Vanilla bean farming in Madagascar has much potential to bring economic benefits to those who grow it, although many problems surround its agricultural production. In this article I theorize some ways to sustainably produce vanilla through a discussion of the various facets surrounding vanilla production that I observed from a survey conducted between December 28th and January 30th, 2018/2019.

Vanilla Bean Farming in Madagascar
An Economic and Social Report of Policy and Development

A Division III project by Timothy Raxworthy
Vanilla Bean Farming in Madagascar: An Economic and Social Report of Policy and Development

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May 8th, 2019

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Acknowledgements:

This project would not have been possible without the help of many individuals. I would like to thank my father, Christopher Raxworthy, who suggested the idea of investigating the vanilla problem in the first place. It is because of his past knowledge of doing biological research in the country that I was well equipped in traveling from the capital to Ranomafana town. I would like to thank my mother, Dianna Raxworthy, for always pushing me to do better, especially as of recently with developing a non-profit to help protect rural communities and biodiversity in Madagascar.

I would also like to thank my committee at Hampshire College for helping with revising and editing the writing of this project, including the various project proposals, grants and numerous rough drafts. As many who know me already know, I tend to like doing many things at once and so things can be quite messy at times! However, I was able to stay on track and continue to make revisions and edits along the course of my Division III thanks to Omar Dahi and Ethan Meyers whom I had the pleasure of having on my committee while completing my final year at Hampshire College.

It was a short introduction but indispensable for this research and so I thank the 76 households who partook in this survey. This report is dedicated to you. In the future, I hope to continue researching in these communities so that I can continue to create a sustainable future for vanilla.

While I was conducting my interviews, I stayed at the Centre Valbio of Stonybrook University. Thank you for providing me with a bed and feeding me! Some specific people who were important from Centre Valbio were my two research assistants, Leontine and George, who translated my survey into Malagasy—Jean Claude, the research coordinator of CVB who helped me set up meetings with the mayors of the different towns that I was operating in, and the director—Pat Wright, for responding to my emails warmly and happily accepting me into the research station.
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Introduction

For many people sustainability has become a major concern, especially with regards to agriculture. This is for good reasons because it shows that there is a greater interest in creating economic systems that can sustain themselves instead of simply creating economic profit. In this article I theorize some ways to sustainably produce vanilla through a discussion of the various facets surrounding vanilla production. This discussion will include my policy recommendations for creating a sustainable market and protecting wildlife, a short history of vanilla in Madagascar, a short political history of Madagascar, a problem statement concerning economic and social issues, and my methodology and data.

In this Division III research paper, I examine how the volatility of vanilla price swings, climate change, and other factors are having an impact on the vanilla bean farmers of Madagascar. I did this by conducting field research with 76 farmers in the Fianarantsoa region in Madagascar between December 28th and January 30th, 2018/2019. My main motivation for doing this study is to examine the intersection between the environment and agricultural markets, and to help inform those who want to know more about the communities that produce vanilla.

Examining this issue is important for several reasons: First, there is a growing concern about the effects of climate change, especially surrounding food security; Second, there are still many questions surrounding economic development, and so this research also examines possibilities for how this development can be sustainable for small rural communities.
Part 1 – Policy Recommendations

To begin, I would like to first define the term ‘sustainable development’, because it is not very clear as to what is understood by it. For those who do not know some history behind economics, it may be even more murky as to what is meant by sustainable development and how is it put into practice. Putting it very simply, sustainable development is what economists refer to as the current stage in the evolution of development economic thought that has been taught, practiced and observed through the years. Its conception has contributed to agreements and disagreements on what goals are to be achieved. In a most truthful and modest sense, sustainable development is more of an empty concept than most would imagine. It has come about not to force its own mathematical models into the minds of those who work on developing economies, and instead would like to remedy the past problems of older generations in an attempt to open up economics for those who may be able to provide the innovative key as to how we may be able to push forward and prevent further failures. This is especially important for countries like Madagascar which exhibit very particular economies that are not generalizable to the ordinary policy creating processes.

Kaushik Basu, an economist for The World Bank discusses the empirical evidence of failures from the past in his paper “On the Goals of Development”. He raises questions in his article concerning development goals for the new generation, “Chile’s per capita income grew at the more sober rate of 1.6 percent a year over the same 30 years, while Ghana’s declined at an annual rate of 0.9 percent. Negative average growth rates over the past 30 years were also observed in Bolivia, El Salvador, Madagascar, Senegal, and several other nations.” These anomalies raise a host of new questions concerning development and distribution. What policies

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1 Statistics from the World Bank 1998
should global organizations such as the World Bank and the World Trade Organization follow or advocate?” (Basu 2011). Much of this confusion over development goals seems to have been blamed on empirical observations in countries like Madagascar, which have consistently been dubbed ‘anomalies’ in the last thirty years. For a country like Madagascar though, these anomalies may be less about supporting claims that Madagascar has had a failing economy, and more in support of the claim that measurements like GDP or GNP, or concepts like constant growth theory are arbitrary for Madagascar’s economy. It is this acknowledgement that has led economists and other social scientists to come up with new models, new equations, and new theories to better represent the largely varying economies of our world.

What has been observed in recent time has been a new concern that has emerged out of the numbers, and this has to do with our environment. It is our environment that has become the center point behind the anxiety of Western economics. This anxiety has grown stronger over time and Basu also notes this anxiety in his paper, “To maximize income growth, environmental considerations were left to languish on the sidelines; the standard of living was often allowed to slide; large inequalities between classes, regions, and gender were ignored; and poverty was tolerated more than it should have been in the rush to generate maximum growth” (Basu 2001).

There is a tension between economic growth theory and what Basu refers to as ‘environmental considerations’. This tension has been exasperated by market barons who exploit constant growth theory to create an ever-increasing surge of products that continues to accrue them capital and maintain a good credit score. The untold negative effect of this though, is that it has generated a societal neglect of the reality of food security and the neglect of health issues that could come about by the irresponsible manufacturing of the many various synthetic products in
retail. Along with these negative effects, there are also climate issues like rivers drying up, desertification, and the increasing strength of tropical storms, hurricanes and tsunamis.

Not to transition this conversation too drastically, but vanilla in both its plant and product form is in the middle of this tension between the capital generated from its production by way of constant growth theory and the many environmental issues that are inherent to its production. On one side, constant growth theory has attempted to do away with natural vanilla, with its reasoning being that if constant growth is to be achieved than there cannot only be only one period of harvest a year, but that there must be constant harvests with increasing potential for even more production. The only achievable way to do this is to find use of chemistry to mimic what is naturally occurring and avoid the yearly cycles of harvest and pollination. If a different method can mimic the natural product and be produced by lab equipment, then the time involved can be condensed into the mechanical processes of that equipment, and all the costs of transporting and payment of agricultural workers can be entirely avoided. This has led to the widespread usage of synthetic vanilla, which is now put in many drinks, flavors, fragrances, and foods.

However, natural vanilla is still consumed all over the world because of its high demand. Natural vanilla is not disappearing per se, but the challenge of producing and marketing natural vanilla it is not getting any easier. Natural vanilla as opposed to synthetic vanilla must consider the yearly cycles of its agricultural production, which means that there is an imperative to use natural science to sustain these cycles into future decades. These cycles have more to do with the environment and less to do with the statistics of input and output and ever-increasing numbers on the board. In these next two sections of Chapter 1, I theorize some possible ways that these cycles can be improved while also keeping the environment in consideration. These
recommendations are based off observations I made while in the country and the results of the survey that I conducted.

**Create & Grow a Sustainable Market**

The first concern is to further develop the existent vanilla market in Madagascar by providing policy that can minimize existent issues and help prosper the local communities involved. The current market has many issues including a large price disparity between middlemen and farmers, a 50% crime rate (see methodology & data section), no local processing cooperative other than those located near or around Sambava, and no established fair-trade system. These recommendations in the following paragraphs are based off assessments of my own research since there is not much research on policy with regards to Madagascar. There are many reasons as to why there is such a lack of research on policy in Madagascar, one of which is the shockingly small percentage of products that have been fair trade certified. This was observed in the study *The Economics of Fair Trade* conducted by Dragusanu, Giovannucci and Nunn. They report that Fair Trade-certified coffee exports were only 1.8 percent of global coffee exports in 2009. Hopefully though, as discussions progress and society becomes more attuned to issues surrounding international products, more research into effective and sustainable fair-trade models can be developed.

First, we will discuss the issue of price disparity between middlemen and farmers. When this disparity is looked at in tandem with the observed low outputs of vanilla (see methodology & data section) and the prevalence of crime, the economic landscape does not look too positive. Although, there is potential for growth if an entrepreneurial focus could be developed alongside the agricultural sector. This potential is demonstrated in the many associations spearheaded by
leaders who attended university either for business or economics. These associations help to unify the agricultural sector for vanilla and give the farmers an ability to progress the market so that it can further prosper all those involved in the trading, growing and marketing of vanilla in its various forms. All that is needed to complement this sector is a marketing apparatus that can develop products to sell to the global market.

To fix this price disparity, an enforcement of increased transparency among middlemen should be established. A major issue is that many who buy green vanilla do not know its background, whether it was grown locally or from a village 1500 kilometers away from the area of processing. This means that vanilla consumed all around the world could be of criminal origin, stolen from a farmer’s plot of crop. The 50% crime rate reflects the prevalence of thievery faced by farmers and it is this stolen green vanilla which ends up being bought in the north for an even cheaper price than what the farmers advertise of around 145,000 Ariary (roughly 40 USD). Observed crime and the price disparity go hand in hand for the Malagasy vanilla market.

A lack of a processing cooperative is the main symptom of the two other issues brought up in the last paragraph. If a local cooperative could be established with its own set of clearly defined policies for long term goals and its own methods of accounting and formal communications with other parties, then it could serve as a solution to observed issues in this survey.

To help clarify what this cooperative could do, an example of a theoretical vanilla processing cooperative will be provided alongside specific policies that it would abide by. Firstly, a policy emphasizing locale integration is necessary with one part working on tightening production and the other being the development of international trade for the town. These two parts are included in the same policy as they outline specific activities that benefit the locale
within the cooperative. Production tightening can be done by conducting surveys of households who comprise the cooperative. These surveys will be directed by a clear hypothesis so that any economic models can be tested with relevant data. Some examples of testable models include those concerned with inputs and output, slow inflation of price over time, or price setting etc. All that is needed is a properly trained team of interviewers and economists who can work together to create data collection projects and gather information. This information is useful when predicting different outcomes of a market as it can further centralize knowledge related to rain-levels, number of plants, age of plants, geographic coordinates, workers hired, income etc.

Production tightening can ensure that a method of accounting is established for the local farmers and the global consumers. By integrating surveys with already existent traditional interests, the formalization of business transactions can be done alongside a board of elders who can give their input on decisions. Overtime, if more jobs can be created than hopefully those who seek payment will turn away from crime and instead, towards a formal business venture that can provide a stable income. To make this formality achievable though, economic surveys must be developed and conducted over a period of time at different intervals so that hypotheses can be checked numerically and formulated better. The price of vanilla can achieve stability if a processing cooperative focuses on this task alongside the regular activities of processing vanilla which in turn can decrease the rate of crime.

The second part to this policy is the formulation of international trade, which can be developed by creating connections to consumers outside of the country and by becoming fair trade certified. To prevent the whitewashing of ethical production and fair-trade though, cooperatives should produce detailed reports and present these reports to parties interested, beyond only the consumer. Producers who have no interest in transparency will be unable to
claim that they are conducting business under a fair-trade system that directly connects farmers to consumers as they will have no data and subsequently no way of giving answers to particular questions about the state of the vanilla market. Currently, some businesses have fair trade certification for products, but there is still not enough. The current system of vetting whether or not products meet a standard for fair trade is provided by Fair Trade America, an organization that has developed an application process to assess if products meets their standards. If a product does pass than a Fair Trade America logo is printed on the packaging. Unfortunately, not many products have this certification. There are also many other ethical business memberships and certifications including B Corporation Certification and the Fair Trade Federation Membership, but just because there are many of these different certifications does not ensure that these businesses are meeting ethical or consumer standards. If anything the prevalence of many different ways to assess the efficacy of a business points to the arbitrariness of these certifications.

The next question then is how do these qualifications vet, rate, and approve businesses, non-profits, NGO’s and all the different labels we have for our organizations? Both B Corp Certification and Fair Trade Federation Membership use an online application format, where a user can input information about their organization. These questions are answered by the user’s discretion solely, making bias and validity both issues of contention. If only one respondent is answering questions about his or her business without a mediator then how can any grounding in meaning or context be achieved? A measurement of social or environmental impact is a subjective thing and needs a grounding in context for each organization since not all are going to achieve this in the same manner. By using a highly structured web application as the means to record this information instead of a real person, those who do only a little digging into what
appears socially acceptable will be able to pass these tests with flying colors. This is a concern that needs to be addressed by the cooperative itself so that trust can be built between all parties involved in business transactions.

The multitude of fair-trade certifications is a large problem for organizations today because they serve to make business activity less transparent, circumvent formalities of written reports, and decrease discussion in the public surrounding the origins of their agricultural products. To fix this problem, social science researchers of different fields should develop a way to assess businesses using survey methods, and re-design the for-profit, non-profit and non-governmental definitions. These definitions in their current state do nothing to define actual social impacts of these organizations for consumers, producers, governments, and international trade. They only serve to ease the delusions of a liberal economy that allows for much confusion and misses the social side of their activities completely. This current system only creates more chaos in our communication with one another and ultimately harms the traditional cultures that are involved with these self-gratifying organizations. Asking for a total re-design of these definitions is a tall order because of how integrated these categories are with how we legally define entities but perhaps a discussion can begin surrounding the real applicability of these categories and whether they are valid when defining and designating legal differences between organizations.

Under a cooperatives own designation, a system of fair international trade should be developed and condensed into public written reports. If cooperatives utilize their own systems, then a better model can be developed without the need for an arbitrary fair-trade logo on the packaging. This then gives the discretion to the consumer to judge a product or organizations efficacy for themselves and not solely one agent or representative of that organization in question.
These are the two parts of the first policy for this theoretical cooperative, namely production tightening and international trade. Once this first policy is outlined by a cooperative then subsequent policies can be developed to help elucidate other issues of contention that have to do with a cooperatives particular line of business. This first policy is of utmost importance as these two policies are lacking in substance in many organizations that follow a liberal economy’s normalized behaviors, including those with ties to the United States and Madagascar.

**Grow & Conserve Wildlife**

Alongside the creation of a sustainable market there is also the need to develop environmental conservation and reforestation projects. This need is addressed as second policy for this theoretical cooperative. This policy has many benefits including the protection of endangered species, strengthening the bond between foreigners and the locale, and the exposure of knowledge between scientists and traditional actors.

The only part of this policy is that a project should be dedicated to conserving and growing the environment, with its methods being judged by regular reports that follow up on the project’s conservation or reforestation goal. For the case of this theoretical cooperative, two separate projects will be discussed.

The first project focuses on creating a nursery of young vanilla plants overseen by the cooperative. The objective of this nursery is to help disseminate vanilla plants to those who do not have the opportunity to grow vanilla, particularly disseminating plants to communities that exhibit stressors stemming from a lack of food. These stressors can manifest in different ways including the hunting of lemurs for food or the association of villagers with bandits, depending upon the specific area of concern. Once villages have been identified these plants can be offered
as gifts to those who accept the offering. By giving farmers access to vanilla, there is more of an economic opportunity for them to pay for food because of the extra income they earn by selling their vanilla. As the price continues to rise for green vanilla, the hope is that rates of hunger drop in tandem with this until eventually there is virtually no hunger seen in these populations.

The second project, which derives from the first, involves planting endemic trees as tutors for farmers. Saplings can be regrown in areas that have suffered from slash and burn or mining. Vanilla is then grown around these trees from communal nurseries developed by the cooperative. The green vanilla produced by these plants can be owned by the cooperative, and its profit from sales can go directly to help pre-finance farmers in the following January when surveys are conducted. Overtime, this sapling project could even expand to areas that have been hit with droughts, although this will entail a larger project that incorporates diverse skills of plumbing. This project could also expand into growing many other kinds of flora than only endemic trees. With help from dedicated researchers this reforestation can be expanded into further complex and interesting territory, beyond the environmental concerns observed in this paper and contemporary economics.

This finishes the second policy for this theoretical cooperative, and two possible future activities undertaken by this cooperative. This next section deals with the historical significance of vanilla. Vanilla has gone through many changes in the last couple of decades and this has been due to a growing economic interest resulting in human activity that has drastically changed vanilla into the spice we know today. Because sustainability implies that a system can last for a long length of time and sustain itself into the future, the past is important so that policy makers can prevent neglecting the causal events that have already influenced Madagascar’s current
situation. Knowing this information unifies opinions so decisions can be met more readily, and baseless arguments can be swept aside.
Part 2 – History of Vanilla in Madagascar

In May of 2018, TIME magazine published an article titled “The Bittersweet Cost of Madagascar’s Vanilla Boom: Vanilla is Nearly as Expensive as Silver. That Spells Trouble for Madagascar.” The thesis of this article is that vanilla is difficult to control, volatile and an agent for problems in Madagascar. This is especially true when prices spike and only a small amount of vanilla is needed to make a fortune. Researchers have identified that climate change related weather patterns destroy the crop and cause prices to surge and supply to drop. This then brings more farmers into the market causing prices to drop again.

Further along in the article the author also notes an interesting idea surrounding the evolution of vanilla beans, “Evolutionarily speaking, vanilla should have died out long ago. Now farmed far from its native Mexico and the bees that evolved to fertilize it, vanilla orchids must be pollinated by hand in a time-consuming process—the small white flowers bloom once a year, for one day only” (Baker 2018). All vanilla produced in Madagascar is hand pollinated which adds to the difficulty of growing the spice. Once plants are grown, they take around three years to grow until they bear fruit. The variety of vanilla grown in Madagascar is known as Vanilla Planifolia A and is one of nearly 110 species described by natural scientists (Purseglove et al. 1981). Vanilla was originally cultivated in Mexico and brought to Madagascar during the Spanish and Portuguese expansion. It was documented by the ethnographer and missionary Bernardino de Sahagun in the mid 1500’s. The word vanilla come from the Spanish word vaina meaning pod and was later commercialized by French Royalty in 1692. The vanilla being cultivated in the 17th century by those in Central America and Western Europe was a different type of vanilla than what we are used to now, Vanilla Planifolia A, and was most likely Vanilla Pompona. It later became a commodity produced by the Reunionese on Reunion Island before
the crop was brought to Madagascar. Because of the innovative practices in vanilla pollination, growing, farming, and processing developed by the Reunionese, the contemporary *Vanilla Planifolia* became a commodity that is now central in many different food items as a natural flavoring. Eventually these practices were brought to Madagascar where it now occupies a large workforce located in the northeastern Sava region of the country. Reunion, Comoros, the Seychelles and Madagascar all share the title of Bourbon vanilla which was originally the name of Reunion Island, Bourbon Island. Vanilla has changed over the years from its earlier stages and has developed into a biological phenomenon. The sheer diversity of species observed exceeds standard taxonomic labeling and so it has been listed as a Taxonomic Complex Group or TCG (Ennos et al. 2005)(Bory et al. 2010).

Vanilla’s main exporter is Madagascar with a $531M share of the total $859M or 62% of the total market in 2018. The top importers are the United States ($326M), France ($150M), and Germany ($131M) reported by the UN COMTRADE. Because of this monopoly-monopsony situation of authorities in Madagascar and the buyers in the United States, issues are raised of double market pricing power with regards to welfare and internal distribution. In the case study “Pricing Policy Under Double Market Power: Madagascar and the International Vanilla Market” it is suggested that the pricing policy followed in Madagascar is “closer to that predicted by a predatory view of the state than by a revenue-maximizing bureaucratic state” (Melo 2000). This results in the over taxation of exported vanilla and severely reduces the producer price. Considering the political instability that has been observed in Madagascar for the last decade this observed taxation falls more in-line with a predatory description and less of a paternalistic one, and it is likely that this observation still holds true. This means that many of these communities
rely on other organizations that the government to sustain themselves. These organizations take many forms like agribusinesses, research centers, and charity organizations.

Recent Political History of Madagascar

Madagascar gained independence in 1960, although most historians agree that real independence was not achieved until 1972. After 1960, Madagascar was still heavily dependent upon the French government, which had colonized the country prior. The French intensely industrialized Madagascar by building large projects like railroads and by moving people through the slave trade. This has had large ramifications for the country as many people still speak French and have business connections with French organizations.

After this the people elected the strongman Didier Ratsiraka, who gravitated towards revolutionary socialism. Ratsiraka ruled for 16 consecutive years and helped to unify the diverse provinces of Madagascar. By the 1990’s, Ratsiraka became unpopular and lost the election of 1992. He would still be a major political figure in Madagascar, although his popularity would never be at the same height as it was when he was in power through the 1970’s and 1980’s. Other political figure would rise after Ratsiraka, including Marc Ravalomanana, who would help to facilitate a much more liberal state for the Malagasy people.

In 2009 a coup d’état organized by mayor Andry Rajoelina took place as a response to the shutdown of his media television and radio stations Viva TV and Viva FM by then current president Marc Ravalomanana. Rajoelina organized a group of 30,000 demonstrators in Antananarivo and successfully took power from Ravalomanana. Rajoelina appeared to be a catalyst for the Malagasy people’s anger towards Ravalomanana’s presidency, particularly because of his 2008 contract with the company Daewoo Logistics which would have
successfully leased up to half of the islands arable land to South Korea for corn and palm oil cultivation if it were implemented (Jung-a et al. 2008). In reality, Rajoelina was acting for personal gain. Natural resources have constantly been a focus for political power in Madagascar mainly for their potential economic profits. These profits are held by a small percentage of the population and help to contribute to the large inequalities between the rural and urban populations. One of the largest money sinks for Madagascar is its reserve of harvested rare hardwoods like rosewood and ebony which are illegal under international law but are sold to buyers who are interested in an assortment of goods including Ming Dynasty imperial styled furniture in China (Garety 2009) and Gibson guitars in the United States (Hunter 2007). The international CITES treaty (The Convention on International Trade in Endangered Species of Wild Fauna and Flora) as well as a national ban on rosewood sale are still not able to stop smuggling in the country and it is more than likely that governmental players benefit from these illegal trades.

During the 1980’s donors like the World bank and the International Monetary Fund (IMF) liberalized the Malagasy economy, effectively changing the job market and developing conservation agencies in the process. With these donations came development objectives like the effort to stop tavy, a practice of slash and burn used to create farm land for rice fields. Other programs also developed to achieve development goals and sustainability efforts including the protection of reserve forests. Many of these reserve programs have failed due to rural villagers resisting conservation programs. The reasons behind this resistance are complex and involve claims that funds were diverted and not given to communities (Sodikoff 2012). Soon after the early 1980’s, market liberalization policies abandoned state marketing boards as a condition for receiving funds from the World Bank and IMF (Rakotoarisoa 2001). It is this decision alongside
many others that spearheaded the Malagasy state development of liberalization market strategies. Because of this, Malagasy state policy actively reinforces village governmental orders due to its reliance on the traditional structures that these villages operate under (Nelson et al. 1973). Each village is known as a *fokon’olana* or commune and each has its own structure of governance. These fokon’olana which are agriculturally based differ from the urban population in marked ways as many studies suggest through evidence (Barrett et al., 2001; Raikes 2000). For example, many who live in the fokon’olana do not speak French, which many who live in the city do. There is also a difference in occupation, where most who live in the rural villages are subsistence farmers as opposed to those who live in the city are more likely to be artisans and merchants.

By examining the vanilla market and its connection to current implemented policies, we can better identify current issues surrounding developing economies. If a consensus surrounding the economic opportunity of the vanilla market can be reached, then economists can better formalize the market and fix the current problems in Madagascar and most importantly help the Malagasy people who are some of the poorest in the world. It is the responsibility of organizations to better understand markets so that they can strive for the betterment of the people and not personal or private monetary gain.
Part 3 – Survey Project

Problem Statement & Context

The main question of this study is how do organizations create sustainable policies for agricultural production? In a study done by Bart Minten, Lalaina Randrianarision, and Johan F.M. Swinnen titled “Global Retail Chains and Poor Farmers: Evidence from Madagascar” research showed that farmers who set up contracts with supermarkets have higher welfare and more income stability. However, this study focused on farmers producing vegetable products, and not vanilla. Vanilla contrasts in crop definition from rice, tubers, potatoes etc. and is labeled as a cash crop like coffee. “Cash crop” refers to crops that can be sold for a large profit. Most crops that fall under this category are specialty items. This definition of “cash crop” is not different from the Malagasy interpretation of the crop according to their traditions and lineage. Vanilla is an agricultural product and not a vine that grows money, but both Westerners and Malagasy define it as if it did. Therefore, a contract may see an observed benefit for populations of vanilla farmers since they could help give structure to the capitalistic terms of which vanilla markets are already operating under, although this was not considered in the Minten et al. study, which focused on vegetable markets in Madagascar.

Many natural science studies have been conducted in Madagascar and this has caused neglect of research incorporating human societies as an area of focus. This same concern is echoed in a recent report of Madagascar in Annual Review of Anthropology, “To be of greatest value, studies must encompass and bring together the multiple and diverse histories of arrival: ‘natural’ Madagascar is landscape with people, not without” (Dewar et al. 2012). By examining economic processes this study is also examining the environment and how human populations interact with it.
My research was conducted directly after Christmas day in December. This time was chosen for logistics surrounding my Division III timeline but also because during the holidays most Malagasy are settling down with their families and so they are not particularly sociable. Because of how much this project relies on my interaction with participants in Madagascar it would be wise to collect data at a time when people are welcoming towards strangers.

I employed a semi-structured survey on economic and social aspects of vanilla to gather information about agricultural production and development in Madagascar. Surveys are an optimal way to answer the question stated earlier in this section, “How do organizations create effective sustainable policies?” Because surveys can be repeated, they allow for discussion of validity and representation when making arguments about specific observations seen in a population. Therefore, surveys conducted by social scientists are one of the only ways that policies can be developed over time because they allow for the tracking of subsequent effects seen in a population.

But what do surveys mean for those living in Madagascar? To answer this, we must discuss the current principles of policies in the country. Since 2007, Madagascar and much of Africa has opted for what has been dubbed a “green revolution” (World Bank 2007). This revolution has been characterized by putting more emphasis on small shareholder-based productivity to reduce problems of soil degradation, biodiversity degradation and human environment degradation. These goals and others have been questioned in their development due to reasons like poor governance and management which have also been blamed for a decline in the African agriculture (World Bank 2013). Other factors like a rising middle class, poor documentation, and climate change could also be considered as causal factors for the decline of
agriculture, although much is still unknown whether these other factors are observed in Madagascar.

Local policies implemented by smaller village organizations have impacts as well. To obtain information about the local policies in this project, the first step was to interview village heads in the Ifanadina region. During these interviews I presented the village heads with authorization papers and questionnaires. These interviews with the village heads were structured so that a discussion about the locale and information regarding vanilla could be held. By talking to the authorities first, I gave myself the opportunity to make my motives clear to those in the village. This method is contingent with the Malagasy governments choice to create decentralized solutions for agricultural issues which were identified by the Action Plan for Rural Development or PADR. The PADR identified two large problems that it was tasked with 1). Institutions and rules and 2). Empowerment of civil society and production system (PADR 2001). To achieve these solutions many organizations, researchers, funders, donors and policy specialists have been working on numerous different projects to develop Madagascar’s agricultural sector.

This decentralized schema taken by the Malagasy government has positive and negative consequences. It is hard to assess whether this policy is having a positive or negative effect in general because of missing data and data collection techniques. One of the negative effects of a decentralized government is the stratification of society along already existing income imbalances. These stratifications could intensify over time when a government chooses liberalization over stricter price setting strategies. What is known though is that there are existing gaps in data collected on specific markets in Madagascar (Oya 2010). This makes assessing long-term longitudinal development strategy goals difficult. If Malagasy society is becoming further stratified then it is right to assume that development projects are heavily dependent on
organized efforts of grassroots entrepreneurial projects and less dependent on governmental programs. To obtain accurate information on the developments of these strategies, there will need to be a coordinated effort between the different hierarchies in society, governmental and nongovernmental, and research conducted.

**Methodology & Data**

The design of this study follows the principles discussed and developed in the text *Survey Methodology*.

*Survey from a Design Perspective* (Groves et al. 2009)
The constructs in this study all relate to either the vanilla market or vanilla production. These include things like output of vanilla, observance of crime, number of contracts etc. To trace this, a survey with questions designed to identify indicators of different aspects surrounding this market was conducted on a sample of vanilla farmers in Madagascar. Different psychological principles were applied to help formulate and structure these questions to accommodate numerous categories of error.

For instance, to make sure questions can be interpreted by the respondent these survey questions were asked in a conversational mode based on the observed increase in accuracy from this mode (Schober and Conrad 1997). Strict standardization has been shown to overlook errors due to definitions and level of complexity and does not allowing the interviewer and the respondent to ground their questions in meaning (Suchman and Jordan 1990).

Another issue that has been observed by the Norwegian communication specialist Øyvind Dahl are the assimilation and contrast tendencies seen in Malagasy culture. These assimilation effects are something that need a study of their own to be properly examined as most of the information documenting this is based on observations. In the chapter “Malagasy Pragmatics” Dahl writes, “In Malagasy culture the expectation regarding self-disclosure is very different. One is not expected to reveal inner feelings but to conform to conventions in expressing what one should say rather than what one really feels. A violation of these expectations incurs sanctions from the community” (Dahl 1990). These assimilation and contrast effects in communication cause changes in the common ground established between the interviewer and the respondent (Schwarz et al. 1991) and this has shown that question order is relational to the interpretation of the question by the respondent as well as the answer provided by the respondent. Therefore, questions included in this survey are quantitatively based and attitudinal feelings towards life or
other constructs are measured using a scale or using dummy variables. As the interviewer works their way down the questionnaire, questions start by establishing a common ground and then become increasingly specific to avoid assimilation and contrast effects. Questions dealing with similar issues will be grouped together to make sure that a common ground can be established between the interviewer and the respondent on varying constructs of interest.

**Survey Results**

To collect the data used in this study, a survey method was used. This survey was semi-standardized, included quantitative and qualitative questions, and was used in multiple neighborhoods of Madagascar. I use the term “semi-standardized” here because I wrote and used a standardized set of questions, but these would often change depending on each person being interviewed. In the introduction of this study, I discussed the possibility of how survey methods can be used in rural Madagascar to develop sustainable policies. This section will devote itself to a review and a discussion of the actual data collected during this study.

The survey itself contains thirty-six different questions, including three questions that I define as “profile” questions, which include more information. I worked with a team of two translators, courtesy of Centre Valbio, who also had knowledge of endemic trees in Madagascar. Most of the time our team included another member of the town who would be the president of the local vanilla association. This president helped with guiding us from one area to the next. Each person interviewed was first explained the objective of the study by one of my translators. After the introduction we would walk to the location of the vanilla vines and conduct the interview. These interviews lasted around 15 to 30 minutes in length. At the end of the interview a token of thanks was given to participants. Finally, GPS coordinates were taken of the area. In
total seventy-six households were interviewed in this study, spanning across 25 different villages.

Some other aspects of the survey are the inclusion of questions used as buffers to screen answers given by participants and the section of questions on government support that were ultimately dropped due to their being little to no evidence of this present in the sample. As a discretion though, I would like to stress that these villages operate in a traditional manner, making provisions more communal so this does not mean that support does not exist but that it appears more readily in the town center or other communal areas, instead of from a government affiliated entity. This is positive for the overall town, but it also creates a bucket of crabs situation on occasion. For example, a town was donated three motor bikes that are rarely used since they are not the official property of anyone.

The mean for years spent farming vanilla is a just above five years\(^2\), meaning that the average farmer has only been looking after their vanilla for a short amount of time. Vanilla takes at the very least two years to develop its first fruits, and this is only assured if the plant is grown in optimal shade and water settings and is pollinated correctly. Once the plant bears its first fruits it will grow fruits for the next five years in increasing quantity and size. After this, the amount of fruit will begin to drop until the plant’s death.

Because of how young this population is, it means that areas surrounding Ifanadina region are still developing vanilla growing techniques, resulting in a wide diversity of methods practiced. The market for vanilla is also only a beginning blueprint of what it could be. Further evidence of this is that only one participant reported having a contract with a cooperative. Most if not all sell their beans on one day that is set up between a vanilla processing cooperative from

\(^2\text{See figure 3 in Appendix for a histogram of years spent farming}\)
the northern part of Madagascar and the gendarme of the village. This restrictive system stifles the market and is counter intuitive to how vanilla naturally grows because green vanilla beans do not ripen at the same time and should be collected over the process of a few weeks in the winter months to prevent issues during the post-processing stage. Because of their being no local cooperative that can buy, process and ship the vanilla, the market is conducted in a removed manner.

Profile Qualitative Questions

This section was made from a series of questions that focuses on farmers anecdotal evidence of different observed phenomenon including natural disaster, cyclone damage and insect damage. These environmental questions are important for sustainable policy as they let researchers record and track stressors that decreases a household’s income. To ground these environmental stressors with each particular household, economists can better pre-finance those who may not be able to make a livable income. Agricultural production and Malagasy economics are heavily intertwined which is why growth theory is less of a concern. What is of concern is the natural environment and by using it as an indicator, economists and natural scientists can better systematize a more sustainable future for Madagascar.

Out of this sample 46% are part of an association with other farmers in the area. There are different ways that famers can claim their association but most often a piece of paper or a book is given to those who are in the association with the names of the others who are also part of the association. There are different benefits to being part of an association with some participants claiming that these associations do not do much. Some benefits I observed are gaining access to communal nursery’s for vanilla and attending group meetings to discuss
problems such as security. To become part of an association you must submit papers to those who oversee the agricultural production within the town to be possibly accepted.

A large problem for those growing vanilla is security. Half of the sample responded that people had stolen their vanilla in the past. These responses appeared in two cases: First of people cutting the fruit from the vine and second of people digging up the whole tutor tree and bringing it to another plot of land. Security was reported as the most frequent problem for those growing vanilla, above sun burning, cyclone damage, and insect damage. Farmers have created ways to deal with this issue with the creation of associations. These associations allow farmers to share information about when and where their crop was stolen to aid in catching the criminal. Those who are fortunate of income can hire guards to protect their land during the volatile months as well. Some have also resorted to setting up traps in their area for protection. These are rarer cases with the most common remedy being farmers relocating their vanilla vines to somewhere high up a mountain where it is more difficult to steal than those located near the main road.

Unfortunately, because of Madagascar’s problem with corruption, some of those who are caught stealing do not serve their full sentencing and are sometimes released within the month that they are caught. I heard this on multiple occasions, but more information needs to be uncovered about the way crime and punishment are dealt with in Madagascar.
Health problems are an issue for farmers as well, although there is a team of researchers at Pivot (a non-governmental organization) who help provide medicine and clinical care to those who are ill\(^3\). Some of the different health problems are fever, diarrhea and vomiting, infection, and inflammation. Malaria was also seen in those who experienced health problems, but it was not reported as frequently as expected (five cases). For those living around Ifanadina there is a hospital that helps provide medical help, which is also supported by the organization Pivot. All the farmers who had experienced a health issue responded satisfactorily when asked about their hospital experience.

Natural disasters like plants burning from too much sun, cyclones, and destruction by insects were noted by farmers as well. With knowledge about the suitable conditions for vanilla vines, these negative destructive factors can be diminished. For example, sun burning can be improved with better shade from either the canopy or from tutor trees. This is why the practice of *tavy* or using fires to clean clear an area is counter-intuitive because it sacrifices important shade that protects the plant from sun burning. Many trees were identified as tutors for the vanilla during the survey, but the most frequently observed tutor was the manga tree. This tree works well because it has many small leaves for shade and lots of water to give to the vanilla vine. The

\(^3\) You read more about this NGO at http://pivotworks.org/impact/
manga tree and other tutors can be groomed so that they stay the same height as they grow. This makes it possible for farmers to reach fruits as the vine grows in length. Endemic trees are used as well including kinanafotsy and voanjohazo, these trees are regularly seen in areas grown far away from the road where there is more canopy to cover the plants. Cyclone damage, a worse problem for those growing on an incline, can destroy the root system of the vine and the flowers of the plant when they are in bloom. By putting plant matter around the tutor and the base of the vine, water damage to the root system can be lessened. Farmers who are on a vertical incline also make small wooden barricades to reinforce the land so that trees are not pushed down by erosion or heavy wind. The final natural disaster is the insect which eats the vine and looks to be a caterpillar of some kind. Farmers remove all parts of the plant that have been consumed and kill the insect to prevent further damage. Below in Figure 1 are a couple examples of what the adult insect looks like and Figure 2, located in the appendix, is of the juvenile insect.

Figure 1
Farmers also grow crops other than vanilla, most commonly coffee and bananas. Other common crops grown are avocados, cassava, and rice. All of these percentages can be found in Table 2 in the appendix. Subsistence farming is what Malagasy farmers have been indicated as the main activity they are involved in, and so it is interesting to note that another ‘cash crop’, coffee, is also very widely grown within this population.

The final profile question asked if the sample believed that they had made good money from vanilla in the past year. 25% of the sample responded positively with a yes. This could be attributed to three reasons: 1). the still developing market 2). The relatively young time that farmers have been growing their vanilla and 3). the stealing of plants. But with still ¼ of the sample responding that they make good money from their vanilla shows the potential for economic development in these areas from vanilla production. The rest of the sample was ambivalent in their ability to make profit.

**Quantitative, Dummy, and Ordinal Questions**

This next section deals with quantitative, dummy variable and ordinal questions in the survey. These questions are what composed most of the survey, although some questions were omitted due to their lack of applicability to the population. A section of three questions about government support programs is an example of this omission. Based off observations, these programs were not witnessed and so there were removed.

As I stated in the section before this one, the average number of years that farmers have been growing vanilla is five years. This explains why vanilla is not known to be grown outside of the Sava region, because of how young most of the plants are. Further evidence that this is a young sample of vanilla plants is also exhibited in the lack of familial ancestry that grew vanilla.
Eighty-five percent responded that they did not have ancestors who grew vanilla and that they are the first in their family to embark on this. Even with this being the norm for Malagasy vanilla farmers in the Ifanadina region there are still some outstanding examples of mastery over the plant, including one farmer who had been growing his plants for twenty-five years and another who’s family has been growing vanilla for four generations.

The average farmer has around five hectares of land. This land is sometimes split into two plots, one for the husband and another for the wife, although this is a rare. The most normal occurrence is for families to share this land together and occupy it as a household. This Malagasy familial structure may be of interest to researchers of gender as it could shed light on how farming households designate roles and how these roles are formalized in day to day activities. Some Malagasy hire those from the village to either be guards at night or to provide yard work on their plot. This 3rd party hiring was seen in 18 different households of the entire sample, which is not as high as expected but many of the respondents made sure to explain that if they could hire guards and yard workers they would. For many though this is not economically feasible.

Due to a lack of information about how vanilla is processed, interview questions were asked about the two separate stages of vanilla spice preparation: first when the vanilla is harvested by the farmers as green vanilla pods, and second when it is processed into black vanilla spice. All the farmers know how to grow green vanilla and sell it in a basic sense. This is seen in the farmers knowledge of flower pollination with eighty-three percent of farmers knowing how to pollinate their flowers. However, some farmers know much more about vanilla including the second stage of its commodity development, the curing process. Five farmers explained their knowledge of how to make black vanilla, with each of these farmers having their
own unique method of curing. One family puts the beans in glass jars while another wraps them in blankets to be put in the sun. Quantities of beans also differ largely between households. The average kilos produced between households was 11.9 kilograms in 2018, although this figure is based off speculations by farmers and not based on actual records. Farmers also expressed that because of crime their vanilla production was much smaller than it could be. Crime is a big problem for the Malagasy farmers, it hurts those who are unable to protect themselves and leaves communities open for exploitation.

There is a wide disparity between farmers who produce a large amount of vanilla and those who do not. This is due to several reasons, some of which are discussed in the section before this one. One factor is differing education between households. Only a few villagers have university degrees, but those who do receive tertiary education degrees and in some cases are main organizers for the associations with local farmers. Those with tertiary degrees are the main reason why most of the Malagasy in this sample know how to pollinate their flowers. It is because others have learned techniques from school to grow greater quantities of beans.

There are many questions surrounding the existing vanilla market in Madagascar which are of interest. For this reason, a series of questions was dedicated to ask the farmers about their opinions of the current market. Ninety-two percent believed that the market could be improved. Some farmers believed it could improve by the establishment of more businesses or the conduction of more research projects in the region. Farmers responded for the most part that they did not know where the green vanilla was transported after it was sold. Many speculated that their vanilla beans were being brought to other cities in Madagascar but because 80 percent of the sample reported that they did not know the people personally who bought their vanilla, most of these speculations are only faint ideas of where the vanilla is being brought. Overall opinions
about the difficulty of selling vanilla were also discussed using a 5 point Likert scale with the categories very difficult, fairly difficult, mixed, fairly easy, and very easy. The highest percentage was those responding with ‘very easy’ occupying 32 percent of the sample and the next most popular opinion being a mixed response occupying 21 percent of the sample. The struggles of growing vanilla vary greatly from one household to the next, but overall there is a sense that the situation is positive and could lead to greater opportunities for the Malagasy people. One man said, “We need people who can buy our vanilla. If more people buy from us than it can make our lives easier.”

Local Governments play a role in the vanilla market as well although they do not directly help farmers with programs. What they do provide is a system of association for those looking to start growing vanilla but who do not have the plants, or the knowledge to do so. This system provided by bureaucracy is not reliant on a barrier like many economic opportunities in the United States and focuses instead on giving as many who are willing to partake in the venture of growing vanilla a system of access to the opportunity. From my own observations, the mayor or elders of the town do this by keeping tabs on who is farming vanilla in the region, making each association file paperwork for the different households in the association. For a farmer to sell their beans, they need to receive authorization papers that can be obtained through an association. Forty-five farmers responded that they were part of an association, with the other respondents indicating that they were still working on their authorization papers.

Villages also have agricultural offices that specifically do bureaucratic work for anything related to agricultural production. With regards to vanilla, these agricultural offices organize a date where vanilla processing cooperatives from outside of the town buy vanilla beans from the farmers. Because these vanilla processing cooperatives are not local, farmers only get one day to
sell their beans. This one date may be the only chance a farmer will get all year to sell their beans, if they don’t have any green vanilla due to logistics or crime than they will have to wait until next year to sell.

A way to prevent this would be to create contracts to pre-finance farmers, although this would only be possible if these contracts were facilitated by a local vanilla processing cooperative. This pre-finance could cover the charges to hire guards who can protect the farm at night. Currently, there is only one farmer who indicated that she has a contract with a cooperative in Sambava but, unfortunately, she did not want to disclose the nature of this contract.

The final section of questions had to do with technology usage of farmers regarding cell-phone, computer and internet usage. This section was included due to the observed increase in the positive results of survey experiments that used web-based methods instead of paper and pencil methods. An example of this is the article “The Use of Mobile Phones as a Data Collection Tool” which used web-based surveys on a cell-phone (Tomlinson et al. 2009). Health workers with little to no interview training supervised these sessions in an efficient manner, making this method of survey a desirable choice for surveys that need to be done in a timely manner. This integration of technology and survey methods is of growing interest especially with the sizable portion of the sample reporting cell-phone usage in Africa (Pew Research Center, 2015).

In the data recorded for this survey, we found evidence to support the claim that Madagascar has seen an increase in the usage of cell-phones. Seventy-five percent of respondents out of the entire sample reported having a cell-phone. For computer usage and internet access these number were much less, with eighteen percent having computer access and
twenty-six percent saying they have internet access. Most individuals who have access to a computer or the internet have the means to do so because they work for internationally funded organizations.

**Concluding Remark**

There is much work to be done to make natural vanilla in Madagascar sustainable, but there is a visible path that can be taken to get there. One challenge that can be fixed by anyone who has concerns for the environment is to stop separating the concepts of economic markets and the natural environment and see how both intersect frequently, especially in countries like Madagascar. If we can envision a connected concept of the environment and markets than international trade may see more innovation paired with better decisions in the future. Hopefully by reading this report you can see the potential in the vanilla market and consider the importance of entrepreneurial development alongside agricultural production.

Thank you Omar Dahi, Ethan Meyers, the Sander Theones Fund, the Rodenberry Fund, and the CSI department at Hampshire college for making this project possible. Your support is greatly appreciated.
# Appendix

Table 2: Other Crops Grown

<table>
<thead>
<tr>
<th>Crop</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>78%</td>
</tr>
<tr>
<td>Bananas</td>
<td>78%</td>
</tr>
<tr>
<td>Jack Fruit</td>
<td>26%</td>
</tr>
<tr>
<td>Pineapples</td>
<td>32%</td>
</tr>
<tr>
<td>Rice</td>
<td>75%</td>
</tr>
<tr>
<td>Casava</td>
<td>71%</td>
</tr>
<tr>
<td>Lychee</td>
<td>51%</td>
</tr>
<tr>
<td>Peanuts</td>
<td>12%</td>
</tr>
<tr>
<td>Avocados</td>
<td>46%</td>
</tr>
<tr>
<td>Oranges</td>
<td>26%</td>
</tr>
<tr>
<td>Beans</td>
<td>13%</td>
</tr>
<tr>
<td>Mangos</td>
<td>11%</td>
</tr>
<tr>
<td>Papaya</td>
<td>7%</td>
</tr>
<tr>
<td>Corn</td>
<td>8%</td>
</tr>
<tr>
<td>Pepper</td>
<td>4%</td>
</tr>
<tr>
<td>Legumes</td>
<td>8%</td>
</tr>
<tr>
<td>Peach</td>
<td>1%</td>
</tr>
<tr>
<td>Potatoes</td>
<td>3%</td>
</tr>
<tr>
<td>Sesame</td>
<td>1%</td>
</tr>
<tr>
<td>Red Pepper</td>
<td>1%</td>
</tr>
<tr>
<td>Lemon</td>
<td>1%</td>
</tr>
<tr>
<td>Cherries</td>
<td>3%</td>
</tr>
<tr>
<td>Cocoa</td>
<td>3%</td>
</tr>
<tr>
<td>Limes</td>
<td>3%</td>
</tr>
<tr>
<td>Pumpkin</td>
<td>1%</td>
</tr>
<tr>
<td>Passion Fruit</td>
<td>1%</td>
</tr>
<tr>
<td>Ravintsara</td>
<td>1%</td>
</tr>
<tr>
<td>Coconut</td>
<td>1%</td>
</tr>
</tbody>
</table>

Figure 2: Juvenile Insects
Figure 3: Histogram of Years Farming
Bibliography


