ASU School of
Sustainability
Arizona State University

MSUS Culminating Experience Final Report

26 April 2019

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Defining Sustainable Scenarios of Development in San Martin, Peru

Conservation International

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Abstract

San Martin is a region in Peru containing some of the most diverse landscapes in the world. It is also home to many farming communities, specifically coffee growers, that rely on the rich soil created by this environment. Unfortunately, along with diversity, comes vulnerability to climate change. Coffee farmers are under stress from changes in climate that have led to unsustainable farming practices, such as slash and burn, that in turn make the region more susceptible to climate change. Conservation International is working within the region to end this cycle. As a student partner, I am aiding with organization and development of a workshop in the region. The goal of the workshop is to implement scenario planning to highlight tradeoffs and opportunities so that governments, businesses and communities can make decisions knowing what the likely positive and negative consequences to the landscape and their livelihoods may be.

In the end, Conservation International is more specifically seeking to aid in the optimization of the use of nature's benefits in the region. The scenario development approach that will be used for the workshop is the quadrant method, where values of the region are used to create an axis that will show four different futures in four different quadrants depending on the direction. An example is using the axis of rainfall (increase or decrease) and the prevalence of slash-and-burn farming (increase or decrease). The findings of the workshop will be used to construct new policies based off of the Peruvian National Coffee Plan to encourage new farming techniques for the coffee growers. While the conclusion of the overall workshop will not be determined during the span of the MSUS culminating experience, the conclusion from my work will revolve around having a successful workshop, with success being defined by participation and usable results; the work, such as a literature review and interviews and running the work plan up to the workshop, that allows the workshop to occur.

Introduction and Background

For millions of people around the world, the day starts with a cup of coffee. The beans used to produce that cup of coffee have been around for thousands of years, and demand for them continues to rise. However, the production of coffee is largely dependent on the environment and soil it is produced in, both of which are at risk. Climate change and soil degradation are growing problems for some of the largest coffee-producing countries in the world. One of these places is Peru, the third largest coffee producer in South America (Peru, 2016). Farmers are battling climate change as well as the current   low market price due to large supplies. Low-income populations are often the most affected by change due to the lack of resources to adapt or move from the situation. High levels of rainfall from unexpected climate shifts cause mudslides that ruin crops or wash away newly planted seeds. On the other hand, dry seasons make it difficult for the beans to grow.

This problem of deforestation and other degrading farming practices is urgent because the people of the region are dependent on their coffee crops and with climate change affecting low-income people the most, an unsustainable landscape will make them unable to live in the region (Conservation International, 2016). Unsustainable landscapes threaten both the humans and the animals of the region. With so many farmers depending on coffee as a crop, any decrease in yield due to climate change and deforestation will hurt their ability to make a living and survive. Farmers are forced to relocate or spread out their farms in search of more suitable soil or climate (Conservation International, 2016). This problem has dispersed effects in the stakeholders involved and the landscape. If farmers are forced to move their crops, deforestation will continue to be a problem. Also, governments will have to get involved with policy making and those along the supply chain for coffee will also suffer. Due to the numerous stakeholders involved (coffee farmers, businesses, local and federal governments, local communities, and various non-profits and those in the academic sector) and the large amount of land covered affected, this problem is highly complex. There is no one solution, and not just one area of the problem to be addressed. It is going to take the involvement of all stakeholders to come up with varying ideas and perspectives to create a number of solutions.

Most of the farmers in this area believe they are left with three options: change profession or location, diversify crops, or use sustainable farming techniques (Peru San Martin, 2018). The first is not an option for many locals, and they do not want to leave the land their family has cultivated for years. The second is possible, but can lead to the same problems occurring now, including deforestation, should new farming methods not be used. The third is a viable option, should education, resources and equipment be available. It could also allow for coffee to be sold to a new market at a higher price by implementing organic, sustainable labeling. This option is further supported by the release of the National Coffee Plan in November 2018. This plan lays out goals and possible strategies the government would like coffee regions to follow in order to

achieve sustainable coffee crops that allow for healthy communities and a reduction in poverty. The National Coffee Plan will act as a guide to creating policy change in accordance with the Peruvian government. In order to move in this direction farmers, NGO's, local governments and other stakeholders need to understand the importance of change and the consequences of maintaining a business as usual mindset. The technique of scenario analysis will be used to explain and demonstrate these consequences.

Scenario analysis is the process of creating and analyzing different future possibilities through current trends, data, and values, the creation of a business as usual scenario will be used to show the projected future of coffee farmers in San Martin should they continue to farm unsustainably. It does this by using found x- and y- values of a graph to build a scenario in each the four quadrants that correspond to the increase or decrease of the axes. One of my roles is to construct the axes before the workshop so that the stakeholders can develop the scenarios based off of them during the workshop. The scenarios created will give glimpses into the future, more specifically the future should they continue to live and act as they do now. The hope is that this should lead them to understanding that sustainable farming techniques that are adaptive and responsive to the environment are the most viable solution and will contribute to the development of healthy communities.

My project is thus the planning and background work that will allow the workshop to take place at the end of May in Peru. In order for a scenario workshop to be held, information and preparation has to be done. Because a two-day workshop is not enough time to build scenarios from scratch, I had to develop the axes needed to start the scenario creation beforehand. I also needed to plan the agenda for the workshop and how the National Coffee Plan will help guide the scenarios towards policy creation and future action.

For this project, I am working as a student partner with Conservation International, an organization dedicated to protecting nature for the benefit of humanity. More specifically, I am working with two of ASU's Professors of Practice: Miroslav Honzák and Percy Summers in one of the Conservation International's Sustainable Landscapes – the Alto Mayo Region, San Martín, Peru. Conservation International has already done some ground research to get to know the farmers and NGO's of the area. These farmers are the major stakeholders as they are hoping to maintain coffee farming as their way of life. They value their family traditions and providing food and opportunity to their children. These values, along with the recognition that something is wrong in the region in which they farm in regard to the use of land and the inability to continue using it freely, has brought Conservation International into San Martin. My role is to prepare for this workshop. In order to do this, I have compiled a literature review of macro trends in the area as well as past work done by Conservation International. I also created a list of stakeholders that have been invited to the workshop, their role and importance, and compiled a list of questions that were used to interview them beforehand. This was for the purpose of seeing the values of the farmers. I then used the compiled values and trends of the region to assign two values to the axes

of a quadrant-method, scenario build. This will be used during the workshop to build scenarios with the stakeholders from each of the quadrants. Since the National Coffee Plan is the guiding policy maker, I also had to identify key strategies within the document that would lead the workshop beyond scenario creation into real change for the people of San Martin. The pre-constructed axes will help shape the scenarios with the stakeholders towards policy change that can help develop a sustainable future. Finally, I helped construct the agenda for the workshop. This is the schedule that will be used and followed during the two-day workshop to organize the event and proceedings as a whole, as well as establish the process of creating scenarios with the stakeholders, building off of my work done before the event itself.

Conservation International has several partnerships with NGO's as well as the coffee cooperative in San Martin. Most importantly, it is also working with national and local governments of Peru in order to comply with the aforementioned National Coffee Plan.

Literature Review

Peru has a complex and rich history that led to its entry and continued growth in the global market, especially within agriculture in the last ten years. Coffee makes up 2.1% of the exports from Peru, accumulating a revenue total of $761 million (Peru, 2016). Coffee has thus become a crucial part of its economy.

A two-and-a-half-hour flight from Lima, and then another three-hour drive after leads to the San Martin region of Peru. This diverse zone is threaded through by the Huallaga river and has several distinct topographies that include the Andean Plateau, ideal for growing coffee (Peru San Martin, 2018). Once inhabited by the Incas and other ancient civilizations, crops such as coffee are being used to pull those remaining out of poverty.

Background

San Martin is the third-biggest coffee producing region in Peru. This region has helped make Peru the number one producer of organic coffee in the world. The region has one of the biggest cooperatives in Peru, known as Oro Verde. The number of members has increased to over 1350. While the majority are men, women are represented. In 2006, this group began to transition to organic products to the point that today nearly all coffee, sugar, and cocoa are organic and sold to local and national markets (Coffee and Coco, 2018).

However, the region is also one of the most heavily deforested areas in Peru. The Unlocking Forest Finance project aimed to design and implement sustainable landscape initiatives. This project has finished its introductory phase but still needs to be implemented as its main focus is microfinancing.

Conservation International is a nonprofit environmental organization that is based off the concept that nature doesn't need people, but people need nature. Humans are completely dependent on the environment and this has led to CI's approach of first protecting our natural wealth, fostering effective government, and promoting sustainable production (Conservation International, 2018). San Martin is one of the regions in which Conservation International is working to move the area to a long-term, healthier, more sustainable development path that in turns benefits the people living there and the environment.

The local market in Peru is expanding due to international tourism and "the overall improvement of the Peruvian economy which has created a new middle class (Coffee and Coco, 2018)."

Scenario Development

Scenario development has been around for many years and is commonly used by planners, policy-makers and researchers of various disciplines. "Scenario development is a methodology for forecasting future events. It relies on analysis of the current situation, the creation of informed assumptions about the future, a comparison of their possible effects, and the likely responses of various actors. At its core, scenario development is an "if - then" statement- but one that gains rigor through analysis (FEWS NET, 2018)."

These plausible scenarios are then used to discuss the impacts of the future and how to tackle new challenges. If you are aware of possible outcomes, you will be more prepared to handle them (FEWS NET, 2018). It is more than a simple projection but less than an expert judgment made over several years of what could happen in the future. It builds off of logic and creates structure into the analytic process. The methodology works particularly well in relaying coffee outcomes because of Conservation International's extensive work in the region and the contacts already built with stakeholders. Knowledge of the coffee outcomes and strong relationships in the region improve the reliability of the assumptions used in scenario creation and decreases uncertainty, which in turn increases the likelihood of a scenario (Mariton, 2019).

The four critical steps of scenario development are summarized below. However, the best way to organize these steps is through a workshop where stakeholders have the opportunity to brainstorm together, having multiple viewpoints and possibilities. This method is particularly useful for the Conservation International workshop in Peru. The steps below represent the quadrant-method of building scenarios and has been used specifically for the workshop. I developed the first steps of the process in order for the last two to be completed in the time-limit of a two-day workshop. After steps three and four are completed at the workshop, a next-step plan will be created by the Conservation International team and the students working with them.

1. *Identify the driving forces*

a. *This includes both large and small shifts in trends and values. These trends and values in San Martin include a movement toward organic coffee and increasing the size of coffee farms. Values lean toward providing for the family and ensuring a good future for children.*

2. *Identify your critical uncertainties*

a. *These are two of the most important impacts on the situation. For San Martin, possible uncertainties include precipitation in the region, coffee production, and soil degradation.*

3. *Develop a range of scenarios*

a. *This particular project will be creating four scenarios based off of the two impacts chosen beforehand by myself and the project team and placed within a graph. The goal is now to form a kind of matrix with your two critical uncertainties as axis (see the below example). Depending on what direction each of the uncertainties will take, you are now able to draw four possible scenarios for the future (Mariton, 2019).*

b. *These scenarios will be built during the workshop. The stakeholders will help build them based off of the matrix chosen beforehand. A narrative piece will be written for each scenario by the stakeholders to help build a better representation of the scenario in the form of a story.*

4. *Discuss the implications*

a. *This where the goal of the workshop is to build a strategy with the stakeholders to move towards a more sustainable future. One way this goal may be met is through the discussion of the various implications and impacts of each scenario.*

Past examples of scenario development use include (FEWS NET, 2018):

- *Assess the impact of drought on poor farming households in Somalia*

- *Estimate the effect of currency devaluation in Malawi on food security*

- *Project impact of extensive flooding in Nigeria on the regional market*

- *Understand the effects of coffee rust on labor dependent households in Central America*
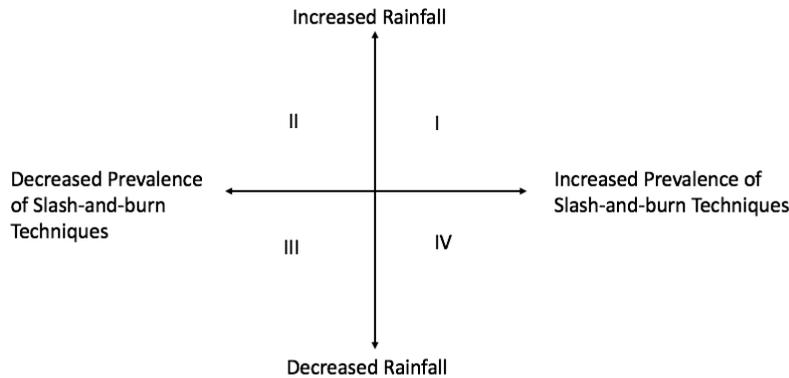
Above is a visual example of the scenario axis in the four-quadrant method. The first quadrant would serve to create a situation where rainfall would increase while the prevalence of slash-and-burn would also increase. This would pose the question to the farmers, what does this mean for you? What kind of future would occur based off of this? A scenario would then be created off of the answers and the possible future formed from the trend of increased rainfall and the use of slash-and-burn.

Axes can be developed on large and small scales. A large scale would include values that the farmers are subjected to while smaller scales consist of values that can be changed by farmers. For example, from the list above, the number of coffee plants planted, and pesticide use are similar scale axes in which farmers can influence directly. These differ from large scale items like precipitation rates and coffee prices which might be beyond farmer control. For scenario development, choosing the previously mentioned smaller scale values that are within changing capabilities for the farmers will be more helpful in directing possible futures as farmers can directly affect these axes. The possible axes will be developed through the research on trends mentioned above. Examples of possible axes include precipitation in the region, coffee production, price of coffee, deforestation and the use of pesticides.

Trends

The background trends in the region are crucial in the main phase of the workshop, which will be development planning. Background trends include survey data about farmer values and wants and needs, as well as larger trends such as rainfall and soil quality. The amount of coffee farmed per year and how it has changed over time, as well as qualitative data as to how farmers have adapted or think they need to adapt will be considered. These values will be used to create a graph, with two measurable quantities on the x- and y- axis, that will in turn allow for four different scenarios to be produced. This will be one scenario per quadrant. This method, also known as the quadrant scenario method, has been used in several case studies and found to be successful when used in conjunction with a narrative piece (Conservation International, 2018). This means the addition of a story attached to each scenario to make them more relatable. Below are some trends found in order to start the creation of the x- and y-axis for the graph. For each trend there are two possible axis that can be used in accordance with it.

- *As young people are seeking more opportunity in larger cities, the average age of farmers has grown to 60 years old worldwide (Coffee and Coco, 2018). In order to continue to protect future food production from this depopulation trend, it is imperative to bring under 35-year-olds into the mix.*

  o *Example x- and y- axis: Median age of farmers vs. Coffee production*

- *Increasing effects of climate change have cause more natural disasters, changes in precipitation and heat, all of which have reduced cultivation area and help spread disease (Coffee and Coco, 2018).*

  o *Example x- and y- axis: Number of natural disasters vs. Disease occurrence*

- *Trend toward specialty coffee in the international market. It makes up 35% of sales. This means that people are preferring coffee that goes beyond standard coffee, which includes organic forms and location-based with higher soil fertility or differentiation*

  o *Example x- and y- axis: Percentage of specialty coffee in the market vs Soil fertility/infertility*

- *With the proliferation of specialty coffee and the preference of American consumers to enjoy their cup of coffee "on the go", the category of quick-serve coffee beverages, such as those typically served to-go, has become a mainstream component of everyday American life and a key-driver of sales in the specialty coffee industry (CI Final Report)*

      o   *Example x- and y- axis: Percentage of to-go coffee beverages vs Soil quality*

- *Organic coffee sales have skyrocketed over the last several years, although the growth rate slowed considerably in 2009 (CI Final Report)*

      o   *From 2014 to 2019, organic coffee sales in the U.S. have grown by an average of 11% per year.*

      o   *Example x- and y- axis: Organic coffee sales vs Soil quality*

- *Over the past thirty years Peruvian coffee production increases have primarily come from farming expansions into the high jungle of Peru (CI Final Report)*

      o   *Framed in the context of under-regulated lands and increased population, this expansion is logical and destined to continue for many years to come*

      o   *Coffee colonization of the Peruvian high jungle forests is the #1 cause for deforestation*

      o   *Example x- and y- axis: Size of farms vs Soil degradation*

Values

- *Farmers want to feed and provide for their family (International Coffee Farmers)*

- *Peru's national government has made significant commitments to address deforestation, including a pledge to achieve zero net deforestation by 2020.*

- *The government has committed to reducing emissions by 20% of business-as-usual projections by 2030, possibly raising that percentage to a 30% reduction in emissions.*

- *The regional government aims for San Martin to become a 'green' region, able to generate economic growth and support its population's prosperity while protecting the environment.*

- *Yield profitable crops*

- *Healthy crops and the avoidance of coffee plagues*

- *Cost of change*

- *Equity among different groups of people in the region*

Strategies

- *Encourage families to produce food crops and have animals for harder times where money is short*

- *Increase young leaders and improve business and technical skills*

- *Increase yield of crops while maintaining sustainability*

- *Sustainable agricultural methods: diversifying crops, technological monitoring systems, etc.*

- *Reforesting some areas.*

- *Continue to support cooperatives.*

- *Create a local certification for organic coffee, beyond Fairtrade and traditional organic as these are expensive to obtain.*

- *Create an education system to learn sustainable methods, and keep it going with new and updated information.*

- *Create a communication system among the farmers, NGOS, and local government representatives.*

Project Approach and Intervention Methods

San Martin is a diverse region with diverse people. In order to tackle the sustainability problem of climate change and deforestation, scenario development will be used. The project's main goal is to implement scenario planning to highlight tradeoffs and opportunities so that governments, businesses and communities can make decisions knowing what probable positive and negative consequences may occur to the surrounding environment, should current practices continue. Scenario analysis will be done through the quadrant method. Trends and current values of the farmers will be used to find an x and y value to which four different scenarios will be created based on an increase or decrease in each value depending on which of the four quadrants a scenario is located. For example, the first quadrant would show an increasing value in the x and y axis that will create a scenario where this would occur and what would result from it. The fourth, or bottom right, quadrant would show an increasing x value and a decreasing y value. The sustainability problems addressed include deforestation and equitable stakeholder representation, where stakeholders can share and participate in decision-making without fear or hierarchy.

In order to engage with and create solutions, I have been reviewing existing indicators of sustainability in the realm of coffee farming and production and analyzing trends and identifying main drivers of change and possible tradeoffs. From this, I discovered that rainfall has been one of the primary problems within the region. Either the increased or decreased amount of rain has caused issues with farming. For this reason, it is the y-axis of the graph. Along with the macro trends in the region, I determined a list of stakeholders in the region that will be a part of the workshop. A set of questions, which I created that revolve around the values of farmers and things they have noticed about climate change, was sent out to distinct stakeholders. The answers from these questions are being used to determine the x-axis of the graph. I decided to use a macro trend that the farmers can't control in reference to a micro trend they can control to create the axis. This way scenarios can be built off of a trend that they can't influence with something they can change in response to unpredictable futures. While I am still waiting on all the interview questions to come back, and unfortunately am not able to list them here, the x-axis is leaning toward the prevalence of slash-and-burn techniques. In this manner, scenarios can be built around unpredictable rainfall that cannot be controlled with farming practices that the local community can use to adapt to climate change.

The purpose of determining the axis before the workshop is to make it possible for the workshop to occur in the first place. A two-day workshop is simply not enough time for background trends to be researched, values of the farmers to be determined, and the axis to be decided upon. Therefore, my main approach for preparing for this workshop has been accumulating information needed to make a two-day workshop possible. This includes the literature review of macro trends as well as past projects conducted by Conservation International. Interviews and determination of the stakeholders who will be attending the

workshop was also crucial. Finally, the agenda of the workshop was needed in order to organize it and assure success in creating scenarios with the stakeholders.

To create the agenda, I split each day into defined objectives. Limited by the days, the objectives of the first is to introduce the participants and the purpose of the workshop, as well as what scenarios are and how they will help plan for the future. A basic knowledge of the current trends in the region and how the axis were determined will also occur. Finally, based on the axis, the stakeholders will be broken up into groups so that scenarios for each quadrant can be made. The second day will lead with an introduction of policy and the national coffee plan. Then, brainstorming will occur with stakeholders on how these scenarios can be connected with the National Coffee Plan to create change and implement policy change.

The National Coffee Plan is crucial in the planning of the workshop. As it was made public during the project, I had to adapt to a change in the scope for what Conservation International wants to do in the region. The scenario workshop is now focused around the National Coffee Plan and approaching policy change through it. I had to determine the main strategies and goals of the Plan and align those with the scenarios. This way, actual strategy can be made with the stakeholders on what to do to take control and change their future. One of the main goals of the Coffee Plan is to have sustainable, coffee farming techniques. As the farmers can control which practices they use to farm, I used this goal in accordance with the x-axis. Rather than slash-and -burn farming, it would be more beneficial for the farmers to start rotating crops, use organic fertilizer, etc. Therefore, funding and policy that will allow the farmers to move away from this technique would be greatly beneficial.

Outcomes/Findings

My role in this project has been to plan and prepare for the scenario workshop to be held in San Martin, Peru at the end of May. Throughout the past few months, my work has been for this purpose. In order to have a successful workshop, several outcomes and findings had to be predetermined. The difficulty of planning for the workshop became apparent as the date of its occurrence was pushed back several times due to politics within the Peruvian government approving the workshop and Conservation International providing funding. Because of this, I had to remake work schedules for each member of the group in order to account for new deadlines. Beyond creating new schedules, I found the relative stakeholders who will be attending the workshop. These stakeholders include farming communities and cooperatives Conservation International has already worked with, as well as the national government. It was clear that not every stakeholder (listed in Appendix A) could be invited to participate in the workshop as there is not enough staff or time to account for a very large group. However, the outcome I found was a list of stakeholder groups, who have already been invited and have responded yes to the invitation, that will attend the workshop and work together to create scenarios during the workshop. I also created lists of questions for each of these stakeholder groups (Appendix B) in order to gain the background information necessary to determine the x-axis of the scenario graph to be used during the workshop.

The question list was used to find out background values and trends of the farmers and other groups in San Martin, Peru. This workshop directly targets the coffee farmers and some of the key information needed to create the scenarios involved in knowing the values of these stakeholders. Some of the questions also target knowledge of climate change and noticeable differences in the environment already seen by the famers. The point of contact in San Martin translated and administered emails and interviews based off the question list.

While the answers to these questions are still being compiled, some of the results that have come back indicate a leaning toward the use of slash-and-burn techniques. This outcome will create a graph with Rainfall vs Prevalence of Slash-and-burn in San Martin. This is based off of the values and trends found through the stakeholder questions as well as the information gained during the literature review. This review showed that one of the biggest environmental struggles in the region is caused by unpredictable rainfall. I discovered that too much rainfall in the region has caused mudslides and drowning of plants, while decreased rainfall during other period has led to drought that kills the coffee sprouts. Therefore, with the current data, these will be the two values used to construct scenarios during the event.

In addition to this, one of the end goals of the workshop itself is to align the scenarios with strategies in the National Coffee Plan so that policy change can be worked towards and funding can be gained to make these changes on the coffee farming level. In order for this to occur, I went through the extensive Plan and found the key points made within it that can be used during the workshop and support Conservation International's mission and the background

trends I already found. While this was difficult due to the document being in Spanish, I found that the use of slash-and-burn techniques in San Martin fell under the main objective of the National Coffee Plan to end unsustainable farming practices and instead focus on techniques that renew the soil and environment while maximizing production. This is critical, and it helps solidify the determined axis and also dictates the course of the workshop and future actions.

Finally, I helped create the agenda for the workshop (Appendix C). Two days were decided on as any more could make it difficult for stakeholders to attend and any less would make it difficult to create accurate scenarios. Every member of the team will participate in the workshop as well, whether that's by leading a presentation, leading a group, or both. In order for this to happen, each team member was educated on the goals of the workshop, the values and customs of the people of San Martin, and the scenario development through the compiled literature reviews. This shows the importance of accurate information among all members of the group as well as the assurance that everyone understands the objectives and goals of Conservation International in Peru. The agenda was created to have the first day revolve around base information on trends and scenario planning, then the formation of the scenarios themselves. The second day is based upon information on policy and the National Coffee Plan. Then how the scenarios can be tied to the Plan in order to develop strategies to follow the Plan's objectives to attain funding and policy change from the Peruvian government.

Overall, this project has shown the possibility of workshop creation in another country, as well as the development of the scenario process beforehand. The quadrant method and scenario creation have not yet been used in San Martin and this is an excellent opportunity to create a sustainable future in the region. Stakeholder engagement to this extent and the participation of different groups in the same room will also be the first in the area. I personally learned the importance of time and project management. Working with a team in different parts of the country was difficult yet rewarding. Work schedules had to be made and adhered to as deadlines changed, and I had to remain accountable for my part. I was also able to use knowledge gained through my education, such as systems thinking and socio-ecological adaptation, in a real-world scenario. This experience has advanced my knowledge of how to work beyond the classroom and prepare myself for the responsibilities of a job. I am grateful for this opportunity and am excited to see the fruition of my part at the workshop in Peru.

Recommendations

Despite several setbacks in the date of the workshop, it has been officially set and will move forward. My recommendations to the client includes addressing the new work plan for a further workshop date, as well as setting the clear objectives for the workshop. Some modification will also need to be made to the schedule to ensure the process of scenario creation is done in the correct order and agrees with each team member. Before the workshop, scripts and exact roles should also be given to each group and its members. In order to wrap up the workshop, assurance of future work in the area and continued support needs to be given. The scale of this project can also increase so that other coffee regions in Peru can work towards the National Coffee Plan.

There were also other areas within the project management phase that could have been improved. It could have been very helpful to establish concrete communication lines between the members of the team in the early phases of the project, as it would have supported us to develop faster and more efficient planning strategies for the workshop. This issue also contributed in a way to the difficulty the team had to adhere to the timetable that had originally been placed at the start of the year.

Finally, after the conclusion of the workshop, information from the event will have to be compiled and further action will be needed to use the scenarios to direct future work and planning in San Martin towards a sustainable landscape. It is important to monitor future work and make certain that this future work does occur by assigning roles to staff and other students to continue helping in San Martin.

Conclusions

On May 28th to the 29th, in San Martin Peru, a workshop will be held for the coffee farmers and other stakeholders in the region. While the schedule of the workshop is still being defined, it is clear that it will happen and include participation from several groups. Coffee farmers will have the opportunity to build scenarios and work with the local and national government to build a future that also aligns with the National Coffee Plan. The results of the scenarios, however, cannot be stated until after the workshop itself. I believe the results are fair in regard to the scope of the project and will be continually worked on proceeding the deliverables of the MSUS culminating experience.

On the other hand, one of the biggest adverse events that the team had to constantly deal with throughout the course of the year was the inability to successfully secure a date for the workshop in San Martin. Due to the existence of strict protocols both within Conservation International and the Government of Peru, the date for the workshop would get pushed back consistently. This affected the team efforts since most of the planning revolved around specific dates that would be modified constantly. More could be accomplished with more direct lines of communication within Conservation International to ensure faster decisions.

Because of the need for more time with dates being pushed back, the work can, and will be, extended by other students. Things will need to be done following the workshop and continued monitoring of the situation in the region as well as planning for any upcoming endeavors towards a more sustainable future for those in San Martin. Contact information can be given to any student interested, and a relationship with Conservation International has been formed.

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Appendices and Acknowledgements

Appendix A

Stakeholder Groups	Scope	Justification
Coffee farmers & their families	Invite to workshop	This group will be the main focus of the workshop and will be targeted when discussing the future of their farming practices in the region
Migrants (both legal & illegal)	Invite to workshop	This group plays a key role in ensuring successful efforts and thus their input is needed in the workshop
Local Coffee Cooperatives	Invite to workshop	These smaller cooperatives that directly affect San Martin need representatives at the workshop in order to target more farmers in the region
NGOs (in the region and those that have participated in previous efforts in Alto Mayo)	Invite of workshop	There are several NGOs CI has already worked with (see below) and they will be crucial to spreading and information and implementing new strategies in the future. They may also have important contact information and knowledge of different subgroups within the stakeholders.
Conservation International	Invite to workshop	As the facilitators of the workshop, this group and its members will be important in organizing and holding the workshop as well as spreading information within the organization about the workshop and any future strategy creation
Ministry of Agriculture (MINAGRI)	Invite to workshop	This stakeholder is responsible for creating the National Coffee Plan and will be needed to help structure the workshop around policy change and to ensure goals align with the Plan.

San Martin Regional Government (GORESAM)	Invite to workshop	As with the above stakeholder group, the regional government will be necessary to help with future policy change and to gain support of local officials.
Other farming communities in Alto Mayo (cacao, plantains, rice, etc.)	Notify of workshop and give a summary of findings, as well as possible, sustainable farming techniques they can use with their own crops	While these farming communities are a crucial part of San Martin, we are focusing on the National Coffee Plan.
Pangoa - Cooperativa Agraria Cafetalera	Notify of workshop and give a summary of findings. Possibly ask if they'd like to send a representative, though not necessary.	This cooperative is very large and is in the general Alto Mayo region rather than just San Martin and may include needs beyond the workshop.
Oro Verde-Cooperativa Agraria Cafetalera	Notify of workshop and give a summary of findings. Possibly ask if they'd like to send a representative, though not necessary.	This cooperative is very large and is in the general Alto Mayo region rather than just San Martin and may include needs beyond the workshop.
ACOPAGRO	Notify of workshop and give a summary of findings. Possibly ask if they'd like to send a representative, though not necessary.	This cooperative is very large and is in the general Alto Mayo region rather than just San Martin and may include needs beyond the workshop.
Ministry of Environment (MINAM)	Notify of workshop	This group will only be notified of the workshop as the organization is too large and outside of the specificity of the San Martin region.
Peruvian National Service of Natural Protected Areas (SERNANP)	Notify of workshop	This group will only be notified of the workshop as the organization is too large and outside of the specificity of the San Martin region.
Camara de Cafe y Cacao	Notify of workshop	This cooperative is outside of the San Martin region.

Junta Nacional de Cafe	Notify of workshop	This cooperative is outside of the San Martin region.

Possible NGOs
1. Soluciones Practicas/Practical Action (NGO)
2. ECOAN (Jose Altamirano)
3. ACAC (Jose Heredia/Oscar Lopéz)
4. Proyecto Mono Tocon
5. Solidaridad

Appendix B

Question List Based on Stakeholder Group

Coffee farmers & their families
1. What does a normal day's work look like for you? Take me through your daily activities.
2. What activities take up most of your time?
3. Who do you work with or depend on? Tell me a little bit about the other people you farm with or sell your products too.
4. How long have you been farming? How long have you been farming here?
5. Have you noticed changes within the years in regard to your farm? This can include more rain, less rain, soil quality, crop disease frequency, and the overall healthiness and abundance of crops
6. How has your farming changed? New tech, different practices, new crops, new markets?
7. How has farming changed for you since you started farming? For example, have you noticed changes in the growing season (shorter, longer), rainfall (more, less, same but over shorter time frames), and yields (more of certain crops, less of others)?
8. How have you changed your farming in response to these changes?
9. Where do you see yourself in the next ten years? The farm? Your family? Your kids?
10. What concerns you most about your future and the future of your family and community?

Migrants
1. Did you experience climate impacts on your livelihood in your former home? If so, which, how did those evolve over time, and with which consequences?
2. What were your reasons for leaving your former homes and migrating to Alto Mayo? (To try and go behind the main stated reasons: "If the reasons were economic, did climate change have any impact on your economic situation prior to leaving?")
3. How has your financial, social, emotional, and personal well-being changed since arriving here? *(Cue: "Here is a list of topics that might help us think of consequences. It includes: jobs, education, health, standard of living, safety, discrimination, satisfaction with life, emotions, meaning and purpose, autonomy, hopes and fears, recreation, environment, family, traditions, relationships, language.")*
4. What matters most to you?
5. What is your daily schedule like?
6. How do you provide for yourself and your family?
7. What do you think of San Martin? Has it become a home to you?

Local coffee cooperatives

1. What is the mission of your cooperative?
2. What are common complaints or changes mentioned by farming members in regard to their farm?
3. How do you as a cooperative tackle these changes and challenges?
4. What is the biggest challenge faced by the cooperative as an organization?
5. What organizations have you worked with in the past? What projects have been completed with them?
6. Where do you see the cooperative in ten years?

NGOs

1. What is the mission of your NGO?
2. What projects have you completed? In San Martin? With which groups?
3. What future projects do you plan on accomplishing in the region?
4. What is the biggest obstacle faced when working with stakeholders in San Martin?
5. What are some of the biggest challenges you have seen or heard voiced by the groups you work with?
6. What are the NGO's strong points in regard to working with the people of San Martin?

Ministry of Agriculture

1. What is your role in the Alto Mayo region, specifically San Martin?
2. How do you envision the goals of the National Coffee Plan to be implemented?
3. What is your role in implementing strategies from the National Coffee Plan?
4. Is there any other planning around current or future threats through climate impacts and how they could drive migration and displacement in Alto Mayo?
5. Over the past years, have any environmental hazards here displaced people? If so, which, whom, when, where, where to, how long, ...? How could this change in the future? How has their financial, social, emotional, and personal well-being changed since the displacement?
6. How do people in Alto Mayo cope with climate impacts on their livelihoods *(From what I heard you will ask such a question in any case),* and which role do (seasonal, temporary, circular, permanent) migration and remittances play therein? How could this change in the future?

Regional Government of San Martin

1. What is your role in San Martin?
2. What are some goals you have for the region?
3. How do you plan on implementing these goals?

4. What are some of the biggest threats you see towards farmers and local communities?
5. Is there any planning around current or future threats through climate impacts and how they could drive migration and displacement in Alto Mayo?
6. Over the past years, have any environmental hazards here displaced people? If so, which, whom, when, where, where to, how long, ...? How could this change in the future? How has their financial, social, emotional, and personal well-being changed since the displacement?
7. How do people in Alto Mayo cope with climate impacts on their livelihoods, and which role do (seasonal, temporary, circular, permanent) migration and remittances play therein? How could this change in the future?

Coffee Rust Specific Questions
1. To what extent can coffee rust reduce your plot's coffee production?
2. What actions do you take to prevent an arrival and infection with coffee rust in your plot?
3. If the rust is already present in your plot, what actions do, or would you take to reduce its spread to other plants?
4. For each of the actions mentioned in response to questions 2 and 3, how frequently do you perform them and how much time do they take?
5. Are there any additional actions that ideally should be taken but in reality, they are not? If it is the case, what are they and why aren't they implemented?

Appendix C

Developing Sustainable Scenarios: Prioritizing Actions from the National Coffee
Production Action Plan to Achieve Sustainable Coffee Production in Alto Mayo
Workshop to be held on May 28-29, 2019 in Moyobamba for up to 30 participants

Objectives
1. *Review trends of sustainable landscape indicators developed by Conservation International;*
2. *Review results from surveys on values and preferences of coffee farming communities;*
3. *Review existing policies and values and identify where they align and where there are gaps;*
4. *Develop sustainable scenarios of coffee production in the region and prioritize strategies and actions described in the National Coffee Action Plan can help to achieve them;*

Day 1 (Tuesday): Talking about science and policies.

Time	Activity	Responsible	Comments/details
8:30 – 8:40 am	Opening remarks	Claudio/Percy (CI-Perú)	On behalf of CI, I would like to welcome you to this workshop… Thank you for finding the time in your busy schedule… I would like to acknowledge financial support of… Now I would like to give the podium to Cecilia who will facilitate the introduction of the participants followed by the introduction to the workshop given to you by the CI-ASU research team.
8:40 – 8:50 am	**Introductions of participants**	Cecilia	
8:50 – 9:10 am	Introduction to the project and purpose of the meeting	Percy/Miro (or another workshop facilitator)	Why sustainability is important (framing)? High level summary of what work has been done what data was collected and how local communities participated in this process. What are the objectives of the workshop? Review of agenda and logistics.
9:10 –	Overview of relevant policies related to	(selected government official)	

9:30 am	*sustainable agricultural production in San Martin*		
9:30 – 9:50 am	*State of the agricultural production from the perspective of local farming community*	*(selected leader of a farming community)*	
9:50 – 10:00	*Clarification questions/answers*	*Percy (or another workshop facilitator)*	
10:00 – 10:30	*Coffee break*		
10:30 – 11:00	*How do we assess sustainability of a landscape? Which indicators are we using? What are the trends? And why? And what are the implications for the future?*	*Percy*	
11:00 – 11:30	*Overview of the survey results on preferences and values of local farmers?*	*Cecilia*	
11:30 – 11:45	*Clarification questions/answers*	*Percy (or another workshop facilitator)*	
12:00 – 1:30	*Lunch & group photo*		
1:30 – 2:45	*Discussion in groups to facilitate understanding of current policies, trends in sustainability, pressures, values, and preferences of local communities.* *Group 1: What are the pressure and drivers of change? What actions can be done at the local by*	*Group 1: Percy/Manuela Group 2: Lauren/Shelbie Group 3: Ivo/Kayla*	*Break up groups to discuss values, policies, and drivers of change; [People in groups could be self-selected (government representatives, academics, local authorities, communities' members, etc.]*

	local communities to reduce the pressures? *Group 2: What are pressures and drivers of change? What actions and policies can be implemented by government to reduce the pressures?* *Group 3. Are the current policies responding to the community needs? What is missing?*		
2:45 – 3:45	*Plenary presentations of group findings from the break out groups & discussion*	*Percy (or another workshop facilitator)*	
3:45 – 4:15	*Wrap up and introduction to next day*	*Percy/Cecilia*	*To anticipate importance of their participation in the second day*
4:30 – 6:00	*Optional reception for participants to socialize*	*Percy (or another workshop facilitator)*	*Details to be announced during the first day.*

Day 2 (Wednesday): Talking about scenarios and actions

	Activity		Comments/details
8:30 – 8:40 am	*Recap from previous day and intro to policy*	*Percy (or another workshop facilitator)*	
8:40 – 9:00 am	*Review existing policies and values and identify where they align and where there are gaps: Local, regional and national perspective*	*Shelbie/Kayla/Ivo*	
9:00 – 9:20 am	*Overview of relevant strategies and actions described in the National Coffee Action Plan*	*Kayla/Shelbie/Ivo*	
9:20 – 9:40 am	*Background to scenarios development and analysis*	*Lauren/Shelbie/Ivo*	

9:40 – 10:00 am	*Climate and other drivers of change leading to migration*	*Jonas/Thiago (PIK)*	
10:00 – 10:15	*Clarification questions/answers*	*Percy (or another workshop facilitator)*	
10: 15 – 10: 30 am	*Coffee break*		
10:30 – 11:30 am	*Break up groups to create scenarios specifically focused on how the communities can thrive and how to achieve it sustainably* *Group 1: Scenario development* *Group 2: Policies* *Group 3: Actions*	*Group 1: Percy/Manuela* *Group 2: Lauren/Shelbie* *Group 3: Ivo/Kayla*	
11:30 – 12:15	*Plenary presentations of group findings from the break out groups & discussion*	*Erwin/Marcela to facilitate*	
12:15 – 12:30	*Clarification questions/answers*	*Miro/Erwin*	
12:30 – 1:30 pm	*Lunch*		
1:30 – 2:45	*Final brainstorming: Priorities actions and develop timeline for implementing strategies and actions described in the National Coffee Action Plan*	*All*	
2:45 – 3:45	*Wrap up and introduction*	*Percy (or another workshop facilitator)*	