Vetiver in Southwest Haiti

Author: Scott Freeman, PhD Candidate at Columbia University

Contents

Executive Summary

Economic Summary

The sale and processing of vetiver roots for essential oil is a complex process not easily described by stable price points. The quantity of roots harvested and their cash value is dependent on not only the time of the harvest, but also the number of months that a specific vetiver crop has been in the ground. Decisions of when to harvest are intricately linked to the economic situation of the planter and family. Given the scarcity of other employment opportunities, this is generally the largest source of income for a family, and therefore any unforeseen expense may force an early harvest. Because of its robust nature, the crop can be conceived of as a rural savings account for Haitian farmers. Similarly, intermediaries (or even store owners in one case) are willing to accept the crop as collateral for small loans. Small loans are taken out against future crops in terms much more favorable to the lender, but which satisfy an immediate cash need by the planter. The vetiver industry is secretive and extractive: cheap labor by smallholders and environmentally damaging harvest practices leave profits among oil producers, exporters, and scent producers. Very little information is shared between these points on the value chain, leaving Hatian farmers without information, forced to only imagine the quantity of money involved in the industry, and how the final products might be used.

Major Economic Issues identified in Haitian Vetiver Oil Industry:

*Vetiver oil production is an extractive practice. Both Haitian hillsides and labor are taken advantage of for the production of high value oil. Vetiver roots are harvested for low rates. Higher rates are paid to the oil producers, who own the means of producing oil. Profits increase with export and production of perfumes and scent products.

*Harvests at inopportune times:

Planters rely on vetiver for most of their cash income and are often forced to harvest earlier than the ideal economic and environmental time.

*This results in lower amounts of money paid to planter and lower yield of oil for producers.

*Low amounts of money received by planters:

Speculators increase price of vetiver roots. They do not provide transportation for roots but rather collect a significant quantity of roots from many smallholders

* A higher price is paid by factories, lower amount getting to farmers.

*Low knowledge base for oil production:

Factories not aware of quality of oil they make- must send to a lab: only two available.

Knowledge about the industry outside of the Haitian market is incredibly limited.

* No knowledge of vetiver oil quality means that oil producers are at the whim of the buyer and exporter who can chemically test the oil.

Environmental Summary

Vetiver grass has a complex relationship with the environment, a relationship that is determined by human interaction. While vetiver has the potential for erosion control when planted by conservationists, it also has the potential to detrimentally upturn hillside soil when planted for essential oil production. Much of this erosion depends on the period of harvest, vas the rainy season (also the low season) is much more damaging than the dry season. Planters are aware of the environmental impacts of this business, evidenced by multiple strategies employed to maintain the soil on the hillsides from which it is harvested. The decisions of how and where vetiver is planted are intimately related to the commodification of vetiver, and the geographic proximity to areas of oil production. While farming areas focusing on root production generally produce vetiver for the oil industry, there are a number of cases where it is used to *kenbe te a* (hold the earth), and stabilize riverbeds or roads. When it is planted for erosion control, even in areas of intense cultivation, those specific soil conservation plants will not be harvested.

Major Environmental Issues Identified:

*Vetiver can be utilized as erosion control:
Planters will use for soil conservation and when doing so will *not* harvest for roots.

*Vetiver harvest as environmentally damaging: Loss of topsoil.
Largely due to:
Inopportune harvest time.
Harvesting entire patches at same time.
Hilly planting areas.

*Erosion control as response to harvest:
Farmers in particular areas use strategies of canals and *ram vivan* (living bands) to prevent erosion in their vetiver fields
These are usually too widely spaced to be effective, and in areas with institutions dedicated to this project, a lack of institutional support leaves the
*Erosion control strategies are largely ineffective in preventing top soil runoff.

Introduction

Vetiver production in Southwest Haiti is hard to ignore. Driving into Les Cayes, the largest town in the south, one is greeted by fields of vetiver on either side of the road. The same is true if driving from Les Cayes to Port Salut: steep hillsides of the green grass seem to line much of the ridges between the two towns. While vetiver is a prominent fixture on the hillsides, little is known by outsiders about the details of the industry. Haitian vetiver is highly regarded among perfumers, and it is a key ingredient in some of the finest and most expensive perfumes in the world. However, the lives and struggles of the Haitians who farm this product are often obscured by the high oil prices and the inaccessibility of many small vetiver plots. This report focuses on elaborating on this contextual information. Additionally, practitioners and policy makers are interested in the potential of vetiver to be used in erosion control because of its deep root structures and robust nature. Yet these properties of vetiver are dependent on the context in which they are planted. The southwest of Haiti provides an ideal location to understand how geography and oil production affects the ways in which vetiver is used and conceptualized. This paper is an effort to describe the context of the vetiver plant in Southwest Haiti, focusing on the planters of vetiver for oil production, as well as the environmental issues surrounding that business.

Literature Review: Framing Vetiver in Haiti

Literature on vetiver (*Vetiveria zizanioides* or *Chrysopogon zizanioides)* generally hinges on two themes: environmental conservation, or oil production. Much of the academic literature focuses on the former, privileging vetiver used in soil conservation and environmental protection initiatives.[1]

Global networks of scholar/practitioners have mobilized around vetiver for environmental projects. Environmental conservation activists tout the utility of vetiver as a 'super' crop, with nearly limitless potential for soil conservation and environmental restoration. The concept carries such a level of interest and excitement that internet social networking groups by environmental activists are devoted to the "Vetiver Grass Stystem"[2] whereby vetiver grass is planted in hedgerows in order to control erosion and simultaneously improve agricultural outputs (Grimshaw 2003). At the heart of its utility for soil conservation are vetiver's vertically growing and intricate root structures.

---

[1] The foundations of this literature review are based on the literature research of Tobiah Gaster and Clayton Winter in their work "Hedging Our Bets: Vetiver Grass Barriers for Erosion Control and Hillside Stabilization in Haiti."

[2] Also known as vetiver grass technology.

Vetiver roots are of primary utility not only for soil conservation but are also the target of essential oil extraction. Vetiver's root structures have been known to grow as many as three to four meters in one year (Hengchaovanich 1999, Hengchwovanich and Nilaweera 1998). The root structures grow vertically, not horizontally, providing deep penetration and preventing soil erosion while also permitting multiple crops in the same space. These roots compliment its rigid grasses that reduce water flow and trap sediment (Truong et al 1995). The combination of deep root structures below ground, and rigid grasses above ground make vetiver an effective plant for erosion control, and the ability to withstand flood conditions. This use is not a new development: historically, vetiver has been used for erosion control in India, its country of origin (Chomchalow 2001).

Vetiver is hearty and can grow in various soil conditions, ranging from sandy to clay-like (Hall and Thieret 2003). In addition to surviving in multiple soil habitats, it is especially resilient in contaminated water sources. Truong and Baker (1997) have observed that vetiver has a high tolerance to acidity, alkalinity, salinity, sodicity and magnesium. Not only can it survive in these conditions but vetiver has the ability to actually reduce the quantity of contamination in water. Truong and Hart (2001) tout vetiver as a possible water purifier and have documented vetiver's ability to clean water sources by diminishing human introduced pollutants causing blue green algae.

Vetiver is also an attractive grass in the context of environmental protection because of its asexual means of production (Chomchalow 2000). This prevents the uncontrolled spreading of an introduced crop. Rather than reproduce on its own, a chunk of roots must be separated and replanted for reproduction. While sexually reproductive species of vetiver do exist, they are not found in Haiti.

Vetiver also has been used as a pest management plant (Van den berg et al 2003). Vetiver attracts certain insects away from productive agriculture and acts as a trap crop. While not widely used for this purpose throughout the area researched, vetiver was used as a trap crop in a nursery in Port Salut, Haiti.

Vetiver for soil conservation is only occasionally found in the South of Haiti; largely the use of vetiver revolves around oil production. According to oil producers in Les Cayes, production in Haiti dates back to around 1930.

Vetiver root was being produced for the international market starting in Fond-des-Negres (Mintz, 1961). As a cash crop produced for international consumption, vetiver did not traditionally move through the public marketplaces as most other locally consumed goods did. Similar practices are true today. Vetiver roots are largely sold not in weekly public markets but in private exchanges between oil producers, intermediaries, and farmers. However, in Masson, the sale of vetiver does occur at a market, providing an immediate cash exchange for roots which is then used to buy food provisions.

In addition to oil production, Mintz's work in the Fond-des-Negres region cataloged vetiver used as a boundary marker between properties, and as a source of grass for roof thatching. While other available grasses and leaves may be more durable for thatching, vetiver is preferable because rats will not consume it (Mintz, 1962). Mintz reported that during his fieldwork the planters would harvest the grass for thatching use, and then pull up the roots to sell to a number of factories in the area, which would in turn process the roots in order to extract the essential oils.

Given the heartiness of the vetiver plant, and the prevailing belief that hilly cultivation conditions produce superior oil, almost all vetiver is planted on slopes. According to the Haitian National Agricultural Investment Plan (2010), more than half of the land in Haiti has a slope of more than 40%. Given this data, and the facility with which vetiver can be grown on hilly terrain, it is of little surprise that vetiver farmers have chosen to utilize 'hilly' land for vetiver production. The Agricultural Investment Plan notes that Haitian farmers have moved to more marginal lands to compliment increased demand for agricultural goods.[3]

While vetiver cultivation has been a presence in the south of Haiti for much of the 20th century, very little has been written of the oil producing context. Rather, the majority of academic literature examines vetiver in a light of environmental conservation possibilities. Other than Mintz's brief jottings on vetiver, there has been no discussion of the vetiver industry, economically or environmentally. To compliment the literature on vetiver in conservation, further examination of vetiver oil extraction should be explored.

Methods and Research Design

The guiding research questions are as follows:

1. How and why is the vetiver grass cultivated in Haiti?
2. What is the economic production and value chain of vetiver production in Southwest Haiti?
    - -How does vetiver move among farmers, intermediaries and oil extractors and exporters/buyers?
    - -What are the relevant economic strategies employed by Haitians working in vetiver?
3. How does vetiver cultivation impact the environment in Southwest Haiti?

The field research for this report was conducted between June 2nd and August 2nd of 2011. Saphinia Sanon was the research assistant and aided in data collection throughout this period.[4] Almost all conversations took place in Haitian Kreyol, with the exception of four conversations with oil producers, which took place in English.

Given a short amount of time, and the dearth of knowledge about vetiver in Southwest Haiti, a holistic methodology was developed with a focus on qualitative information, and included specific quantitative data goals in regards to scale of production, and land and income estimates. Beginning the study, the number of vetiver planters, territory cultivated, and process

[3] While this type of intensive mountain agriculture is largely considered detrimental, forestry and other farming techniques open the possibility for constructive agricultural ventures in mountainous areas (Haitian Agricultural Investment Plan 2010).

[4] Support for the research assistant were provided by American University of the Caribbean in cooperation with Catholic Relief Services

of cultivation was unknown. Therefore, a methodology was developed that would quickly, in the time allotted, begin to understand the process of cultivation, the variations within that cultivation, and some of the major issues presented.

The main method of investigation was semi structured interviews. Semi structured interviews allow for fluidity in the interview conversation, and the encourage the possibility of novel information. Quantitative surveys with pre-determined questions would have prematurely selected categories and topics that informants may not have identified with. These semi structured conversations also attempt to move away from a "testing" dynamic where the informant feels that he or she is being asked a series of questions with right or wrong answers (Bernard 2002). This allows for informants to discuss what issues they felt to be problematic in the vetiver industry, making the research much more collaborative. An interview guide with specific questions was used throughout the research (see Appendix 1), though the order varied given the conversation. Questions and themes were added and subtracted in different interviews as necessary.

The study began with a focus on the process and problematics of the vetiver oil industry. Because of existing institutional and personal connections, these discussions began with owners of eight vetiver oil processing factories. These interviews were exploratory in nature, addressing questions of quantity, quality, and process. By beginning with oil producers, who are mainly concentrated within the city of Les Cayes,[5] information on the location of major (and minor) vetiver producing areas could be confirmed.

After interviews with the oil producers, it was necessary to work down the production chain to understand the role of intermediaries and farmers. After interviews with oil producers, geographic areas were selected based on the information they provided. The following locations were selected:

> **Laurant and Cavaillon**: Selected as the main site of investigation in the area of Les Cayes. Intense vetiver cultivation reported by oil producers and farmers. Geographically closest to oil production facility. Fairly easy access for vetiver trucks.
>
> (15 days in area. Approximately 54 conversations[6])
>
> **Saint Helen/Trikom**: Selected to triangulate data from Laurant/Cavaillon. A significant vetiver industry, but without the reputation of Port Salut or Laurant. Geographically less proximate to the factories, and without the ease in access enjoyed by the areas of Laurant and Cavaillon.
>
> (Four days in area. Approximately 18 conversations)
>
> **Port Salut**: Selected because of heavy vetiver cultivation. Different agro-ecological zone from the Les Cayes area (as described by a Haitian agronomist). Many described Port Salut vetiver as highest in quality.

---

[5]All terminology will be referred to in *Kreyol*. However, given the readership of this report, place names will be referred to in their French name. For example, Port au Prince will be the favored terminology as opposed to the *Kreyol* Potoprens.

[6]Total refers to both individual interviews as well as group interviews.

(Seven days in area. Approximately 51 conversations)

Carrefour Mason: En route to Port Salut, this area is visually covered with vetiver and was selected because of proximity to Port Salut, notable activity in vetiver cultivation, and its reputation of having some of the larger intermediaries. (Two days in area. Approximately 13 conversations)

Chardonniers: Used as a comparison site chosen to investigate vetiver in a non-oil production area. Vetiver planted for uses other than oil.
(Two days in area. Approximately 13 conversations)

Conversations conducted

Location	Individual Interviews	Group Interviews	Intermediaries	Total
Laurant/Cavaillon	42	12	11	54
Saint Helen/ Trikom	13	5	2	18
Port Salut	42	9	3	51
Carrefour Mason	10	3	4	13
Chardonniers	12	1	2	13

The sampling selection of informants within these geographic areas was based off of a number of sampling strategies and rationales. Geographic convenience was paired with snowball sampling in many cases. A geographic zone would be selected, and as vetiver farmers and intermediaries were identified, they would serve as references for where other farmers/intermediaries might be found.

While interviews and surveys can provide information on what actors say and what they say they do, it is important to triangulate this with what actors actually do. This data is best gathered through extended participant observation. By spending time in the areas where farmers work and live, anecdotal evidence was contrasted with observed practices. Because most days of fieldwork were spent in these areas of cultivation, the study included observation of harvest/planting practices and examined the rationale behind them.

This section on methodologies would be remiss to not address the ways in which the researcher's own position as a white male (often driving in UN vehicle) may influence the responses of Haitian vetiver planters, intermediaries, and oil producers. A number of strategies were used to mitigate these potential issues. Often, both researchers were dropped off at a convenient location and would walk for the majority of the research day in order to distance themselves from the large UN vehicle.[7] Additionally, informants were encouraged to ask questions about the project openly and would receive honest responses from the research pair about the goals of the research project and the unknown nature of any possible intervention. A number of informants provided more in-depth information only after they were able to query the

[7] Interviews always began by clearly stating the affiliation of the researchers and the project at hand.

nature of the project. Similarly, using Kreyol rather than French as an operating language allowed the informants direct questioning access to the researchers rather than through translators. Despite these methodological strategies, these issues may not be entirely resolved.

History of Vetiver in Haiti

Because of limited literature on use of vetiver in Haiti, personal history interviews with farmers, speculators, and owners of oil producing factories were essential methods for understanding the progression of vetiver cultivation in Haiti. Vetiver is planted not by large landowners but rather in small plots among many small scale farmers. These smallholding practices are essential in understanding the way that farmers utilize their land for savings, credit, and for recognizing the fundamentally non-industrialized structure of planting and harvest of vetiver.

The first name that emerges in any historical discussion of vetiver is very often Louis Dejoie. Dejoie is perhaps most famous as the opposition candidate to Francios Duvalier in the elections of 1957 (see "Haiti: In the Middle," Time Magazine 1959). Dejoie was not only a political candidate but a wealthy planter who is credited with bringing the essential oil industry to the south of Haiti. According to a living family member, he began the essential oil industry not only concentrating on vetiver, but also farming ylang ylang and other crops to be distilled for their essential oils. However, after losing to Francois Duvalier, he was expelled from the country and the essential oil industry somewhat simmered out, though vetiver remained. Interestingly, a few planters in Laurant, Port Salut and Mason referenced Dejoie as "*Prezidan Dejwa":* despite having lost the election, some planters still seemed to hold a particular reverence for the elite candidate and agriculturalist.

According to an oil producer and (corroborated by a farmer in Mason), in the early vetiver industry, Dejoie would lease land from the farmers. That is to say, he would give the farmers vetiver to plant, and then would buy it back from the farmers after the harvest.

While accounts differ slightly, it is evident that Duvalier and the Haitian government then assumed control of the vetiver industry. During the Duvalier's control of Haiti, any vetiver oil produced had to be sold to the government, which would in turn be sold to brokers in New York, and finally to European markets. After the Duvalier's regime crumbled in 1986, the government's monopoly over vetiver oil was broken by oil producers who made these direct connections with European clients, and vetiver was sold directly to European markets for more than double its price under the regime.

According to two oil producers, during the 1970s, the production of vetiver oil was around 700 drums a year and came from approximately 27 oil producers. In the 80's and 90's that amount decreased to 400 drums a year. Currently, there are far fewer producers: around 10 oil producers, and only 3 or so major exporters producing about 400 drums a year nationally.

It is estimated by one producer that there are approximately 10,000 *kao*[8] of vetiver in the Les Cayes area. However, these *kao* are not linked together in large plots. Not only are the vetiver farmers smallholders, but they are also working within a land tenure system that divides land through generations. While a vetiver farmer might have a total of 2 *kao*, that land is most likely divided into an average of 4 separate plots.

The Vetiver Oil Production Process

I. Players Involved

This section profiles the populations involved in the production of vetiver oil. From planter, to intermediary, to oil producer, each population plays a specific role in oil production. As vetiver moves up the value chain, the price paid increases. Despite the excessive labor required during the harvest, farmers receive the lowest amount of money in the oil production process. Often, farmers would take the time to talk about their position at the bottom: working hard to produce vetiver, and receiving almost nothing in return, unable to pay for school for all of their children. While planters have little idea of where the vetiver goes (other than to the international market) or how much it is sold for, they know that the factory owners see much more benefit from the industry than they do. This was most evident when discussing the price breakdown with the head of a small organization in Port Salut. Rather than respond verbally, he picked up three rocks and laid them out on the ground, small to large. "The smallest one," he said "is the farmer. The middle, the *spekilete (*intermediary), and the largest is the factory owner." The following brief synopses give an idea of these populations and economic roles, which will be expanded on in a processual analysis of the business.

[8] *Kao*, or the French *carreau* is 1.29 hectares or approx 3.1 acres. This is the measurement used by farmers in Haiti and will be utilized throughout this report.

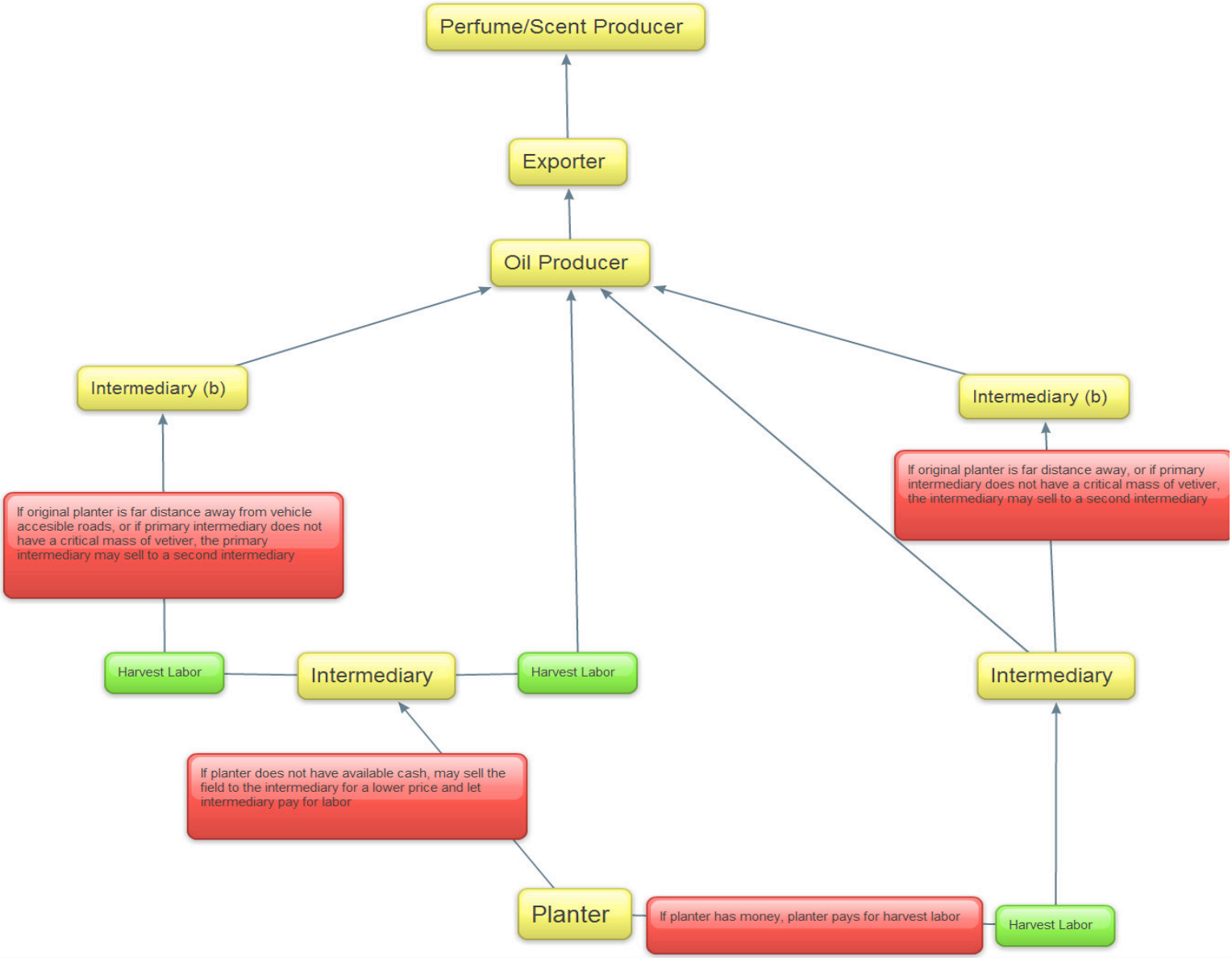


Figure: Value Chain

From bottom to top: If the planter has money to pay for labor, he/she will do so (track to right of 'Planter'). If not, the planter will sell the unharvested crop to an intermediary, who will pay for the harvest labor. In both situations, there may be more than one intermediary, generally depending on distance and quantity of vetiver purchased by the original intermediary. The vetiver is then processed, sold to an exporter, and then to a scent producer. The scent producer may then sell directly to stores, or sell their product to a label (eg CK1 might be a label, though they may not produce the scent itself).

Planters

According to one oil producer, there are approximately 28,000 farmers working in the vetiver industry (according to an exporter/oil producer). Another estimate of the industry has been that 30,000 households depend directly on vetiver production in the Les Cayes area (ProNatura 2011). According to another oil producer, the farmers in the area of Les Cayes harvest from approximately 10,000 *kao* of vetiver fields. From all vetiver farmers interviewed across Port Salut and Les Cayes, the average land holding is approximately 3 *kao.*

Farmers of vetiver were rarely content with their occupation. There was a pervading sense of frustration with the system they worked in. While vetiver provides the most cash of any income generating strategy the farmers and their families had, it most often did not provide a sufficient income for their cash related needs. High labor prices and very little pay were often contrasted with the large benefits of the vetiver oil producers.

The vetiver industry is comprised of small scale planters rather than large landowners. Most often, a farmer will own multiple small plots planted, each planted with different crops and spread out geographically. While farmers were always aware of the number of plots they owned, discussions around land ownership and possession were particularly difficult to have with farmers. While farmers were quick to respond to how many spaces they had in total, when questioned about the total space they owned, many did not know the exact number in terms of *kao.* Usually, the farmers were able to say with specificity how many spaces (*espas, moso, kote*) they had planted with vetiver, but often did not know, or did not articulate the total amount of land that they owned and planted with vetiver. Therefore, interviews with farmers to determine total and average land holdings through verbal responses are particularly problematic. Therefore, attempts to calculate average landholdings and the amount produced per quantity of land is also particularly problematic. This is also a particularly important point when thinking about further research collaborations with farmers. Further investigations using GIS data would be able to reveal with much more certainty the plots planted with vetiver.

In all conversations (excluding two), vetiver was reported to be the most significant form of cash income for farmers. One of the largest cash needs was sending children to school, a common expense given that the majority of education in Haiti is provided by the private sector. These small cash incomes are usually supplemented by small subsistence gardens. Almost all farmers own land that is used for crops other than vetiver: corn, sorghum, and sweet potato are common crops found in these small *jaden.* Other forms of household income revolve around small business ventures. Conversations with farmers, along with contemporary knowledge about economic gender roles in Haiti, supports the idea that the women of many households are most likely participating in *komerse*, or small businesses.

Farmers make labor and harvesting decisions based on the amount of money they have, and the amount of money that they need. The amount of money that they have when they want to harvest determines the type of labor they can pay for, if any (see

"Labor" section below), and the amount of money planters need may dictate choices about when they harvest (see section of this report labeled "The Business of Vetiver").

Intermediaries

Known as *funise* or *spekilete*, intermediaries link the small scale farmer with the oil production factories. However, the intermediary is not limited to only this function. Intermediaries are also planters. Across geographic regions they generally own more than 1 *kao* of land, and some own upwards of 40. The limiting factor for any planter to become an intermediary is the available cash to do so. Intermediaries need to have money in order to purchase vetiver from farmers upfront. Without these funds, the farmers may turn to another intermediary.

Intermediaries seek out smallholders and amass a quantity of vetiver that warrants a trip by the factory trucks. Each oil processing *izin* has their own large dump trucks used to go out into the countryside and transport vetiver back to the factory, usually in Les Cayes. Once the intermediary has enough for at least one truck full, they will find out the price at different factories, search for the best price, and alert that factory to where they have vetiver to be retrieved.

The intermediaries are the second step in the value chain, and raise the price of raw vetiver roots around HTG$50-75 per unit of vetiver (*bal* or *paket*) before reselling to the factory owners. If the farmer producing the vetiver is a significant distance from a road accessible by vetiver collection trucks, the intermediary purchasing the vetiver may sell to another intermediary. This may also occur if the intermediary does not have a quantity of vetiver that warrants a trip by a vetiver factory (generally one truck worth). While some intermediaries have relationships with specific factories, many simply search for the best price.

Intermediaries who form relationships with specific factories report that those factories will lend money to them in order to complete the purchase of vetiver roots. One oil producer mentioned that while cutting out the intermediaries seems like a way to increase the income to farmers but that he sees their role linking the crops of multiple small farmers together as essential.

Picture: Vetiver roots in transport. Vetiver grass in foreground.

Oil Producers

Just as vetiver farmers rarely farm only vetiver, vetiver oil producers (referred to interchangeably as 'factory owners') rarely invest only in vetiver oil. Many have other businesses as well. One NGO employee noted that wealthy individuals are using vetiver production as a way to diversify their investments. These individuals often own multiple businesses (some own businesses in Les Cayes, others in Port au Prince), and have a much higher level of income and education than intermediaries or farmers. Many speak fluent English. Whereas farmers and many intermediaries live in the countryside, oil producers live in Les Cayes or Port au Prince. Oil producers must sell their oil to an exporter (of which there are three major exporters in the country), unless they export themselves.

They follow the seasonal constraints of the vetiver harvest: they report that most intense production occurs between December and March. The rainy season is particularly difficult for production: according to an oil producer the yield of roots to oil can decrease to 30% of the dry season level.

Factories play the role not only of processing the vetiver, but also transportation of vetiver roots. Oil producers both actively seek vetiver roots from particular intermediaries, and also accept requests by intermediaries to purchase roots. The rainy season hinders the yield of vetiver to oil, and also inhibits transportation: other than main roads linking Port Salut, Les Cayes and the main road up through Laurant and Cavaillon, the roads through the region are dirt. As such, trucks have more issues accessing far removed areas.[9]

II. Planting and Harvest

This section will detail the planting and harvesting procedures of vetiver farmers. Not only is it informative to describe how vetiver planting and harvesting take place, but also what vetiver farmers report as the most ideal conditions for the harvest. The differences between these ideal harvest conditions and actual practices reveal some of the major problems that vetiver farmers face.

While vetiver is robust and is able to thrive in multiple environments, the conditions preferred by oil producers for oil production are much more specific. Vetiver is able to survive in the flat plains of Les Cayes, but for the cultivation of oil, vetiver is preferred on hilly terrain. Over and over again, both farmers and oil producers said that vetiver plants are to be planted on hills, and not in the plains.[10] In addition, many noted that rocky or sandy soil was better for

[9] In the areas of Saint Helen, these roads were actually made worse by the large vetiver trucks that tear up the dirt roads when they access the vetiver fields. Despite the reportedly multiple requests by local planters, the factories would not repair the roads.

[10] However, one oil producer/exporter stated that in his lab he tested oil from vetiver planted in the flat lands, in rich earth, and received a much higher quality oil. Though a large player in the industry, he was the only one that mentioned this specific kind of cultivation.

vetiver; more rocky conditions were said to yield more oil. Therefore, throughout the region of Les Cayes and Port Salut, vetiver is really only found on the slopes of hills.[11] It is not planted in rows as other crops are, but is scattered about randomly, a practice that one oil producer said has been engrained after years of habit.

The harvest of vetiver is physically taxing, time consuming, and can be potentially damaging for topsoil. Because the oil produced by the vetiver plant is contained only within its root structure, the plant must be completely dug up in order to harvest the roots. This involves cutting off the tall grass, digging up and removing the roots. This practice leaves the harvested hillside with loose, upturned soil. The already mostly treeless hillsides are then particularly vulnerable to erosion should rain fall. The tools used for the harvest are simple: often a pick and/or machete. Given the minimal tools, terrain, and the nature of the harvest, vetiver work has a reputation for being extremely physically taxing.

This environmentally and physically intensive harvest is reflected in the terminology used: the common word *rekot* (harvest), which is most common in conversations dealing with agriculture, is *not* used to describe the collection of vetiver root. Instead of the *rekot*, vetiver collection is referred to in the industry as the *fouye* (the dig), a much more accurate description of the process of collecting vetiver.

In all geographic areas of cultivation, planting occurs at "the same time" as the *fouye.* For one farmer in Laurant, for example, that meant harvesting one day, and planting the next. Generally the two activities will not drift more than a few days apart. The planting occurs by taking harvested root clumps ('the onion,' as described by one oil producer), and replanting. If the clump is big enough, it can be divided into multiple pieces to be planted.

Vetiver Harvest: Note the harvested pile of roots, and seedlings planted in the soil

[11] However, one of the larger oil producers stated that according to his trials, vetiver on flat land with fertile soil produced a better quality oil.

After the vetiver root is extracted from the ground, and the new seedlings are planted, the grass (*pay*) that was cut off is often spread over the ground. While this may serve the purpose of a mulch (to keep moisture in the soil), farmers also discussed its use in erosion control, and as fertilizer. Some argue that the grass serves as erosion control by covering and protecting the loose soil from rain which might otherwise wash the topsoil away. Additionally, most farmers will burn the *pay* on top of the soil. The charred grass mixed with soil is intended to provide nutrients and improve the quality of the soil.

The vetiver harvest season is dictated by the rains. The dry season is reported by both planters and oil producers to be the main period of harvest. This means a prime vetiver season that begins around December and lasts through about March. During this period of time, the factories get an increased yield from vetiver roots, and will pay intermediaries more for the vetiver roots that they supply. Some factories will actually shut down for a period of time during during the rainy season of May and June because the yield of vetiver root mass to oil is so low. Additionally, the rainy season creates issues of transportation/access to the vetiver growing areas of the south: the large dump truck sized vehicles have difficulty getting to the hilly areas of cultivation because of mud and washed out roads.

Farmers are very aware of the price differences in vetiver, and the ideal harvest months. Farmers were asked why there was this seasonal aspect to the vetiver harvest. Some commented that in order to harvest the vetiver, you must be able to 'beat' the dirt out of the roots, something that wet soil prevents. A farmer from Chardoniers noted that when vetiver is harvested/planted in the rainy season, the roots encounter the packed mud and cannot penetrate it, inhibiting growth.[12] Many discussed the fact that the dry season was when the vetiver was of better quality.

According to the oil producers, vetiver should be harvested between 12-18 months after being planted. Similarly, planters stated that vetiver should be harvested between 12 and 24 months. However, both oil producers and vetiver farmers noted that these are only the *ideal* situations for harvest. In practice, farmers will still harvest during the rainy season because of economic necessity.

This off-season harvest activity was explained in the same way throughout the region: harvesting occurred in concert with need. Unexpected events such as death in the family, hospitalization, or other family economic emergencies may prompt a farmer to harvest in June rather than the ideal harvest period. All but two farmers talked about vetiver as the largest source of income for their house. Without other significant sources of cash, a farmer might harvest in the off-season (for example, in June) and sell for HTG$150 per *paket* when he might otherwise have received HTG$300 for the same vetiver in February. The concept of harvesting by need rather than at the point of greatest benefit is an issue that is reflected in a number of their economic strategies (see section on "The Business of Vetiver").

The Distillation

The vetiver factory itself processes vetiver roots through a process of distillation. Roots are brought to the factory by truck, and packed into large stills or *alambik.* While they vary from

[12] It should be noted that Chardonier is an area of little to no vetiver for oil production.

factory to factory, the stills themselves are generally around 20 feet tall and six feet in diameter. A processing plant might have anywhere from 8-20 stills. Once vetiver roots have been placed in the *alambik*, steam is pumped into the chambers via a boiler. The steam captures the oil from the roots, producing an oil and water mixture that passes out of the stills in pipes. This mixture remains in pipes as it passes through a cold water pool to cool. In addition to boilers and stills, the factory also has storage containers for *mazout*, the fuel oil necessary to run the boilers. In at least three of the factories, the capacity of the boiler was not enough to run all the stills at one time. Once the steam has been converted back into liquid, the water is separated from the oil. The oil is then barreled and sent to an exporter for sale to a scent producer.

The expenses for oil producers lie between roots and fuel for processing. Generally it is around a fairly even split between the two. The high prices of fuel contribute to a high price of Haitian vetiver oil in the international market.[13] One oil producer said that there is a substantial difference in the price of *mazout* in Haiti and in the Dominican Republic: he could purchase in the Dominican Republic for $.62 a gallon, while he quoted the Haitian price at $2.55.[14] For example, for one producer, it takes 4000 gallons of *mazout* and 20 tons of vetiver to produce 53 gallons of vetiver oil (approximately one drum).

Each producer has different strategies of production, and what may take one producer 30 hours to distill could be achieved by another producer in 8 hours. These variations and strategies are kept very secret, and oil producers are wary of spies who might come and report on the goings on of one *izin* (factory) to another. This secretive nature permeates the vetiver industry.

Each factory has their own preferred time for distillation, their own still size, and their own yield. According to vetiver oil producers and exporters, while the quantity of vetiver produced from the roots is dependent on the harvest period and region, the quality is supposedly determined by the distillation process. The distillation process can determine if the oil is acidic or basic, and these characteristics determine if a buyer is interested in the particular batch of oil. However, these 'quality' characteristics can only determined in laboratory tests. Only the large exporters have their own laboratory. Therefore a domestic vetiver oil producer does not generally know the quality of oil that he produces. This information gap puts Haitian oil producers in an unfavorable position when negotiating the sale of their oil.

The Business of Vetiver

I. Labor

The harvest of vetiver roots is physically and economically taxing. A planter can generally not harvest his own vetiver because of the enormous amount of work required. Planters

[13]Despite this high international price, Haitian vetiver remains in demand for its high quality.
[14]Another producer quoted *mazout* at $3.50 a gallon.

must pay others to assist in the harvest. Because of the expensive nature of this work, there are a number of labor strategies which farmers employ in order to complete the *fouye.*

When a planter does not have the cash to pay for harvest labor he/she may decide to first sell the un-harvested crop to a speculator. The speculator will then pay for the harvest of the vetiver and sell it to the *izin.* That price is one that is negotiated between the two, and is substantially lower than the price that the intermediary would have paid for harvested vetiver. In this arrangement, the responsibility for the harvest is taken off of the planter and is assumed by the intermediary.

The following labor strategies are described and discussed in reference to the geographic regions where they are most commonly found:

**Konbit:* Found throughout Haiti, the *konbit* operates as a small labor sharing cooperative. A group of farmers will work one participant's land without pay, and the host provides food and drink). Then they will work another participant's land another day with the same agreement. Most often found for vetiver in the area of Port Salut.

**Eskwod:* A cooperative arrangement with approximately ten members, and functions slightly different in each geographic area. In general, an *eskwod* will be paid for a day's work, dividing the revenue among themselves. In one instance in Trikom, the strategy of the *eskwod* was slightly different: each day that they worked together, the landowner would pay the group per *paket* of vetiver harvested. That money would be pooled and a different member would receive it each time. This agreement would last for the season. Occasionally a drummer is part of the *eskwod* and paid for his work to motivate the group. All areas reported occasional use of *eskwod* in some form.

**Asosyasyon:* Farming by *asosyasyon* means that the income from the harvest will be split between the landowner and the individual(s) helping with the harvest. This may be completed with as few as one or two other workers. Sometimes this division is down the middle, while others prefer a 60%/40% split. Farming by association was also cited as a way to provide income for others who may not have vetiver land. That is, by farming by *asosyasyon,* a planter who owns a plot of vetiver can insure that another, who may not own a plot of vetiver, can supply their labor and have a cash income. Farming vetiver by association is a common practice in the hills of Port Salut.

**Pa bal/Pa Paket*: The *bal* and *paket* (bale and packet) are the common forms of packing vetiver for sale to the factory. While speculators generally purchase by the *bal* or *paket*, this also can be a way of paying for the labor of the harvest. The laborers will be paid per number of units harvested. Usually this will be more or less half the value of the *bal* or *paket* when sold to the intermediary. Under this strategy, the individual paying for the labor has control over the amount of labor completed. Mostly practiced in the region surrounding Les Cayes (Laurent, Cavaillon, Saint Helen, Trikom).

**Pa jouney*: Paying by day. A fixed price for labor regardless of quantity produced. This is generally used when a squad is employed.

**Pou kont mwen:* Individuals will occasionally choose to harvest themselves if they cannot afford to pay for the labor required. The benefits of harvesting *pou kont mwen* are that there is no labor paid for. Because the *fouye* is so demanding, this usually only occurs with small landowners. No regional differentiation as it is a fairly rare practice.

III. The value chain

According to the Haitian National Planning Document for the South (2010), in 2003 there were 16 distilleries operational. Due to constant entrance and exit of distilleries from the market, this number fluctuates. However, at the time of writing there were 10 distilleries in the Les Cayes area.

According BM Lawrence in a 2009 report on world production of essential oils, there was a total of 250 tonnes of vetiver oil produced globally. Of those 250 tonnes, Haiti was the top producer, producing 100 tonnes. Most vetiver oil producers reported a national production of approximately 400 drums of vetiver produced per year, which is in accord with Lawrence's figure of 100 tonnes.[1516] According to an oil producer and one of the three largest exporters in Haiti, current international price is priced per kilogram, and ranges from $190-$200 per kg.[17] With a drum of oil at 200kg net according to a US distributor, the current price of 1 drum on the international market would be between $40,000 and $43,000.

At $200-$215 per kg of vetiver oil, the total production of vetiver oil in Haiti is approximately US$16 to $17.2 million. This is similar to an estimate given by a smaller exporter who estimated the national industry at about 16 million dollars.

For a domestic oil producer who sells to an exporter, the pound of oil is priced between US$65-$85. In July of 2011 now, an oil producer in Les Cayes (who does not export any of his own oil) is selling for US$70 per lb, receiving around US$31,500 per drum (based on a 450 lb net weight drum). He reported that the markup by exporters could be between US$10-20 per pound.[18] This is similar to the above reported price of the current international market.[19]

In calculating the amount of vetiver per drum, the figure of 20 tons of biomass to produce one drum of oil is used as a rough guide by one of the oil producers. Among all oil producers, one *alambik* produces an average of between 2-3 gallons of oil. Depending on the time of year, the cost of vetiver roots to fill one *alambik* is between HTG$15,000-$35,000 (US$371-$867) depending on the time of year. In June, the price is about HTG 15,000 (US$371). If the

---

[15] Given a drum size of 550 lbs, (or 249 kg per drum) and the BM Lawrence (2009) figure of 100 tonnes per year, the number of drums produced by Haiti per year would be 401.61, roughly the figure which oil producers state as the national production of vetiver oil.

[16] Other producers estimated 250 drums per year.

[17] A US vetiver oil dealer quoted that his current price for vetiver oil is $215/kg. For these calculations we will use $215/kg as a current market price.

[18] Another factory owner estimated the increase was also approximately $20 per pound.

[19] For the same 450 lb net weight drum, a markup of US$10-20 would produce a drum at the price of US$36,000-40,500.

production of each still is between 2-3 gallons, and each drum holds about 55 gallons of oil (as quoted by an American export company), then there would be approximately 17-27 processed *alambik* per drum. This means a root cost of approximately US$6,487-10,000 per drum in the off season, and up to US$23,800 during the high production season (with the price for roots to fill an *alambik* at H$35,000). This estimate is supported by one of the largest oil producers who said that he routinely spends between US$13,000-20,000 on roots per drum. Mazout spent per drum is approximately 4000 gallons per drum. At a price of $2.55, mazout costs are approximately $10,200.

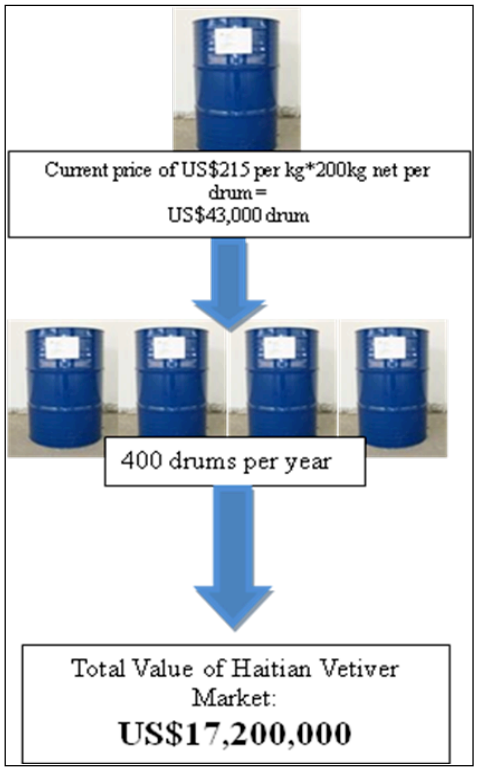
The below chart is an estimation. Because of seasonal variation in yield and vetiver price, this revenue per drum can vary extensively by producer and by time of year. It is a sample calculation based in a particular point in time.

Revenue Calculation for Oil Producers during low season	
June 2011 price quoted for vetiver oil per pound	70
Domestic price for a drum (given 450lb net weight)	31500
Cost of mazout per drum (at $2.55 per gallon and 4000 gallons per drum)	10200
Vetiver root cost per drum in low season	13000
Rough net revenue per drum for oil producer (does not factor in labor)	8300

Calculating the income of planters is a more difficult calculation. Because of the range in quality of land (taking into account slope, erosion, quantity of vetiver planted, and divisions of plots), the output of one *kao* of land is not stable. Similarly, each harvest may not occur at the ideal harvest time (ie after 12 months). Therefore, while the quantity harvested per kao per year may be a useful statistic, it is not one that is particularly indicative of the adaptive and fluctuating harvest styles of vetiver farmers. One must also take into account that the harvest of the vetiver crop may also be completed under conditions unfavorable to the planter because of a preliminary lack of cash.

The charts below calculate the domestic production of vetiver, calculate the amount a vetiver farmer might earn per year, and estimate a range for income based on land ownership. Again, these are examples that are not transferable to the entire population, but are calculations based on a particular context of time and space.

Figure: Estimation of Domestic Production of Vetiver Oil



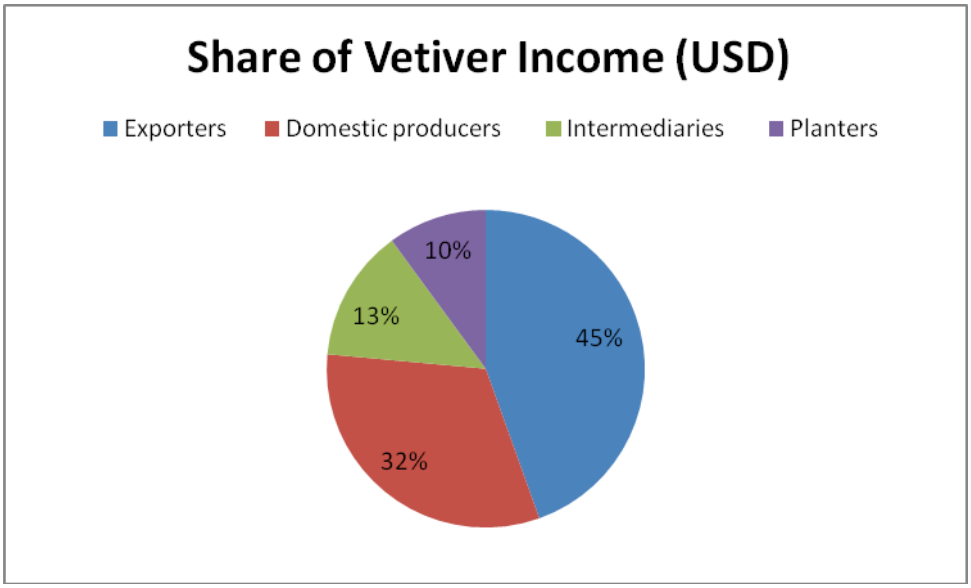
Example of Income based off of land estimates

Example: Calculation of Planter Revenue in Les Cayes Area (Laurant, Cavaillon, Saint Helen, Trikom)	**In Gourdes**	**In US Dollars**
Current average price of bal	$275	$6.82
Average price of labor per bal	$100	$2.48
Net income per bal to farmer	$175	$4.34
Approximate bal per *kao* (in Les Cayes area)	310.21	
Current estimated amount per kao in Les Cayes area	$85,307	$2,114.18
Net income for 1 kao (amount per kao – labor per bale)	$54,286.46	$1,345.39

Price Breakdown by value chain in July (low season)

Gross Revenue per stage in value chain	In US Dollars
Exporters	$17,200,000.00
Domestic producers	$12,345,886.67
Intermediaries	$5,200,000.00
Planters (if all were to work in bales)	$3,898,381.63

Gross Income per planter (Based on planters/30,000)	$129.95



Total Vetiver Market: ~$17.2 million

IV. The Sale

The movement of vetiver through the value chain includes both the sale of roots and of vetiver oil. However, the sale of vetiver roots is the focus of this analysis. It is also the point of most concern to those involved in agriculture and the environment in the south of Haiti.

The sale of vetiver from farmer to speculator can take multiple forms. The form it takes and the timing of the sale is at first glance determined by seasonal factors: the highest price for vetiver roots corresponds with the highest yield, which occurs during the dry season. This research was conducted in the off season, and despite planters continually talking about the 'ideal' harvest conditions, observation of vetiver harvests, sales, and full trucks of vetiver roots indicated that the off season still had an active trade. While perhaps the majority of planters were not harvesting, the presence of these activities confirmed that planters do not always harvest at the 'ideal' time.

Time of Harvest

The ideal harvest time is generally from December through March. It is at this point that the roots of the vetiver plant are reported to have the most oil by oil producers and many farmers. Therefore, it is during these months that all individuals in the value chain receive the highest return. Oil producers receive higher quantities of oil for the same input of vetiver root and gas, and intermediaries receive a higher amount per still, which is then passed on to the planter and laborers.

While the months of December through March are seen as the ideal period of harvest economically,[20] these harvest periods are not always observed. This research was conducted during June and July, the rainy season that is the least beneficial time to harvest vetiver roots. Yet still roots were being actively harvested, and vetiver trucks would roll in and out of Les Cayes regularly. When asked about the decision to harvest during 'off-peak' exchange seasons, planters continually provided the same response: "*yon bezwen"* (a need). Harvests during 'off-peak' months were due to economic necessities of the planter. During one interview, conducted when a planter was harvesting a small patch of vetiver, he pointed up a hill towards a patch of vetiver. He said that though it was now early June, he was saving that plot for July, when he would harvest it, sell it, and use the money to pay his children's school fees. Vetiver therefore might be understood as a consistent storage of cash, similar to a savings account, to be drawn on in times of need.

---

[20] While economically beneficial, these months are also the 'dry season.' They are also the environmentally ideal harvest season. Because of the erosion potential after harvest, rain can be particularly threatening to topsoil after the removal of the vetiver plant, which provides a root structure that mitigates erosion.

In a group interview in Port Salut, a planter mentioned that the turn to intensive vetiver cultivation was as a result of the slaughter of kochon kreyol. These pigs were the 'savings accounts' of the peasant, and when a scare of swine fever compelled the US to finance the slaughter of nearly every pig in Haiti (1.3 million), with them died the savings accounts of Haitians. These hearty scavenging pigs were owned by families and used to finance school, health care, and other cash needs (Smith 2001). When they had the kochon kreyol, this farmer did not have to depend entirely on vetiver as he does now. Vetiver seems to replace the kochon kreyol as the dependable source of cash for the peasants of the south- effectively a savings account - and thus its harvest is often dependent on cash needs of the planter.

Because of this variation in 'peak' and 'off-peak' harvests, calculations of how much income can be produced per 1 *kao* is particularly difficult. The same amount of vetiver harvested a month or two apart would have completely different prices. Similarly, the amount of time that vetiver has been in the earth is a large complicating factor. Many farmers will harvest after twelve months, while others will harvest after six. This produces extreme variation in reported quantity per *kao.* Even if two farmers harvest at the exact same time on the exact same space of land, the amount of vetiver that they harvest will be different depending on when that crop of vetiver was planted.

Strategies of Sale

Planters sell vetiver to speculators, who then sell to oil producers in Les Cayes. When the vetiver roots are harvested and sold from planter to intermediary, the sale can take different forms depending on the needs of the farmer, the availability of cash for labor, and the geographic location of the harvest. Because of the robust nature of vetiver, the harvest is close to garunteed

after it is planted. Crops such as corn could be affected by a draught or flood, but vetiver is a nearly guaranteed crop. The resilient nature of vetiver and its use as a cash crop make it a form of rural collateral for small loans. Often, farmers use one of the below strategies to use the vetiver as a way to receive small loans. Though farmers will use this strategy in order to receive a large sum of money to address a particular need, the intermediaries who provide the loan are the beneficiaries- the farmers accept loan conditions that are less than favorable.

Below are details of different sale strategies as vetiver roots move from farmer to intermediary.

B*al o Paket* (bale or paket*)*

Selling by *bal* or *paket* is a form of sale in which the planter pays for (or provides by him or herself) the labor required to harvest vetiver roots. Then, upon harvesting, the planter sells by *bal* or *paket* as a unit of measurement, dependent on geographic zone. The Les Cayes area is oriented towards *bal* while the Port Salut area is mostly geared towards *paket*. *Paket* size varies and its worth is assessed by the speculator at the time of the sale. However, *bal* size is supposed to be much more consistent, and the price per bale is established and also consistent.[21]

Bal appear square in size, and vetiver root is packed into a box frame and tied with twine. The result looks similar to a bale of hay. *Paket* are much less compact and are often bound with *latanye* (palm leaves).

Picture: Carrying a paket.

[21]While this was reported by planters, the study did not weigh a significant number of *bal* to determine the accuracy of this statement. Given nine *bal* selected in the area of Laurant, Cavaillon and Carrefour Mason, the range in *bal* weight was from 20kg-35.4kg with a mean of 26.4kg.

*Chan (*field*)*

Whereas sale by bale or packet is a sale of the post labor product (the vetiver roots have already been harvested), selling by *chan* is a sale of the vetiver field before the labor of the harvest has been invested.

Most often, farmers expressed interest in this strategy as a secondary option to sale by bale or packet. This option is appealing when the farmer does not have the cash available to pay for the labor of the harvest. Selling by *chan* requires the labor to be paid for by the intermediary. Once the speculator has paid for the labor, he then takes the *paket* or *bal* and sells them to the oil producer. This sale is always at a lower price than might be garnered by the planter by selling by *bal* or *paket*. Therefore, it is really only utilized if there is no money to pay for labor, or if the planter is unable to organize and work himself.

Multiple Year Sales

Multiple year sales are sales by *chan* that occur at one point in time but account for harvests into the future. This is a strategy invoked by the planter when a larger sum of money is needed for something as serious as a death or hospitalization. Given the form of investment and return structure, this can be seen as a system of informal credit that exists between planters and intermediaries. Intermediaries benefit by higher returns on the purchase of vetiver, and planters who are in need of cash can have access to it. This interaction exists in a context of economic power and cash availability: the planter often loses a significant portion of future revenue in return for cash at the moment of need.

While the exchange of future harvests for cash occurs in all areas, it is slightly different depending on the geographical region. In the majority of Laurant and Cavaillon, multiple year sales were framed in dramatically descending price per year payments. For example, the total sum of the sale would be HTG$8750, but the sale would be described for a harvest of three years paid out as HTG$5000 for the first year, HTG$2500 for the second year, and HTG$1250 for the third year.[22]

In Port Salut, one speculator talked about "*ipotek"* (mortgage). This was a more extractive economic arrangement whereby a loan would be given to the farmer by the speculator.[23] The speculator then has the right to harvest the field until the planter is able to pay back the loan (or mortgage) in full.[24]

[22] In La Porte, planters stated that multiple year purchases did not have this descending price.
[23] The intermediary in question mentioned that it is not only a speculator could enter into this business venture but anyone with available cash.
[24] While this was introduced by a speculator, no planters that were interviewed mentioned this arrangement.

Vetiver as Credit: Multi-year sales are possible because of the hearty nature of vetiver. Unlike many other agricultural crops which can be damaged by weather variations, the harvest is dependable. Planters in need of a large quantity of cash for a hospitalization or death can use this strategy to sell a portion of their holdings for years into the future. The speculator and planter come to an agreement about how much money will be paid for how many years of harvest and the planter then has access to previously unavailable cash. However, these rates are often much more beneficial in the long term to the lending intermediary.

Vetiver and the Environment

Vetiver has been heralded by conservation practitioners and scholars as a tool for erosion control, water purification, and environmental rebuilding throughout the world as well as in Haiti (Grimshaw 2003). If planted properly, vetiver's dense and vertical root structures can provide effective erosion control even on steep slopes. However, the context of vetiver use in the Southwest of Haiti is heavily influenced by the vetiver oil industry. In the harvest of vetiver roots for oil production, there is an increased potential for erosion and the loss of top soil. Given these two potential uses of vetiver, the properties of the plant cannot be discussed in a de-contextualized fashion but rather must be discussed in relation to their linkage with human actors.

Vetiver for erosion control

Vetiver for erosion control is not a phenomenon isolated to the discussions of environmentally oriented agriculturalists and planners, but is also in practice among farmers in

the south of Haiti. In areas of intense cultivation, it is seen only occasionally. In Laurant, an area where farmers estimate that approximately 80% of farming land is used for vetiver, vetiver was occasionally planted along river beds in an effort to hold back the river banks. This was described as vetiver whose purpose was to "*kenbe te a"* (to hold the earth). These plants were visibly larger than the vetiver in oil production fields, as they had never been harvested. Notably, even in these areas of intense vetiver root cultivation, farmers stated that this vetiver would not be harvested for oil.[25]

More distant from the areas of vetiver root cultivation, on the coast west of Port a Piment (around Chardonniers), vetiver was more readily identified for its properties as something that "*kenbe te a"* (holds the earth). While many informants were aware of the potential economic possibilities of oil production, its usage was more commonly discussed as a plant that holds and protects the soil.[26] Passing through the area, vetiver is more visibly present on the sides of roads and rivers than in areas of Port Salut and Les Cayes, perhaps indicating the lower value placed on vetiver roots in that area, and the higher value placed on erosion control. It is notable that the area where vetiver is discussed mostly in terms of erosion control is geographically farther from the oil production factories. Chardonniers does have two intermediaries who report purchasing roots from planters deeper into the hills of the area. Trucks from oil producers do make the journey up to collect roots as well. Still, while this small amount of root harvesting activity perhaps makes the surrounding population more conscious of the oil production industry, the majority of the population discusses vetiver in terms of soil conservation and roof thatching.

The root harvest and soil erosion

The oil of the vetiver plant is held within its roots. Therefore, in order to harvest for oil production, the plant must be dug out of the ground. The grass above the ground is cut off, and the root structures are unearthed and removed. The excess dirt is shaken off, the roots are then collected and sold. This leaves the soil from which the vetiver was harvested no longer tightly packed with vegetation, but rather loose and without vegetative cover. In harvesting an entire plot of vetiver, a hillside may be at risk for debilitating erosion. Numerous hillsides covered with generations of vetiver show emerging rock, where top soil has completely vanished.

However, it is not always the case that farmers will harvest an entire hillside. In the areas of Carrefour Mason, and some areas of Port Salut, roots are harvested not all at the same time, but little by little, as cash is needed.

Farmers re-plant vetiver seedlings soon after the harvest. However, these small seedlings do not have extensive root structures and are easily washed away with a heavy rain. In another effort to control soil erosion, planters also use the *pay* (grass) to cover the dirt which has been

---

[25] However, during a conversation with an aid worker living in Les Cayes, a discussion arose about a recent NGO project to plant vetiver on hillsides in the south in order to prevent soil erosion. After the NGO planted the hillside, the intended project was damaged because someone dug up the plants, ostensibly for essential oil production. This is a different situation than a farmer (or farmers) who identify issues of erosion and chose to address them with vetiver.

[26] These areas also used vetiver grass to cover houses to a much greater degree than the areas of Port Salut and Les Cayes.

harvested. However, throughout the vetiver plots there are many locations where the topsoil has worn away to reveal exposed bedrock. Many farmers interviewed do believe that the farming of vetiver leads to erosion. Some remarked that simply the act of farming on a hillside means that soil will move down the slope. One planter in the Trikom area remarked that though vetiver gave him more cash in hand than his rice plot, he said that the soil depletion caused by the harvest effectively deteriorated his investment, and said that rice is a better crop because it will not deplete his capacity to produce in the future.

Coping

Where farmers see their soil depleting, they will often take reactive measures. In some areas of the region, soil is actively replaced on the hillside from which it eroded. Farmers will take soil from the bottom of the slope, haul it to the top, and spread it out over the depleted areas.

Another strategy involves using the vetiver grass in combination with soil. Vetiver grass is placed over the exposed bedrock, then soil is spread along with new vetiver seedlings which will then penetrate the soil, grass, and bedrock.[27] Other farmers merely rake soil back over the small troughs that are created by heavy rainfalls. There are also those who take no coping measures.

Picture: Exposed bedrock and vetiver

[27] Vetiver roots are known for their heartyness and ability to penetrate most surfaces. One knowledgeable vetiver exporter noted that vetiver roots could even penetrate cement if given a bit of water.

Prevention

In the area of Trikom and Saint Helen, farmers were acutely aware of this issue and many utilized *ban vivan*, or living bands. These are composed of strips of vetiver (and often other plants and occasionally trees) that are planted across the hillside of cultivation in a row in order to provide stabilization and hold back soil erosion.[28] Similar strategies were utilized in areas of Port Salut, again with the encouragement and involvement of a non-governmental organization. However, in both of these cases, the soil conservation strategies are not particularly effective. In Trikom, the bands are so far apart that while they do prevent the runoff of soil above them, below there is significant top soil loss such that bedrock is exposed. In Port Salut, similar problems are visible. One recently graduated agronomist living in the area noted that one of the issues in soil conservation projects was the lack of follow through by the implementing organization.[29]

Other preventative measures included digging canals around the vetiver plots in order to divert the water during heavy periods of rain. The strategy with canals was to limit the impact of torrential downpours on the planted vetiver crop.

One of the main prevention techniques used is to harvest vetiver roots in the dry season. Interestingly, the dry season is not only preferable for oil yields, but is also preferable environmentally. I witnessed a number of torrential downpours that occurred during data collection and directly followed the harvest of a vetiver plot. With heavy rainfall and lose soil without vegetative cover, soil erosion becomes a major issue. If planting and harvest occur at a time least likely for rain, there is a lesser probability of a downpour carrying away the newly upturned dirt. Similarly, when the rainy season does come, a vetiver plot with maturing plants seems to provide increased protection against erosion.[30]

Conclusion: The Complexity of Roots

The complexity of the vetiver industry in Southwest Haiti called for a research project that allowed the populations most intimately involved in the process to discuss their lives and relationships with vetiver. Many of the planters were frustrated with how much they depended on vetiver, and how little it supported them. However, its robust characteristics make it a guaranteed source of cash income for planters. Therefore, it is used almost as savings reserves, similar to the *cochon kreyol* (Kreyol Pig). It is also used as collateral for cash advances in the event of family emergencies or an unforeseen need for cash. The high expense of labor and

[28] Planters revealed that this strategy was introduced by a project from the Pan American Development Fund.

[29] Other areas had recently implemented these strategies, and therefore a full seasonal cycle had not passed in order to visually evaluate the utility.

[30] A phenomenon to be more thoroughly investigated by applied agronomists.

limited alternative incomes intersect at complex labor and business decisions made by vetiver planters.

The environmental impact of the vetiver plant is dependent on its context. While it has remarkable possibilities in terms of environmental conservation, the impact of vetiver must be framed in light of the context in which it is utilized. In the process of essential oil production, vetiver 'digging' can damage the limited quantity of top soil on the hillsides cultivated by farmers. While farmers recognized this damage and may make concerted efforts to repair or limit the soil erosion, the economic necessities of many Haitian families places pressure to harvest at environmentally and economically inopportune times.

While vetiver might appear an environmental solution to some, the nature of cultivation makes it an extractive practice promoting environmental degradation and the exploitation of inexpensive Haitian labor for luxury goods. Yet amid this context of extraction, Haitian farmers utilize the properties of vetiver to temporally stabilize their income. In this effort to find a reliable source of investment, decisions on when and how to harvest are made that may not be environmentally or (in the long term) economically as profitable. Like other aspects of life in rural Haiti, the vetiver industry's future impact on the lives and lands of Haitians is summarily affected by a context of economic urgency.

Works Cited

Bernard, Russell. 2002 *Research Methods in Anthropology: Qualitative and Quantitative Approaches* . Third edition. Walnut Creek, CA: Altamira Press.

Chomchalow N. 2001. The Utilization of Vetiver as Medicinal and Aromatic Plants with Special Reference to Thailand. Tech. Bull. No. 2002/1, PRVN / ORDPB, Bangkok, Thailand

Chomchalow, N. 2000. Techniques of vetiver propagation with special reference to Thailand. Technical Bulletin No. 2000/1, Pacific Rim Vetiver Network. Office fo the Royal Developments Board, Bangkok, Thailand.

Grimshaw RG. 2003. The role of vetiver grass in sustaining agricultural productivity. (http://www.vet.org).

Haitian National Agricultural Investment Plan. 2010. Ministry of Agriculture, Natural Resources, and Rural Development.

Hall, D. W. and J. W. Thieret. 2003. Chrysopogon *in* Flora of North America. Vol. 25.Oxford Univ. Press. New York and Oxford.

Hengchaovanich, D and Nilaweera, N S. 1998. An assessment of strength properties of vetiver grass roots in relation to slope stabilization. Proceedings of the First International Conference on Vetiver. Chiang Rai, Thailand, pp 153-158.Hill, R D (1998). Personal communication.

Hengchaovanich, D. 1999. Fifteen years of bio-engineering in the wet tropics from A (Acacia auriculiformis) to V (Vetiveria zizanioides). Proceedings of the First Asia Pacific Conference on Ground and Water Bio-engineering for Erosion Control and Slope Stabilisation. Manila, Philippines, April.

Lawrence, BM. 2009. Progress in Essential Oils. Perfumes and Flavors 34(January): 48-57.

Mintz, Sydney. 1961. Standards of value and units of measure in the Fond-des-Nègres market place, Haiti. Journal of the Royal Anthropological Institute 91(1): 23-38.

Mintz, Sydney. 1962. Living fences in the Fond-des-Nègres region, Haiti. Economic Botany 16 (2): 101-5.

ProNatura 2011. Feasability Study: Green Vetiver for Haiti.

Time Magazine. 1959 “Haiti: In the Middle.”

Truong, P, Baker, D E, and Christiansen, I. 1995. Stiffgrass barrier with vetiver grass. A new approach to erosion and sediment control. Proceedings of the Third Annual Conference on Soil & Water Management for Urban Development, Sydney. Pp 214-222.

Truong, P.N. and Hart, B. 2001. Vetiver system for wastewater treatment. Technical Bulletin No. 2001/2. Pacific Rim Vetiver Network. Office of the Royal Development Projects Board, Bangkok, Thailand.

Truong, P.N., and Baker, D. 1997. The role of vetiver grass in the rehabilitation of toxic and contaminated lands in Australia. Proceedings of the International Vetiver Workshop, Fuzhou, China. October.

Van den Berg, J., Midega, C., Wadhams, L.J. and Khan, Z.R. 2003. Can vetiver grass be used to manage crop pests? *In* Vetiver grass – a world technology and its impact on water. Proceedings of the Third International Conference on Vetiver and Exhibition, Guangzhou, China, October. Agriculture press, Beijing pp. 262 – 27.

Appendix 1: Interview Guide

Vetiver Questions
6/17/11

FOR ALL
*What affects change in price?
*What is vetiver oil used for?
*What is vetiver cultivation's impact on the environment?

For Oil Producers:
-What is the process by which you make vetiver oil?
-How many alambit (stills) do you have?
    What is the size of your alambi?
    How much oil is produced by each alambi?
        How many drums do you produce each year?
-How long do you distill the vetiver for? Does this affect the quality or quantity?

-Where does your vetiver come from?
    Do you have any contact with the farmers you work with?
-Where is the best quality vetiver from?
    -What characteristics does good quality vetiver have?
-Does vetiver differ from place to place?
    How? Quantity? Quality?
-Do you own the vehicles used to transport vetiver to your facility?
-How do you know the intermediaries who sell to you?
-How many intermediaries do you work with?
    Do they work alone or do they also have other agents that they work with?
-Are you a part of any sort of cooperative?
-Do you export vetiver?
    -If not, then who do you sell to? Is there any particular reason you sell to a particular person?
    -How many exporters are there in the country?
-Do you have any other businesses?
-How many years have you been working in vetiver?
    How did you come to work in vetiver?
What is the general price per barrel of oil?
    How and why does it fluctuate?

*How many producers exist?
*Are they similar sizes?
*Do they have similar methods?
*What sets them apart?

*How much vetiver produces how much oil?
*How much do you pay for a packet of vetiver? How many pakéts fill an alambi?
*How much oil comes out of each alambi?
*How many drums of oil do you produce each year?
*How much does each drum sell for?
*Do they know the intermediaries they buy from?

For Intermediaries (funisier, agents, spekilete)
Could you tell us from the beginning to the end about the vetiver oil production process?
Who do you buy from?
How much do you buy? What is the price range?
What affects the prices that you buy at?
Do you know the people you buy from?
Do you plant any vetiver or own land?
Do you have any other businesses?
How did you come to work in vetiver?
Did your family work in vetiver?
Are there any associations of funisiers?
Do you have partners?
Are there organizations of oil extractors or planters?
How much vetiver do you buy and sell each year?

*Who do you sell to? Does this vary?
*How much do they make per year in selling and buying vetiver?
*How do they contact the producers to say they have vetiver?
*Do they only buy in the region that they work?
*Do they know the other intermediaries who sell to the producers?
Do they communicate with them?
*How do they know prices to sell and buy?
*How did they become intermediaires?
*Do they work with a standard pakét size? Can I see it? Measure it?
*Do different producers pay different amounts?
*Do producers have any requirements?
*How do you go about getting the money for the purchase?
*What other sources of income does your house have?
*What is the process of paying for vetiver? How do you front the money to the farmers?

For planters:
Quick survey data:
***What is the plot size of vetiver? What is the proportion to total land they have?**
***How much do farmers make per kao of land in vetiver?**
***For how much do they sell their vetiver**
***Are all the packets the same size?**

***Do you have other sources of income/How much of your total income is vetiver?**

How does vetiver harvest work?
- When does it begin and end?
- Who participates?
- How is vetiver bought from you?

Do you own the land or work the land?
If you own the land, how much land do you own?
- Is it all used for vetiver production?
- Do you have any other forms of income?
  - How else does your house make money?
- Does the rest of your family work in vetiver?
- Do you work with cousins or extended family?

-What does vetiver oil do? What is it sold for? Is it expensive?
-Does vetiver planting year after year do anything to the soil?
-Have you noticed any change in soil quality?
-Do you utilize vetiver for anything other than selling it to the factory?
-Do you work with just anyone when you plant and harvest vetiver?
- Family? Friends?

-Do they know the intermediaries they sell to or is it just anyone?
-Is there an association of vetiver growers

Do you harvest? If others harvest, how do you pay them?
- How big are the parcels of land that you work on?
- How many people will work at one time in harvesting vetiver?

What else do you use vetiver for?
- Do you use the grass at all?

What is the planting strategy for vetiver?
Why do you plant vetiver instead of another crop?
- How long have you been planting vetiver?