. 2005). The rise in demand for tropical products, especially international demand, has shifted agricultural production away from its subsistence roots. In order to increase output, agricultural production has intensified and brought with it an increased use of agrochemical inputs, such as fertilizers and pesticides. The input-heavy systems have increased in importance with the rise in global population and the associated increase in the demand for food. These factors have placed an increased pressure on natural resources worldwide.

As the agricultural frontier expands outward, forested areas and the species that inhabit them have become vulnerable to many threats, including habitat destruction, the spread of invasive species (including GMOs), the pollution of nearby waterways and changes to ecological processes (Harvey et al. 2005). Central America is home to an incredible diversity of wildlife, which makes the risks posed by these threats particularly menacing to biodiversity conservation. In order to balance human food-needs and environmental protection, trade-offs must be overcome and food production made more sustainable. Unfortunately, an array of socio-economic and policy-centered factors further complicates attempts at solution derivation.

Agricultural systems, however, are not all equal; the environmental repercussions of their implementation can vary incredibly.

Agroforestry and Achiote

Agroforestry is an example of a more alternative agricultural system that is more sustainable than many conventional options. The World Agroforestry Center defines this system as,

“a dynamic, ecologically based natural resource management practice, that through the integration of trees and other tall woody plants on farms and the agricultural landscape, diversifies production for increased social, economic, and environmental benefits.”

(ICRAFT 2000)

This production technique is common to Achiote, where agriculture is a key form of income-generation for the community. One of the most popular crops harvested by the residents of Achiote is shade-grown coffee of the variety *Cafea robusta*. Many of their coffee farms are located within the limits of the protected areas. Farmers use these plots under the condition that no trees be felled. Achiote coffee thus grows beneath the cover of the surrounding forest, in an agroforestry system. Worldwide, coffee is in fact, one of the most commonly grown agroforestry crops (Schroth et al., 2004).

Environmental Benefits of Agroforestry

The global market for coffee is one of unprecedented proportions. In fact, demand for the commodity birthed an export industry worth 15.4 billion USD (International Coffee Organization, 2010). Its production employs between 20 and 25 million people worldwide and makes use of over 11 million hectares of land (Somarriba et al. 2004). In Central America its production covers 1 million hectares and supports 300 000 farmers (Vaast et al. 2005). The high level of land use suggests that sustainable coffee production, has the potential for widely felt environmental benefits. This may be especially true for biodiversity conservation, as there is substantial evidence of links between shade-grown coffee and biodiversity levels (Perfecto et. al 1997; Monro et. al 2006).

Although present Central America is home to 669 protected areas covering 124 250 km² (Declerck et al. 2010). In many countries, shade-grown coffee constitutes a large proportion of the forested area (Somarriba et al. 2004), further increasing the potential role of agroforestry in biodiversity conservation. If properly managed, coffee-agroforestry may present an opportunity to preserve biodiversity, through the associated reduction in deforestation, the preservation of habitat and its ability to serve as a buffer zone to protected areas. This potential for promoting biodiversity conservation is made stronger by the regional overlap that often occurs between coffee production and areas of high biodiversity (Somarriba et al. 2004).

Research suggesting links between shade-grown coffee and the protection of avian diversity is particularly abundant (Greenberg et. al 2006, McNeely and Scherr 2003, CEC 1999, Faminow and Rodríguez 2001). In a study of Colombia's coffee-growing region, for example, Botero and Baker found 170 avifaunal species, representing 10% of known bird species in the country (as cited in Somarriba et al. 2004). This number was made up primarily of species that frequent open and second-growth forests, forest generalists and forest-edge species. Migrant

species, including flycatchers, wood warblers, tanagers and orioles commonly make use of shade-coffee plantations (Somarriba et al. 2004). Migrant species are oftentimes more suitable to these created environments than their local counterparts, a characteristic which may stem from the higher adaptability of these species to new habitats (Perfecto et al. 1996). Research suggests that agroforestry may also help mitigate many of the negative environmental effects associated with conventional agriculture. Agroforestry systems can play a key role in providing ecosystem services such as carbon sequestration, watershed protection, soil improvement and increased ecosystem resilience to shocks (Pearce and Mourato, 2004).

Although the use of agroforestry provides benefits, the potential of these systems to provide environmental-protection is limited. For example, agroforestry plots are often not large enough to provide the territory required by many megafauna species. The survival of such species will likely depend on the availability of adjacent forested areas (Somarriba et al. 2004). Agroforestry, is in no way a replacement for maintaining protected areas; instead it is, a complementary strategy that can help with biodiversity conservation and encourage sustainable agriculture.

The Economics of Agroforestry

Environmental benefits are not enough to ensure the success of agroforestry. Producers must be provided with incentives for its uptake. Financial feasibility is key to implementation, and incentives of an economic nature are likely to be the most effective. In fact, the net economic returns provided by agroforestry must be higher than those of all other production options in order for it to be favoured (Pearce and Mourato, 2004). Due to the use of policulture in agroforestry, a possible economic benefit of this kind of farming is that due to the different

cultivation seasons associated with various crops, income generated from agroforestry plots can be spread out over the year, ensuring a more constant source of revenue and making the process more affordable for low-income farmers.

The distribution of the costs associated with organic farming differ from that of conventional agriculture, however, there is no guarantee that organic farming is the most cost-effective method of agricultural production (IFAD, 2003). Although economic benefits may come about through savings associated with lower production costs, by means of the reduced need for agrochemicals (Vaast et al.), lower levels of production risk discounting these savings. Organic agriculture is typically associated with an increase in labour costs, since natural pest management tends to be less effective than conventional methods and greater effort is required to preserve soil nutrients (IFAD, 2003). In theory, these losses should be made up by the higher prices at which organic producers can sell their products. In the long run these savings could manifest themselves into productivity gains for the farmer and benefits that extend beyond the environmental (Scroth et al. 2004). Unfortunately, many coffee producers live off limited financial means and cannot afford to wait for long-run returns on their investments, and therefore they tend to discount the future highly. A system that delivers more immediate returns must be developed in order for agroforestry to be economically sustainable. The economic valuation of ecosystem services is still in the early stages of development, and until the market financially rewards farmers their use of sustainable agriculture, alternative means for financial compensation are required.

The Economics of Agroforestry: Certifications

As the negative socio-economic and environmental impacts of coffee production become better known, demand for alternative products has increased. The certification of coffee-products has become a popular means of catering to niche markets and increasing product-value, although this kind of specialty coffee it only represents 4 percent of coffee exports (Vaast et al. 2005). Many certifications schemes are in existence today, including coffee marketed as organic, fair-trade, shade-grown and bird-friendly. This process can increase returns from sustainable farming, and allow economic benefits to be made available more quickly to the farmer. In theory, abiding by the requirements associated with these certifications should allow farmers to receive a higher price for their products. In practice, whether or not farmers have access to this kind of marketing is less certain. Economies of scale, insecure land tenure, and difficulties meeting both administrative and organizational requirements may result in reduced local and foreign investment in these projects (Davis and Mendez 2011). The high cost of certification can be incredibly restrictive and seriously limit the producer-access to the price benefits that should theoretically be associated with organic farming.

The Economics of Agroforestry: Tourism

Another means of offsetting the economic barriers faced by farmers, is to diversify their income-generation through eco and agro-tourism ventures. Potentially, this kind of supplementary income could ensure the economic longevity of sustainable agricultural practices, by making them more profitable and minimizing vulnerability to price fluctuations associated with the volatility of the coffee market. Panama's potential to introduce and expand these kinds of niche-tourism ventures will likely be made easier by its popularity as a tourist destination and

even more so by its recent selection as The New York Times top place to visit in 2012 (Moon 2012). Our paper will focus primarily on the potential benefits of agrotourism.

Agrotourism attempts to marry agriculture, particularly sustainable agriculture, with tourism by encouraging the spread of tourism into rural areas (Bruch, L. *et al.*, 2005). Through the establishment of this relationship, the enterprise has the capacity to benefit both tourists and farmers across a varying scope, particularly in the realms of economics and education. Ultimately, the objective of agrotourism is to attract financial support for sustainable agricultural systems by allowing these systems to fulfill the consumer's pursuit of environmental education and recreational activities. According to the WTO (World Tourism Organization) agricultural businesses that engage with the tourism industry experience a growth in income by as much as 30% over their previously recorded returns (Martinez, 2011). According to a study in the southern United States, the target audience of agrotourism is quite broad, encompassing younger student groups as well as independent student researchers, volunteers, adult and youth and children's club groups, vacationers, wildlife watchers, photographers and outdoor adventurers (Bruch, L. *et al.*, 2005). However, the members of each of these categories share a communal objective: environmental education. Of the over 53 million farm visitors who participated in this survey 86% claim to travel because they enjoy the rural scenery, 71% because they seek a better understanding of the food production processes, 64% desire to participate in farm activities, and another 43% seek the opportunity to pick or purchase their own produce (Bruch, L. *et al.*, 2005). Agrotourists often travel in hopes of gaining a deeper understanding the food industry, its operators, and the factors affecting its development. The diversity of sustainable farming practices worldwide provides farmers with a unique opportunity to market themselves based on their particular production methods. If properly managed, it is likely that this diversity can be

taken advantage of to provide sustainable farmers with a supplementary source of income. A second study, also in the southern United States, supports the increasing belief that farm incomes can be substantially supplemented by tourist expenditures (Jensen, K. *et al.*, 2006). This study indicates that over 50% of visitors to rural areas travel for educational purposes, either as a part of elementary school activities or college-level independent student research, while tour groups compose a mere 15% of visitors.

Although these studies did not take place in Panama, they likely provide insight into the types of people most interested in agrotourism and towards whom these opportunities should be marketed. This is important as marketing strategies are often pose challenges to agrotourism operators. Jensen's study suggests that among the most effective forms of marketing are word-of-mouth referrals and business websites (Jensen, K. *et al.*, 2006). Unfortunately, operators often experience difficulties identifying target markets and promoting the enterprise itself (Bruch, L. *et al.*, 2005). These issues require local attention and may also benefit external support. Many of these issues have been addressed in the past by supporting organizations such as CEASPA; however, problems of this nature continue to persist within Achiote. Effectively communicating with visitors is another common difficulty that faces agrotourism operators (Jensen, K. *et al.*, 2006). This issue is particularly present in Achiote, where a limited level of English in the community makes it particularly difficult to communicate with non-hispanophone visitors. Although Achiote's farmers possess a profound knowledge of local agricultural processes, they are incapable of exchanging this information with anyone who does not speak sufficient Spanish. These sorts of challenges may limit the ability of farmers to gain from the potential for income diversification provided by agrotourism.

III. OBJECTIVES AND HYPOTHESIS

Hypothesis

We hypothesize that agrotourism can provide Achiote's shade-grown coffee farmers with a complimentary income, that will provide long-term financial returns and the stability to encourage the continued use of these agricultural practices.

Objectives

The main objective of our investigation is to explore the connection between agriculture, biodiversity and tourism in Achiote. Beyond this we would also like to provide the town with tangible products to benefit the community's future efforts to foster tourism.

i) Research project

Over a four month period between January and April 2012, conduct research in order to test the validity of our hypothesis. Do this research through both a literature review and through interviews with local coffee farmers. Beyond examining the links, connect the three themes previously mentioned and collect information to better understand the challenges facing organic coffee farmers in Achiote, in case these challenges have an influence on the applicability of our hypothesized solution. Issues to look into include,, the current agricultural practices in Achiote, the economic feasibility sustainable agriculture, the economic and environmental benefits of these techniques, and the potential to use these to draw tourists.

ii) Guide for the Ruta del Café

Create a guide to complement the "Ruta del Café" by outlining the flora and fauna tourists are likely to encounter on the trail as well as share the history of coffee production in Achiote and the benefits of shade-grown coffee. This guide will be available in English and Spanish, in order to cater to national and international tourists.

Eventually this guide can be updated to coordinate with the signs that will be put in place identifying important plant species along the trail.

iii) Museum Exhibit: farmer biographies

Increase the resources available to tourists in Achiote by updating the Casa Museo. Do this by creating a new exhibit that uses biographies, which outline the histories of various coffee producers in the village. Collect biographical data through interviews with coffee farmers and take portraits to complement the stories. Arrange this information on boards to display in the museum.

iv) Recommendations to help foster tourism

After a few visits to the village, it soon became clear that although Achiote has potential as tourist destination, it faces some serious challenges that have yet to adequately secure it a substantial tourist base. The limited success seen by many of the tourism-development projects previously implemented in the village, prompted us to expand our research to include an investigation of the potential challenges to the promotion and sustainability of tourism in Achiote. This fostered the creation of a fourth product: recommendation of specific solutions or techniques to more efficiently overcome some of the challenges that face the promotion of agro and ecotourism in the community.

V. METHODOLOGY

Interviews

Thus far, there has been very little investigation of these links within Achiote. As a result, the goal of our research was to do a preliminary analysis of these links as a first step to better understanding them. We conducted open interviews coffee producers from Achiote in order to

collect qualitative data on their agricultural methods, the economics of their agricultural production as well as on their opinions relating to the value of conservation and tourism in the community. Due to communication challenges within the community we elected to sample by convenience, since collecting results of statistical accuracy was not the goal of our research. The sample of farmers we interviewed is composed of those with which our supervisors from CEASPA were associated. It was largely determined by what farmers were available during our visit and who our supervisors were able to find for us to talk to. We understand that this may create a bias in who we interview, but due to the preliminary nature of our research we do not feel that this compromises and value of our results.

We decided that the most appropriate way to collect our data was through open conversations with the farmers. Rather than conducting a widespread survey or short interviews where the subjects' responses were limited by time or a given range of answers, we invested extensive amounts of time with fewer farmers discussing open-ended questions. We created 17 base questions (see appendix A) to guide our interviews, but the conversations often steered away from these depending on what the interviewees felt was most important to discuss. The flexibility and willingness to change the direction of the interviews ultimately allowed us to leave each conversation with a more holistic understanding of each farmer than we would have otherwise gained. Understanding what aspects of the themes: conservation, agriculture, and tourism, the farmers most wanted to discuss allowed us to better understand the challenges they face with and the issues they find most important. It is hoped that this deeper understanding will allow us to create a report that is as tailored as possible to the needs of the community.

During our first round of interviews we interviewed 9 farmers using 17 base questions (see appendix A). During the second round of interviews we spoke with 2 more coffee farmers

with 12 revised base questions. After completing the first nine interviews we realized that there were some additional ideas that we had previously overlooked; since we felt these were worth exploring we revised and refocused our original interview questions for the next round of discussion. This makes a total of 11 interviews with coffee farmers in Achiote.

Verifying our results

We revisited each interviewee with the records we collected from our interviews to make sure that we had accurately understood what they were trying to convey. We allowed them to make any changes they saw fit. We felt this was important to do since we did not have a recording device during the interviews and because of potential language barriers stemming from limits to our understanding of Spanish and Achiote's local vernacular. On the second visit, we also asked the farmers if they would be interested in participating in the new exhibit we were planning for the museum. If so we provided them with a list of biographical questions that we picked up on our next visit. In the end we collected 10 biographies.

Literature Review

To supplement our field research, we reviewed academic literature relating to biodiversity conservation, shade-grown coffee production and agrotourism. The results of much of this research can be seen in Section *III. Introduction*. We also reviewed literature provided to us by CEASPA, which provided us with substantial history of the initiatives that had been previously implemented in Achiote. This allowed us to gain a better understanding of previous approaches to biodiversity preservation that had been in the area.

Limitations

During our field research we encountered several logistical challenges. Due to the complicated nature of communication in the community (limited cell phone service and the

frequent unreliability of word of mouth), it was often difficult to track down the individuals we were meant to be interviewing. Additionally, most of the residents we interviewed worked the same hours or longer hours than we did, which made it difficult to catch them. Also, many of these coffee producers cultivate land both within and outside to the community and would often be away from the village on days when we had planned to speak with them. As a result, we lost many hours trying to track down the farmers we had originally interviewed, when we returned to verify their responses and request their participation in the biography project.

Additionally, our main mode of transportation in Achiote were bicycles from the Centro de Túcán. However, as a result of poor maintenance by the end of our second visit they were no longer fit for use; our later visits were made completely on foot which required many hours walking long distances to the homes of the farmers, without knowing beforehand whether or not they would be home. These obstacles considerably inhibited the number of coffee producers we were able to interview within the four month period.

VI. RESULTS

Number of Research Days: 34

Number of Field Days: 10

Due to the qualitative and open-ended nature of the data we collected, it is not possible for it to be represented in graphical form. For this reason we have divided our findings into four sections (*agricultural techniques, economics of shade-grown coffee, conservation and tourism*) in order to better explain how our results link to our research themes.

Agricultural Techniques

100% of the coffee farmers we interviewed in Achiote grow various other crops in addition to coffee, the income from which they support their families to varying degrees depending on the seasons and cycles of cultivation. None of the interviewees rely solely on the income from their coffee crop as means of financial provision. In general we found that economic stability is established through the additional harvesting of a combination of other crops, including: plátano, guineo, yuca, ñame, maíz, cacao and some fruits. In some cases, the farmers also hold work in the city of Colón to supplement their revenues from the harvest.

The use of policulture is widespread throughout the community; this provides the backdrop for the common practice of shade-grown coffee. 100% of the farmers we spoke to reported the use of policulture. Generally farmers in Achiote use the differences in the canopy heights of their crop varieties to maximize the shade provided by taller species. For example, the Café Robusto plants are frequently planted in the shade of other fruit trees in the forest, with even smaller root crops (such as yuca and ñame) in the shade of these. Policulture benefits the farmers by allowing them to species which generally prefer a shaded environment.

A consistent trend suggests that the majority of agricultural techniques employed by the farmers in Achiote are traditional. Generally, the process begins with cleaning the plot, which translates as clearing away all of the smaller plant-life in the designated area. However, it is important to distinguish *cleaning* the plots from *deforestation* since larger tree species are left standing for the variety of benefits they offer the finca. In some cases new crops are sown from seeds; however, planting small seedlings or transplanting young plants from outside of the finca is the more common practice in Achiote. In their early years, most of these are supported by small stakes and deflowered regularly to promote healthy growth before the plant starts

producing for harvest. In its third year the tree is permitted to flower and begin producing coffee, although it will be a few more years before the crop's coffee production normalizes.

Economics of shade-grown coffee

Approximately 50% of the farmers feel that the economic compensation for their work on the farm is fair. There is less of a consensus, however, regarding their feelings towards the land division among residents in Achiote. Approximately 50% of the interviewees are content with the current division of land, whereas others have expressed concern over the fact that some residents have significantly more land to farm than others, or that they must farm in the protected area due to a lack of land in the community. Generally, the farmers own approximately 1-6 hectares of farmland, and despite the consternation on the part of some individuals each claims to possess an appropriate amount of land for their farming capabilities. When asked if they would be interested in increasing the amount of farmland in their possession, 100% of respondents admitted that according to their current resources they are not currently looking to farm more land than what they already possess.

Once crops have reached the mature stage where their production is harvested, the coffee is sold to an intermediary dried, peeled, or green depending on the amount of time the farmer devotes to the process before selling. Whether initially sold to an intermediary within the community or external to it, ultimately 100% of the coffee produced in Achiote is branded by Panamá's popular label Durán, where it is mixed with varieties from all across the country. The majority of coffee crops in Achiote are purely organic, raised without the use of synthetic or

chemical pesticides or fertilizers; however, as a result of the relatively small volume produced here there is currently little opportunity for coffee producers in Achiote to demand higher prices.

Biodiversity Conservation

The farmers shared a very positive outlook on both the necessity of biodiversity and the idea of conserving it. The general sentiment amongst the interviewees is that biodiversity is of great value for what it provides the residents, for its part in the natural processes of agriculture, as well as for its inherent beauty. Most farmers mentioned the incalculable value of the shade provided by the forest, as well as the fresh and clean air it produces. One of the farmers interviewed expressed that “El bosque es los pulmones de la gente; sin el bosque, no sería aire fresco o limpio, ni agua, ni especies, ni bastante sombra.” Some suggested the forest’s significant role in the preservation of their crops due to the ecosystem’s process of recycling nutrients, the fact that it guards the soil from erosion and desertification due to sun-exposure, and its hand in the preservation of water reserves. Generally, even those individuals who were unable to offer a scientific explanation for the importance of the forested areas in Achiote recognized its contribution to the livelihood of the community. Similarly, the farmers described conservation using words such as: *cuidar* (to look after for), *contribuir* (to contribute to), *trabajar con* (to work with), *ayudar* (to help), and *convivir* (to live harmoniously with). Most indicated that they believe conservation to be an act of coordination between the natural cycles and species existing in the forest and the farmer’s agricultural practices. Rather than understanding the term as the practice of segregating the residents from the forested areas surrounding the community, it has harboured a sense of respect for and dependence upon the earth’s natural processes for their

wellbeing. Furthermore, 100% of respondents insisted that by planting and tending plants within the local forests, they are in fact encouraging the ecosystem health and diversity.

Tourism

We did not encounter anyone in the community who was opposed to tourism in Achiote; 100% of respondents insisted that there are 0 disadvantages to the presence of tourists in the town. 1 of the the 11 farmers suggested that tourism really has no effect on her life, and all others strongly noted that past experiences with tourists have been extremely pleasant and that the community as a whole could benefit from more. All of the respondents spoke of the beauty of the town's location as a tourist draw, as it is set against the backdrop of a protected region unmarred by substantial industrial development. Additionally, 9 of the 11 farmers individually mentioned that tourists are drawn to the community by its coffee farms; however, the current agenda for visitors includes a tour of the birding trails and only the one small Sendero del Café. Although coffee is cultivated on this trail, community members believe tourists both desire and would benefit from touring a more extensive cultivation plot.

Apart from the obvious economic ways in which tourists benefit the community, the interviewees recognized the potential for cultural exchange that presents itself in the tourism. Whether visitors are Panamanian strangers or extranjeros to the country itself, the community displays a great deal of enthusiasm for the opportunities to share experiences and knowledge. There is widespread acknowledgement of the opportunity that tourism brings even the children of the village through this cultural exchange. As a whole, tourism is seen in a very positive light within the community; the general response indicating that the more tourism the better.

VII. DISCUSSION

As previously discussed in section III, strong connections exist between agriculture, biodiversity and tourism. With its shade-grown coffee farms and burgeoning bird-watching industry, potential links between biodiversity conservation and agroforestry are particularly pertinent to Achiote. If these two activities can be made to work together, this could help create reliable, long-term forms of income-generation. To help illustrate this point, imagine an agricultural system. The techniques used within this system, contribute the level of biodiversity that lives within it and this in turn determines whether or not eco-tourists will consider the region a desirable place to visit. The following diagram (Fig 1) helps to illustrate this relationship.

Figure 1.



Throughout our paper we have been examining the links between these features to understand if they can be taken advantage of to promote biodiversity conservation and the use of sustainable agricultural practices through the promotion niche tourism, namely eco or agro-tourism. The following diagram exhibits this relationship (Fig 2).

Figure 2.



Businesses often take advantage of links between agriculture and tourism, as was seen in the previous examples given of studies by Bruch and Ziehl (2005) and Jensen and Lindborg (2006). With respect to our investigation, important questions remain: Is Achiote a suitable candidate for agrotourism? Can agrotourism be practically implemented to help foster both sustainable agriculture and biodiversity conservation in the village? We address these questions in the upcoming section. Here, we will examine the results of our research in order to determine whether this kind of venture could be successfully developed in Achiote. Based on our results, we will first, we will first determine whether or not Achiote's farmers would benefit from a supplement to their current levels of farming income, and whether this income-boost could come from agrotourism. Next, we will investigate how the farmers feel about conservation and finally, their thoughts on expanding tourism in the village.

Economic Challenges Facing Coffee-farmers in Achiote: Acquiring Certification

The coffee farmers we interviewed in Achiote complained of two main economic challenges related to their practice of organic farming, both are the result of structural issues that limit the financial gains the farmers can receive from their farming activities. There are two faces to this issue; the first involves the challenges of acquiring organic certification in Panama, and the second is that selling an organic product at a fair price can a significant challenge if the consumer fails to recognize its value, or if the producer is forced to sell it to an intermediary.

The first, which we have labeled *the organic issue*, relates to the inaccessibility of organic certification. Although in theory it should be possible to sell organic products at higher price, without certification, farmers cannot demand such prices. Global demand for organic products outweighs supply (Sylvander, B., Le Floc'h-Wadel 2000), meaning there remains an untapped market for these products. Achiote underwent an incredibly successful *agropecuario* program with the help of CEASPA in 2003, which helped eradicate the use of synthetic or chemical pesticides and fertilizers on coffee farms in Achiote. Although, Achiote produces organic, shade-grown coffee, the products are not recognized as such, and can therefore not be used to fill excess demand. In sum, limits to the economic benefits seen by Achiote's farmers have arisen from a non-recognition of their organic practices, rather than from a lack of demand.

The absence of liquid capital for financing certification and the lack of structures through which accreditation can be accessed in Panamá makes acquiring organic certification incredibly difficult. Achiote's most common form of livelihood is subsistence farming, meaning most local families are supported with revenue from seasonal harvesting. Acquiring organic labelling is expensive, and the practice of saving excess funds is not an option for most small-scale agronomists (IFAD, 2003). These farmers simply cannot spare the financial resources to purchase organic certification, nor do they possess sufficient collateral to seek loans to achieve

such an end. Therefore, the high cost of acquiring organic certification for agricultural products leaves certification out of reach for Achiote's farmers. Consequently, despite the fact that these farmers are employing the same organic agricultural techniques as those who are certified by BioLatina, Ecocert or the Fundación Orgánico de Panamá, without this official recognition they will continue to withstand the production loss common to organic practices without the income supplement of increased prices. Furthermore, these producers are excluded from the social networking and advertisement inherent in this type of recognition.

A second structural challenge may also be preventing Achiote from acquiring the organic label. Coffee producers in the province of Chiriquí claim that there is considerable mismanagement within certification institutions in Panamá, which has led to poor levels of consistency in access to the organic labelling and the benefits that follow (Fínca Hartmann, 2012). Thus far, there is little academic research supporting this claim; nevertheless, there is a real possibility that a lack of stability in these institutions is a contributing factor to the inaccessibility of certification to Achiote's farmers. Difficulty acquiring certification, due to high prices and limited capacity for certification, reduce the the potential benefits seen by coffee farmers in Achiote, suggesting that they could benefit from diversifying their livelihood, supporting the potential for agrotourism initiatives in the community.

Economic Challenges Faced by Coffee-farmers in Achiote: Selling to intermediaries

The second main issue described to us by the coffee farmers we interviewed is the challenge of acquiring a fair price for their product by selling to intermediaries. Coffee producers in Achiote do not sell directly to consumers but rather to an intermediary. Ultimately, the coffee produced here joins the blend of other coffee varieties from farms across Panamá that fall under

the Durán label. In addition, agricultural production in Achiote happens on a small scale. Since each farmer produces and sells independently of the others, any level of price-control could potentially be contained in the power of numbers is lost for these finca owners. Furthermore, sales calls from the intermediaries are always unannounced, meaning farmers do not have time to search for the best price at which they can sell their product. Similarly, Achiote's farmers do not have enough disposable income to hold back their product to wait for a better price. Independently, the farmers sell a relatively inconsequential sum of coffee, and unfortunately, at its current level, tourism in the area is too low to provide a large enough consumer base for coffee products. This combination of limited power and the high levels of uncertainty with regards to sales opportunities has led farmers to sell their product to the first inquirer, at whatever the asking price, however low.

The ability of Achiote's farmers to market their products is further limited by the lack of local-level networks between producers and consumers. Such networks are often especially resilient compared to other systems that fail to cultivate a relationship of mutual respect between the two parties (Marsden, T., et al. 2000). Through a better understanding of the agricultural and market systems, local networking promotes social responsibility. The communication issue is made worse by failures to successfully encourage local tourism. This has denied coffee producers in Achiote the opportunity to form networking links with tourists and consequently prevents them from selling their product directly to these consumers. Systematic problems that emerge as a result of this pricing issue might benefit from the networking potential provided by agrotourism. This kind of income diversification would not only provide a new source of revenue for the farmers, it would also provide them with direct contact to potential consumers,

who would theoretically be willing to pay higher prices for coffee products, than the intermediaries to which these farmers normally sell.

Farmer opinions on conservation and tourism

Looking over the results from our interviews with coffee farmers in Achiote, some trends emerged that lend themselves positively to the potential for developing agrotourism in the village. This is not to say that the required structures for such an industry are presently in place or that an investment into such a venture should be undertaken just yet. It is just to say that support for this kind of a venture exists amongst the interviewees. Many farmers spoke about the importance of conservation, a desire to share their local knowledge and the hope that more tourists will come to Achiote. This positive outlook suggests that at least amongst the farmers we interviewed, there were no responses that would lead us to completely discount the agrotourism's potential in the community.

Achiote and agrotourism

In response to the questions posed at the beginning of this section. We have found that due to several economic challenges, namely difficulty acquiring organic certification and adequate pricing, many farmers would benefit from diversifying the methods by which they generate their income, suggesting that there could be a role for agrotourism within Achiote. This possibility is also supported by the positive responses given by the farmers about their views regarding conservation and tourism. If agrotourism were to be successfully implemented in Achiote, this could potentially provide the long term financial returns, necessary to ensure the continued use of sustainable agriculture. By preserving their sustainable techniques, farmers

would not only be conserving the environment, but preserving two potential draws for tourists to the community: biodiversity (which could feed ecotourism) and sustainable agriculture (which could feed agrotourism). Although many of these findings support the potential for agrotourism in Achiote, there are currently many challenges to its implementation. These challenges and many potential solutions will be discussed in the following section.

VIII. RECOMMENDATIONS

According to our preliminary analysis of the links existing between sustainable agricultural production, biodiversity conservation and ecotourism, Achiote is definitely a worthy subject with clear potential for success in the implementation of this self-perpetuating cycle. However, without some well-directed changes to the current structures already existing in the community, any future benefits of this kind of integrated system are certainly limited.

It is clear from our own experiences connecting with the residents throughout our study that major improvements to the communication system in the village are pertinent. Currently, communication in Achiote lacks the ease that may be encountered in other parts of the country; limited cell phone service and a lack of private internet access seriously limit both national and international networking. The community's ability to self-promote is inhibited, and because the residents are unaware of tourists' plans to visit they are therefore unprepared to offer their product when they do finally receive guests. These issues also inhibit the community's ability to cultivate tourism.

An increase in the access of internet would generate a more dependable connection between the village and those outside of it, but it would also offer marketing opportunities which are at present clearly lacking in Achiote. It would allow for communication with tourist groups

or individuals who are planning trips to the area, and would also offer parties interested in learning about tourist activities a direct way to inquire about such opportunities. A website advertising what the community has to offer visitors could be easily monitored and maintained, and other online marketing opportunities would also be made available. Advertising Achiote as an ecotourist destination is currently greatly lacking, and effectively utilizing the internet as a marketing tool would open the door to presenting the community as the unique eco and agrotourism destination. Improving the residents' access to internet does not need to take the form of private home access, which would be costly and may not be deemed necessary by the residents, but rather further public availability in designated areas outside of the school would go a long way. For example, El Centro Túcán is meant to be a resource center for the village and would therefore be an appropriate second location to integrate internet access.

Other necessary improvements to the communication system in Achiote which should not be undervalued include the serious introduction of the English language to the education system. Although we strongly support the concept of travellers learning at least a basic level of communication in the dominant language of their travel destinations, the reality is that a considerably large portion of tourists do not. As a result, if residents of the community consider communication with tourists of value, notable steps must be taken towards the acquisition of a second language among members of the village who are anticipating any level of involvement in future local tourism. Since a large portion of tourism in Panama originates from North America, we consider English to be the most appropriate starting point.

A third aspect of communication in need of advancement is in regards to better conversation between the residents themselves. In the form of finance and guidance of development the community has received external support from CEASPA for almost a decade.

Yet, reports that were offered us by members of both the NGO and the community itself claim that long-lasting changes have been few. Despite the number of participatory initiatives supported by CEASPA, the prearranged withdrawal of external support has in many cases led to either a paralysis or collapse of the initiatives. We have witnessed a very clear need for the community to discuss and set clear goals as a united group. It is vital that together the residents firmly decide on a direction of community development; what the changes are that they desire, the most appropriate approach to success, as well as who will take responsibility for ensuring progress in meeting these objectives. This could take the form of a formal communal business plan regarding the three themes that we have identified (sustainable agriculture, conservation and tourism), or a more casual agreement; however, importance of a clearly organized plan must be recognized.

Following these necessary improvements to the different types of communication taking place in Achote, we also recognize the need for increased preparation for the reception of guests; of course not all visits are planned, but when they arrive it is important that visitors feel like they have been anticipated since this fosters a sense of welcome. Refining and maintaining some of the structural faults in the community to a level that is visitor-ready will help to send the message that Achote is ready and waiting for tourism. Some of these repairs will include: repairing the dilapidated bridge on the Sendero del Café, and formulating a schedule for the upkeep of the Casa Museo to keep it free of insect infestation. Structural upkeep is not the only way residents can better prepare themselves to receive guests. Individuals who have been trained as guides to the fincas and the bird trails should also be prepared to make themselves available to accompany visitors through the village, and especially to share their knowledge of these particular attractions.

An important characteristic to note about preparedness is that it is not attainable simply by standing at the ready for tourists. It is strategic for community members who are interested in interacting with tourists to evaluate together their strengths and weakness so that the role each plays in receiving the visitors compliments their strengths, and supports the weaknesses of other members. Some individuals are strong communicators, personable and able to make strangers feel comfortable in a foreign space; others are familiar with the earth's natural processes and how they interact with local agricultural; still others have a wealth of knowledge to share about resident wildlife. The more each member of the community can find the role most suited to their strengths, the higher the quality of the experience will be for tourists. Similarly, since word of mouth is such an important feature of marketing to tourists, the better reputation about the reception of guests, the more encouraged travellers will be to pay a visit.

In terms of more effectively benefiting from their economic opportunities, we propose that the community consider ways in which they can unite their economic endeavors. For one, a common coffee market could help Achote farmers to capitalize on the power of numbers, and perhaps offer them greater opportunity to influence the price at which they can sell their coffee. Particularly since coffee production in Achote is not only organic but biodiversity friendly, and considering the demand for such produce, we believe that even if the price difference is at first only small, united the farmers have more market power than divided.

Finally, as a result of the social nature of our educational backgrounds, our own qualitatively-based research, we feel that further study of a statistical scientific focus would compliment our research in Achote well. Therefore, we recommend that further investigation of these issues concentrate on a scientific analysis of the issues linking agriculture, conservation

and tourism, specifically focusing on the current ecological benefits of the type of agricultural practices in the community.

IV. CONCLUSIONS

Irrespective of the environmental and socio-economic threats posed by current large scale, high-input agriculture, the option to halt food-production is non-existent. That said, production, need not continue with these same techniques. A shift to more sustainable agriculture could help mitigate such threats, while simultaneously allowing producers to meet food demands in the long run. In this paper we examined the potential for coffee-agroforestry, to play a role in this kind of solution, through agrotourism. We conducted interviews with local organic coffee producers in Achiote, in order to understand the economic challenges they face using agroforestry techniques and their candidacy for income diversification. We often took an economic approach to answering the aforementioned question because financial considerations are often key to determining production decisions. We hypothesized that agrotourism would have the potential to provide Achiote's shade-grown coffee farmers with a complimentary income, that would provide long-term financial returns and the stability necessary to encourage the continued use of these agricultural practices. The main objective of our investigation was to test this hypothesis by exploring the connections between agriculture, biodiversity and tourism in Achiote. We also sought to provide the town with tangible products that would compliment the community's future efforts to foster tourism.

We interviewed 11 coffee producers in Achiote using open questions relating to four categories: their agricultural techniques, the economics of shade-grown coffee, their opinions on conservation and their opinions on tourism. Although we interviewed only a small percentage of Achiote's coffee farmers, we saw themes in the responses received, which tend to support our

hypothesis. The organic techniques used by the farmers, their positive opinions of tourism and conservation as well as the economic challenges they face, all support the possibility that agrotourism can serve as a form of income diversification for the community. Although these positive results do not ensure that agrotourism can necessarily be successful, they do not discount its potential. Further research would allow for a better understanding of the challenges that Achiote might face in implementing agrotourism within the community. Based on our experiences working in the community we came up with a list of recommendations that we feel would better equip Achiote to implement this kind of tourism initiative. Increased infrastructure and communication capacity as well as more effective marketing strategies are three key recommendations for bettering Achiote's chances for establishing a successful agrotourism industry. Moreover, it was hoped that the guide we created for the Ruta del Café as well as the new biography exhibit we created for the museum would provide the community and CEASPA with two new tools to support their future agrotourism ventures.

Our research provides a preliminary look into Achiote's potential as a candidate for agrotourism initiatives. Based on our findings we believe that the community is a good candidate, but that many relatively large-scale changes would need to be implemented and further research would be essential prior to any attempts at establishing such an initiative. With a growing population globally and the expansion of the agricultural frontier, it is time for a rethink of our current agricultural practice. The spread of agroforestry and other forms of alternative agriculture is only part of the solution. As we move forward, these realities will only become more restrictive. It is likely that we will need to call for a large-scale shift in our consumption patterns. For the mean time, initiatives like agroforestry, which provide an income boost to organic farmers may provide the stability necessary to encourage the continued use of

sustainable agricultural practices. Through this, agrotourism is able to shift a small portion of the profits generated from agricultural production towards farmers engaging in sustainable practices, rewarding them for their environmentally- conscious production choices.

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Appendix A:
Interview Questions

Formal Interview Questions: Speaking with Coffee Producers in Achioté

Somos estudiantes de la Universidad de McGill. Hacemos una pasantía con el apoyo del Instituto Smithsonian de Investigaciones Tropicales y de CEASPA. Estamos investigando los enlaces entre el turismo, la producción del café y la conservación de la biodiversidad. Escribimos un trabajo de investigación sobre estos temas por nuestro curso y por eso vamos a recibir créditos académicos. Después de nuestro trabajo, al fin de abril, vamos a presentar a CEASPA una guía turística para el sendero de café, una nueva exposición para la casa museo y también, algunas sugerencias para mejorar el turismo de café en Achioté. Las respuestas de este cuestionario serán usadas solamente por nuestro trabajo de investigación y una presentación al fin de nuestro curso. Apreciaríamos sus respuestas si está dispuesto(a) responder. Tiene el derecho de no responder sin consecuencias.

Agricultura

1. ¿Se produce mucho café en Achioté? ¿Aproximadamente cuántas personas piense que se dedican a este cultivo?
2. ¿Cómo lo venden: cerea, seco, o pilado?
3. ¿Quién compra su producto, y en cuanto venden el producto?
4. ¿Cómo se beneficia económicamente de la producción de café? ¿Qué papel juega el café en el bienestar de su familia?
5. ¿Qué opina de la distribución de la tierra en Achioté? ¿Siente que tiene suficiente tierra para cultivar?
6. ¿Cree que el dinero que gana por su trabajo en la finca de café es justo? ¿Cambiaría algo de esto si pudiera? ¿Cómo y por qué?
7. ¿Si hubieran cambios que pudieran aumentar sus rendimientos de café, estaría dispuesto a hacerlos? ¿Cuáles tipos de cambios estaría dispuesto usted a hacer y cuáles no?
8. ¿Puede describirnos sus cultivos? ¿Por ejemplo, qué tipo de agricultura practica? ¿Monocultivo o policultivo? ¿Café de sombra o de sol? ¿Cultivos grandes o pequeños, y de qué densidad?

Biodiversidad

9. ¿Qué importancia tiene el bosque para usted? ¿De qué manera es importante para su vida?
10. ¿Para usted, qué significa la conservación? ¿En su opinión es importante, y por qué?
11. ¿Piensa que sus prácticas de producción agricultura ayudan a la conservación del bosque de Achioté? ¿Por qué?

Eco-Turismo

12. ¿Cree que hay una relación (o enlace) entre el café y el turismo? ¿Por qué?
13. ¿Qué opina del turismo y las turistas en Achioté?
14. ¿Cree que la cantidad de turismo en Achioté es adecuada?
15. ¿Contribuyen las turistas a la comunidad de Achioté? ¿De qué manera?
16. ¿Cuáles son las ventajas o desventajas, en su vida, por la llegada de turistas en Achioté?
17. ¿Le interesaría compartir su conocimiento con los visitantes o turistas?

Appendix B:
Biography Questions

Biography Questions for Coffee Producers in Achiote

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1. ¿Cómo se llama?
2. ¿De dónde viene sus antepasados antes de llegar a vivir en Achiote?
3. ¿Ha vivido en Achiote toda su vida? Si no, de dónde viene?
4. ¿Fue a la escuela aquí?
5. ¿Qué estudió?
6. ¿Tiene familia?
7. ¿Viven aquí?
8. ¿Piensa que Achiote es un buen lugar para criar a los hijos?
9. ¿Qué piensa del futuro de Achiote?
10. ¿Hace cuanto años que tiene finca de café?
11. ¿De qué tamaño es su finca?
12. ¿Dónde esta su finca?
13. ¿Qué otros cultivos se cosecha?
14. ¿Utiliza otra manera a parte de la agricultura para ganarse la vida?
15. ¿Cuando no trabaja, cuales son sus pasatiempos favoritos?
16. ¿Le gusta pasar tiempo en el bosque?
17. ¿Cómo toma su café? Negro? Con leche? Con azúcar?

Appendix C:
Product for Host Institution

Appendix C: Products for Host Institution
Bibliographies for the Casa Museo

Historias de los productores de café de Achíote



Cecilia Moreno

Cecilia ha vivido en Achíote desde su niñez, y tiene ascendencia de Colombia y de Costa Rica. Tiene familia en la Ciudad de Panamá, Colón y San Esteban (Provincia Nacional San Lorenzo) desde hace 20 años. Sus genes culturales incluyen cosas como: aguacate, mango, papa, guineo, plátano y yuca. Sus pasatiempos favoritos son leer la Biblia y reflexionar sobre la iglesia, los temas café, sus genes.

Cecilia has lived in Achíote since childhood, but has ancestors from Colombia and Costa Rica. She grew up in Panama City, Colón and the United States. She has had a coffee farm in the mountains for 20 years, and her other crops include wheat, pigeon peas, banana, cocoa, banana, plantain and yam. Her favorite pastimes include reading the Bible and reflecting on church, her coffee farm, and her genes.



Rosamelia Ross

Antes de mudarse a Achíote, Rosamelia pasó su vida en Costa Rica. Tiene cuatro hijos, pero le gusta visitar a su hijo y su nieto que viven en la Ciudad de Colón, Costa Rica. Ella trabaja en un hotel y también es una granjera. Tiene una granja de café desde de su casa en el sector de Providencia y trabaja los sábados en el restaurante Café y Fresa parte del Grupo de Restaurantes Los Rioseros. Tiene su café con leche y azúcar.

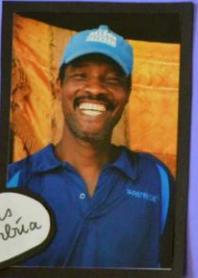
Rosamelia grew up in Costa Rica and then moved to Achíote. She has a son and a grandson who she enjoys visiting in Colón. She feels that Achíote has a great atmosphere and that things will only improve for the town. She has a small coffee farm in the hills, and with the rest of her time she works at the local restaurant, Café. She drinks her coffee with milk and sugar.



Ciferino Moreno

Ciferino tiene un finca de café desde hace 10 años, donde además cultiva otros productos como plátano, guineo, banana, mango, otros cítricos y yuca. Ha vivido en Achíote su vida y vive en familia aquí. Por parte de su padre, su familia viene de Colombia. Su mamá de su madre vivió en la Costa Rica. Fue la mamá en Achíote y se dedicó a la agricultura y al comercio. Cuando no trabaja estudia la Biblia y cocina en el hogar. Tiene su café negro y con leche y su punto de azúcar.

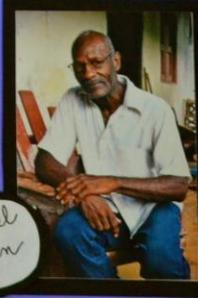
Ciferino has had a coffee farm for the last 10 years. He has other crops as well, including plantain, banana, yam, mango, citrus and oranges. He has lived in Achíote his entire life and his family here, the his father's side. His family originally comes from Colombia. His mother's side, they come from Costa Rica. He went to school in Achíote and studied agricultural commerce. During his free time, Ciferino enjoys Bible studies and walks on the farm. He takes his coffee black, or with milk and a pinch of sugar.



Luis Borbúa

Luis ha vivido en Achíote toda su vida pero tiene familia en Colón, la Ciudad de Panamá y al interior del país. Para Luis, Achíote representa un buen modelo de turismo relacionado con personas que se quiere compartir mucho. Tiene su finca hace 20 años. Piensa que los conocimientos adquiridos de su finca son importantes y que al tenerlos debe ser parte de enseñarles a los visitantes. Cuando los visitan, sus pasatiempos favoritos incluyen ir al lago y conversar con los vecinos. Tiene su café con leche.

Luis has lived in Achíote all his life, although, he has family in Colón, Panama City and in the interior of the country as well. For Luis, Achíote presents a good model for interpersonal relationships because sharing is part of everyday life. Luis has had a coffee farm for 20 years. He feels that from his he has developed a deep understanding of his natural environment. When he is not working his favorite pastimes include going to the lake and talking with his neighbors. He drinks his coffee with milk.



Manuel Haysen

Manuel vive en Achíote y es productor de café. En su finca tiene otros cultivos también. Le gusta pasar tiempo en el bosque, pero su pasatiempo favorito es leer. Tiene su café como sea.

Manuel lives in Achíote and is a coffee producer here. On his farm he also has other crops than his coffee trees. He enjoys spending time in the forest, however, his favorite pastime is reading. He drinks his coffee as is.

Guide for the Ruta Del Café (See next page)