**The Evergreen State College**

**Graduate Program on the Environment**

### Thesis Prospectus

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**STUDENT AGREEMENT:**

**SIGNATURE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**FACULTY READER APPROVAL:**

**SIGNATURE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**MES DIRECTOR APPROVAL:**

**SIGNATURE:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Provide the working title of your thesis[[1]](#endnote-1).

Factors that motivate cacao agriculture in Jamundi, Colombia

1. In 250 words or less, summarize the key background information needed to understand your research problem and question.

Between 1975 and 2000 increasing demand for cacao led to the doubling of world cacao production (Rice & Greenberg, 2000). In 2016 over 4.7 million tons of cacao were produced, and 16% was supplied by the Americas (ICCOa). Colombia is the 11th highest cacao producing nation (Mattyasovszky, 2018) and produced over 60 thousand tons of cacao in 2017 (Mendoza, 2019). However, I have found few studies on qualitative aspects of cacao faming in the Americas, specifically in Colombia.

Naturally, cacao trees thrive in a forest setting (Grimes, 2009), but the desire to increase productivity has caused a shift towards plantation-style agriculture using hybrid cacao (Middendorp et al., 2018).  Because of the increasing demand for cacao, farmers in the tropics have converted forested land to cacao agriculture. Between 1975 and 2000 the area of land devoted to cacao cultivation increased by over 2.5 million hectares (Rice & Greenberg, 2000).  Cacao varieties native to the Americas tend to be fine-flavor varieties suited to grow in agroforestry systems in which crop plants are grown amongst higher canopy trees. Agroforestry systems can maintain ecosystem services and have been preferred by some communities for soil quality, biodiversity, ecological benefits, access to medicinal plants, and cultural importance (Blare & Useche, 2013).

The cacao industry relies on small-landholders (Rice & Greenberg, 2000), with about 85% of cacao production being supplied by small-scale family farms (Lynn, 2017). Since cacao farmers exist in many countries throughout the tropics, farming practices vary by cultures. Understanding cultural preferences and drivers can lead to appropriate agricultural policy and aid programs that will benefit small farmers.

1. State your research question.

What factors influence cacao farmers’ agricultural decisions in Jamundi, Colombia?

1. Situate your research problem within the relevant literature. What is the theoretical and/or practical framework of your research problem?

I have found few studies on social factors of cacao farms. While literature on quantitative aspects of cacao agriculture, such as disease (Schroth et al., 2000), carbon stocks (Jacobi et al., 2014), shade (Rice & Greenberg, 2000), biodiversity, and ecosystem services (De Beenhouwer et al., 2013) are abundant, my research will help fill a gap in literature focusing on social factors in tropical agriculture.

The Green Revolution began in the 1960s as a solution to world hunger. Norman Borlaug created a variety of wheat that increased production which eventually won him a Nobel Peace Prize for helping “provide bread for a hungry world.” Similar work led to the doubling of wheat and rice production in Asia between the 1960s and 1990s. Technology drives the Green Revolution by innovating farming practices; one approach to this is genetically modified (GM) crops. First introduced in the 1990s, GM crops now cover 11% of the world’s arable land in 28 countries. GM crops make up half of all crops in the US, including 90% of corn, cotton, and soybeans (Folger, n.d.).

While the Green Revolution may sound like a solution to a food crisis during a time of rapidly growing population, countries in which its practices were first adopted have seen serious negative effects. The Green Revolution replaced traditional draught tolerant plants with water intensive cash crops such as sugar cane and wheat (Shiva, 2014). Compared to ecological farming, the Green Revolution uses ten times more water, which has led to the creation of more dams. These dams flood large amounts of land which have sometimes submerged entire villages and displaced residents (Shiva, 2012). In India, a country where the Green Revolution began, water availability had significantly decreased by the 1980s since 75-95% of the water was going to irrigation (Shiva, 2014). Along with a limited water supply, agricultural chemicals leaching into water supplies such as rivers and groundwater have increased cancer rates in agricultural areas (Shiva, 2012). Farmers in areas utilizing Green Revolution practices have seen an increase in pests, resulting in increased pesticide use, an increase in nitrogen fertilizer use with no increase in production, a decrease in soil quality, and an increase in farmer debt (Shiva, 2014).

The pressure for cacao farmers to switch from traditional shaded and biodiverse agriculture to shade-less monoculture fits within the theoretical framework of the Green Revolution. Farms utilizing shade-less cacao agriculture can have shorter productive lifetimes, use more agrochemicals, and are more vulnerable to pests, pathogens, and the effects of climate change (Useche & Blare, 2013). These practices are also responsible for deforestation (Bentley et al., 2004), carbon dioxide emissions (Harris et al., 2015), and biodiversity loss (Rice & Greenberg, 2000). Farmers have expressed preference for shaded systems for their ecosystem services such as nutrient cycling, natural pest management, prevention of weed growth, soil quality, and water retention (Useche & Blare, 2013). Region-specific qualitative studies should be carried out on cacao agriculture to determine the best sustainable and productive methods that will benefit farmers, rather than cause them environmental and economic harm. Since there is a lack of literature on the factors that influence agricultural decisions made by small cacao farmers, specifically in Colombia, this research can contribute to the theoretical framework of the Green Revolution and agricultural trends in Latin America.

The practical framework of my research is the use of the information in Colombian agricultural policy, the cacao market (Colombian or international), specialty chocolate purchasers, agricultural aid programs, and environmental restoration/conservation organizations. My research can be valuable for these parties because agriculture, and specifically agroforestry, varies among ecosystems and cultures throughout the tropics. Having regionally specific information can guide programs and policy that will be better suited for those they aim to support.

1. Explain the significance of this research problem. Why is this research important? What are the potential contributions of your work? How might your work advance scholarship?

With a 1.1 million ton increase in cacao production between 2009 and 2017 and a projected increase in world cacao production (ICCOb), many farmers worldwide have adopted intensive practices of agriculture that cause environmental degradation (Tilman et al, 2002). While there is literature on the biological and ecological aspects of cacao farming (Barral, et al, 2015; De Beenhouwer et al., 2013; Bisseleua et al., 2009), there is a lack of research that focuses on social aspects that motivate cacao farmers to use traditional biodiverse farming or adopt monoculture principles. Knowing specific regional and cultural factors that motivate farming styles can lead to aid programs, regulations, and outreach that encourage sustainable, biodiverse agriculture while conserving unique varieties of cacao. Since cultures within cacao-growing regions vary greatly, stakeholders, including processing plants, cacao buyers, chocolate companies, and environmental organizations, can benefit from understanding a specific region’s cacao growing culture.

Colombia has a unique cacao market; most cacao producing nations export a majority of their beans outside of cacao-growing regions, but Colombia’s cacao production is focused on meeting domestic demands. Chocolate is a staple of Colombians’ diets and is commonly consumed as chocolate de mesa, or drinking chocolate, which typically consists of cacao solids, palm oil, sugar, and flavors such as vanilla, cinnamon, or cloves. Along with chocolate de mesa, Colombians consume chocolate candy bars that are predominantly produced by two companies: Casa Luker and Nutresa (Benjamin et al., 2018). The production and consumption of cacao within Colombia creates a unique market. The domination of the Colombian chocolate market by two large companies could leave small cacao farmers vulnerable to the loss of economic and environmental sustainability, which emphasizes the importance of gaining regional and cultural information on cacao farmer preferences.

1. Summarize your study design[[2]](#endnote-2). If applicable, identify the key variables in your study. What is their relationship to each other? For example, which variables are you considering as independent (explanatory) and dependent (response)?

My study will involve gathering information on the cacao industry in South America and Colombia, which includes price differentiation for bean quality, export and import quantities, importance of cacao to the Colombian economy, and government programs designed to aid cacao production. Information on varieties of cacao grown in Colombia will also be gathered. I will research the pros and cons of agricultural styles such as agroforestry and monoculture. Aspects include pest management, ecosystem services, income diversification, and spiritual importance. I will hire a Colombian to collect qualitative and quantitative data on the factors influencing farmers’ agricultural decisions. I will collect this data through surveys of 50 farmers and semi-structured interviews of 3-7 cacao farmers. Individuals who have decision-making authority on farm operations, regardless of land ownership will be surveyed and interviewed. With limited time and resources, I hope to gain access to, and participation from, 50 farmers. Due to time restraints and my limited Spanish ability, I will limit my number of in-depth interviews but include open ended questions on surveys to allow for more robust data. To facilitate this process, I will use a Spanish translator during the interviews. I will also interview several direct-trade chocolate companies that promote their chocolate as single origin, organic, eco-friendly, and/or fair trade to compare their view of cacao agricultural practices in Colombia.

1. Describe the data that will be the foundation of your thesis. Will you use existing data, or gather new data (or both)? Describe the process of acquiring or collecting data[[3]](#endnote-3).

The foundation of my thesis will be previous literature on tropical agroforestry systems, market data on Colombian and international cacao supply, economic data on the Colombian cacao market, and answers to my survey and interview questions. I will acquire this data through semi-structured interviews via video chat and surveys in Colombia.

The following is a draft of survey questions:

How large is your farm?

How long has the farm been in your family?

How long has cacao been grown on the farm?

How old are most of your cacao trees?

Is cacao your primary crop?

How many other plant species do you grow to sell?

How many plant species do you grow only for family consumption?

Biodiverse, forest farming is necessary for providing food for family consumption (strongly agree-strongly disagree)

Do you incorporate timber trees in fields?

If so

For income

For shade

For nitrogen input

For weed management

For Erosion control

Other (open ended)

How important is the inclusion of shade trees on your farm?

Biodiverse, forest farming is important to me Spiritually/ religiously (strongly agree-strongly disagree)

Do you use chemicals (non-organic) on your farm?

Chemical inputs (non-organic) are necessary for profitable cacao farming (strongly agree-strongly disagree)

Shaded cacao systems are better for the environment/land (strongly agree-strongly disagree)

Shaded cacao systems are better for the long-term financial well-being of my family (strongly agree-strongly disagree)

Shade-less cacao systems are more profitable (strongly agree-strongly disagree)

The inclusion of native forest species within my farm is important to me (strongly agree-strongly disagree)

Providing habitat for wildlife on my property is important to me (strongly agree-strongly disagree)

Does your farm have any certifications (Organic, Rainforest Alliance, etc)?

If yes: Having a certification increases the price I receive for cacao (strongly agree-strongly disagree)

Where do you acquire plant materials (cacao trees/seeds/seedlings)?

What varieties of cacao do you grow? Crillolo, trinitario, forastero

Do you grow and sell fine flavor cacao?

If yes: Do you receive a higher price for this than hybrid/bulk cacao?

The market price of cacao beans influences the varieties of cacao I grow (strongly agree-strongly disagree

Household size

Number of people working on farm

What is the estimate of the price of cacao you received (per kilo) last year?

Has this price increased in the past 5 years?

What is the estimate of cacao yields last year?

What is the estimate of revenue from cacao yields last year?

1. Summarize your methods of data analysis. If applicable, discuss specific techniques that you will use to understand the relationships between variables (e.g., interview coding, cost-benefit analysis, specific statistical analyses, spatial analysis) and the steps and tools (e.g., lab equipment, software) that you will take to complete your analyses.

To analyze my qualitative data, I will use interview coding to identify themes within responses to see what the main factors are that influence farmers’ decisions. I will analyze my data using correlation.

1. Address the ethical issues raised by your thesis work. Include issues such as risks to anyone involved in the research, as well as specific people or groups that might benefit from or be harmed by your thesis work, perhaps depending on your results. List any specific reviews you must complete first (e.g., Human Subjects Review or Animal Use Protocol Form), and specific permits or permissions you need to obtain before you begin collecting data (e.g. landowner permissions, agency permits).

I will be working with farmers in Colombia, possibly including indigenous individuals. One risk in interviewing indigenous farmers is that traditional and/or sacred knowledge may be shared by participants. Participants may not want this information shared, and I will be cautious not to include this sensitive information in my findings. I will explain my intended study and how my information will be shared, ensuring that participants are comfortable with specific information being shared. Indigenous knowledge has been exploited for commercial gain in the past (Persoon & Minter, n.d), and any information given to me that is requested to remain private will be kept separate from my research information. I will ensure sensitive cultural information is not a part of my thesis.

Parties that may benefit from my research could be chocolate companies, forestry companies and non-profits, the Colombian government, environmentally-minded organizations, and cacao farmers. The intention of my research is for small-landholder cacao farmers to benefit from culturally and regionally appropriate agricultural regulations and aid programs.

Before I begin my research, I will need to complete a Human Subjects Review. Since I will be performing interviews and surveys, I will acquire permission to use information from each participant prior to and after each interview, to ensure free, prior, and informed consent. I will translate questions and consent forms into Spanish before I travel, and I will be working with a translator during the interviews to ensure a proper understanding of the research by all parties.

1. Reflect on how your positionality as a researcher could affect your results and how you will account for this in the research process[[4]](#endnote-4).

Since I am studying cultural aspects of Colombian farmers, I must address the fact that I am a white female and U.S. citizen. There are differences between the cultural norms of my home and my place of research, which could potentially cause confusion, misunderstanding, distrust, or resentment between myself and people I encounter during my travel. The Americas have a history of colonization, slavery, and the marginalization of communities and cultures that have been embedded in societal structures, and I have not experienced these traumas personally.

I must also acknowledge that I am an educated individual and have had opportunities to travel for parts of my education. I began my interest in the social aspects of cacao farming after a study abroad program in Peru. My educational background in topics including agroforestry, biocultural diversity, environmental justice, indigenous cultures, and ethnobotany gives me a respect for indigenous uses of plants. As an educated individual researching low-income individuals who may lack education, I plan to avoid perceived power differentials by adopting social customs when appropriate and making the survey and interview process as convenient as possible for the farmers. I plan to travel with an interpreter to participants’ property, if desired, at times that are most convenient for the participant. My past research of indigenous cultures and cacao farming has shown that agricultural policy, markets, and supply chains are typically not designed to provide the best benefits to small farmers, which has given me bias against large-scale agriculture. I will address this bias by including arguments and information by individuals who prefer high-intensity agriculture, provide market standards, and/or are higher on the supply chain in my thesis. I plan to include pros and cons of each agricultural style in my literature review.

1. Provide at least a rough estimate of the costs associated with conducting your research.  Provide details about each budget item so that the breakdown of the final cost is clear.

My research will require me to hire a Colombian to conduct surveys and interviews. I expect to spend about $500 on this. Rough estimates of expenses are as follows:

Surveryor/Interviewer: 284

Phone for recording/sending interviews: 222

Unexpected expenses: 100

1. Provide a detailed working outline of your thesis.

I. Introduction & History

A.      Chocolate Market trends

1.       Global

2.       S. America

3.       Colombia

B.      Indigenous connection to cacao

C.       European settlement

D.      Current agricultural trends of Colombia

II.  Colombia cacao market

A.      Importance of cacao to Colombian economy

B.      Bulk vs Fine flavor

C.       Supply Chain

III. Agroforestry vs Monoculture

A.      Deforestation from ag/ Climate change effects on ag/chocolate market – world examples

B.      Ecosystem services: comparison of agroforestry and monoculture

1.       Pest and disease management

2.       Water

3.       Biodiversity

C.       Economics

D.      Access to resources (irrigation, fertilizer, machines, etc)

IV. Influencing Factors

A.      Cultural

B.      Ecosystem services

C.       Economic/ Price differentiation

D.      Access to markets

E.       Political

V. Aid Programs

A.      Non-profit, conservation, agro, etc organizations

B.      Government

C.       Education & Resources

D.      Success vs Failure

VI. Importance of Research

A.      Cacao market increase

B.      Climate change/biodiversity

C.       Lack of social studies in area

VII. Methods

VIII. Results

IX. Discussion

X. Conclusion

1. Provide a specific work plan and a timeline for each of the major tasks in the work plan. Be as realistic as you can, even though you will probably need to alter this schedule as you complete the tasks. Remember that faculty readers take time to return your drafts and that the final polishing and formatting of your thesis for binding will take longer than you ever imagined.

 Winter Quarter 2020: Community Sociology: Theory and Research

        ILC: Qualitative Data: Gathering and Analysis

Spring Quarter 2020: Environmental Economics

        ILC: Colombia: History, culture, and agriculture

May-June:  Travel to Colombia to collect data: surveys and interviews

Fall Quarter 2020: No enrollment. Interview transcribing.

Winter Quarter 2021: Coding interviews, analyzing survey data in R by mid-quarter.

Begin analysis of data and thesis writing.

Spring Quarter 2021: Perfect literature review, finish intro, conclusion.

1. Who, beyond your MES faculty reader, will support your thesis? Indicate support both within and outside of Evergreen. Be specific about who they are and in what capacity they will support your thesis. If you are working with an outside agency or expert, be specific about their expectations for your data analysis or publication of results.

My data collection will rely heavily on the support of Renata Moreno Quintero, a native resident of Cali, Colombia. She will assist me in finding a community member to hire for data collection. She will also act as a translator during my data collection to ensure all parties are in understanding and agreement.

1. List the 3-5 most important references you have used to a) identify the specific questions and context of your topic, b) help with issues of research design and analysis, and c) provide a basis for interpretation. For each reference, explain how your project specifically connects to the source by extending, challenging, or responding to the conclusions, methods, or implications.

*An analysis of the supply chain of cacao in Colombia* (Benjamin et al., 2018) has been an important resource for me, particularly due to its depth of information. The article discusses production, import, and export trends within Colombia and addresses the cultural factors that drive a high demand for cacao domestically. The article also challenges ICCO reporting on fine and flavor cacao production, sales, and pricing, which creates much uncertainty in my previous and continuing research.

*Seeing the trees: Farmer perceptions of indigenous forest trees within the cultivated cocoa landscape* (Atkins & Eastin, 2012) has been a useful article for me not only in content, but in research design and analysis. The researchers interviewed 34 cacao farmers in Ghana regarding their demographics, cultivation methods, and attitudes about shade trees on their farms. This study helped me in producing survey questions.

*Cultivated plant species diversity in home gardens of an Amazonian peasant village in northeastern Peru* (Coomes & Ban, 2004), has been a helpful article for me in terms of helping me identify questions in my research. The study is based on home gardens in Peru, which provides a similar plant structure to my country of research. The study concludes that home gardens provide biodiversity and household needs and are related to socio-economic factors. This leads me to question socioeconomic factors of cacao farmers in Colombia compared to farm biodiversity.

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1. You are not locked into this title; its purpose is to help you identify the main point or topic of your thesis at an early stage. [↑](#endnote-ref-1)
2. You might discuss selection of case studies, sampling methods, experimental design, and/or specific hypotheses you will test. You should also address any specialized knowledge or skills that are necessary to complete the research. [↑](#endnote-ref-2)
3. If you are planning to use existing data, explain the specific source, contact information, arrangement with collaborating agencies, and expectations about use of data and final products of your research. If you are planning to gather new data, describe specific methods, time, place, and equipment that will be required. [↑](#endnote-ref-3)
4. Your *positionality as a researcher* refers to the fact that one’s “…beliefs, values systems, and moral stances are as fundamentally present and inseparable from the research process as [one]’s physical, virtual, or metaphorical presence when facilitating, participating and/or leading the research project…” (The Weingarten Blog 2017). [↑](#endnote-ref-4)