

THESIS

*KILTI PYEBWA*, THE CULTURE OF TREES:

THE VALUE OF LOCAL KNOWLEDGE IN COUPLED SOCIAL-ECOLOGICAL SYSTEMS OF RURAL HAITI

Submitted by

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## CHAPTER 3: *PWOBLEM PYEBWA*: THE TREE PROBLEM

### Introduction

Haiti's area of forest cover has dropped from 80% to below 1.5% since 1492 (Roc 2008). This loss includes a drop from 80% of Haiti's land covered by trees to 60% during the time of colonialism, a brief period of reforestation after the Haitian Independence of 1804, and a drop back to 60% by the time of U.S. Occupation in 1915, as seen in Table 3.1. Since the mid 1900's, processes seem to have initiated and catalyzed a cycle of positive feedback loops leading to more deforestation. Recent studies estimate Haitian tree cover at 1.5% or less.

Table 3.1. Loss of Haitian tree cover through history

Era	Date	Starting Tree Cover %	Ending Tree Cover %	Tree Cover Loss %	# of Years
Pre-Contact	-1941	80	80	0	200+
Colonial	1492-1803	80	60	20	311
New Republic	1804-1934	60	21	39	130
Post-Occupation	1935-2013	21	1.5	20	78

(Sources: Roc 2008; Brenner and Binford 1988; Williams 2011; Library of Congress 2006; Gibbons 2010; Mintz 1995; Walter and Ugelow 1979; Katz 2008; Food and Agriculture Organization 1988; ICG 2009; Diamond 2005)

Despite this deforestation, research partners in rural Haiti remain intertwined with their environment, depending on trees for food, housing, rituals, medicine, cooking fuel, and hurricane protection. Loss of these heavily relied upon trees has fostered a cycle of poverty and environmental degradation that I have named *Pwoblem Pyebwa* ("The Tree Problem" in Haitian Creole) occurring throughout the Post-Occupation Era. Through iterative qualitative research with rural Haitians, I have identified processes involved and visually mapped this cycle, as seen in Figure 3.1. I argue that the *Pwoblem Pyebwa* Cycle lowers quality of life through complex social-ecological processes that developed throughout Haitian history.

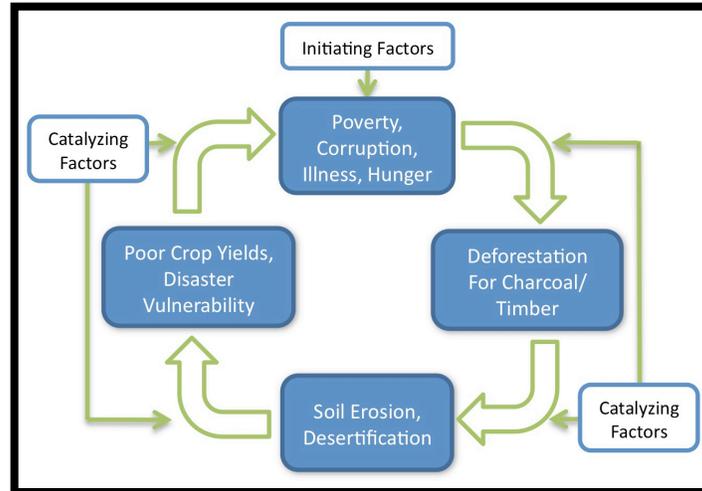


Figure 3.1. *Pwoblem Pyebwa* Cycle currently impacting rural Haiti

### Understanding History and Combining Knowledge Types

This study on the *Pwoblem Pyebwa* Cycle follows the suggestion of Mintz (1995), who argues that outsiders should not attempt to address current phenomena in Haiti without first understanding the historical processes involved. Observers have long blamed only Haitians for the issues impacting this Caribbean nation. Yet, international forces have contributed more to vulnerability in Haitian history than foreigners recognize, as pointed out by Kennedy and Tilly (2010). Not acknowledging these connections has resulted in misguided and paternalistic prescriptions to Haitian dilemmas, seen in the mismanagement of Haitian disaster relief after the earthquake of 2010 (Schuller 2012). I argue that 50 years of attempts to address deforestation in Haiti have also suffered from this way of thinking. To combat this mindset, the *Pwoblem Pyebwa* Model provides a means to understand the history of deforestation in Haiti as it relates to current social-ecological processes. Mintz supports such a method to understanding issues in Haiti, and notes, "Haiti's current crisis then, is historical" (1995:73).

Along with history, literature on Haitian deforestation lacks aspects of local knowledge and qualitative understanding of rural culture. My research, which attempts to contribute these lacking aspects, comes after 50 years of outsiders studying Haitian tree loss. Over the last decade, researchers have begun calling for better understanding of local views, but nearly all studies remain focused on

statistical data. Moreover, this data originates from outsider-chosen variables like land tenure, education level, and income (Williams 2010; Dolisca et al. 2009; Dolisca et al. 2007). Such a focus leaves little room for locally observed processes or historical factors.

To better understand the complex interactions between these factors and those aspects overlooked by foreign researchers, I performed qualitative research in Haiti during the summer of 2012 and winter of 2013. I learned from experts on Haitian human-environmental interaction: the rural Haitians that rely on trees. According to Berkes (2008), these people who rely on trees possess more knowledge on the topic than outsiders. Also, rather than focusing on environmental or social factors alone, I targeted the interaction between them, viewing Haiti as a Coupled Social-Ecological System (Lui et al. 2007).

For this portion of my research, I focused on the following research questions: “What do locals perceive as factors impacting deforestation in Haiti?” and “How can this knowledge be used to help improve impacts of reforestation initiatives on resilience and quality of life in rural Haiti?” I then incorporated this data into the *Pwoblem Pyebwa* Model, combining outsider and local knowledge types to understand deforestation as intertwined social-ecological processes. In doing so, I sought to fill gaps in literature on historical and locally acknowledged processes involved in Haitian deforestation.

### **Haitian Deforestation Literature**

As noted in Chapter 2, I have focused a large portion of my research on the social-ecological processes impacting deforestation and quality of life in Haiti. This research focus comes after more than two years of searching through literature. During this search, I have yet to find a comprehensive overview of deforestation in Haiti. Studies on the subject have identified some factors impacting deforestation (such as land tenure and charcoal production), but few researchers, if any, have looked into the complex interactions between such factors. Similarly, few researchers have addressed the

historical causes of this deforestation. Instead, they have tended to focus on Haiti's current citizens and their impact on tree loss while ignoring historical and international impacts.

The limited literature on deforestation in Haiti seems to fall into two categories. The first category includes critiques of current and past initiatives to reforest Haiti, often by those involved in such initiatives (Murray 1986; Murray 1989; Bannister and Josiah 1993; Bannister and Nair 2003; Murray and Bannister 2004; Sprenkle 2006; Sprenkle 2008; Gibbons 2010; Fischer and Levy 2011; Williams 2011). The second category involves research on the causes of deforestation in small regions near Port-au-Prince that the Haitian Government and foreign donors find important (Ashley 1989; Pierre-Louis 1989; Dolisca et al. 2006; Dolisca et al. 2007; Dolisca et al. 2009). Both of these categories provide useful information, and without them my research would not have been possible. Yet, they remain focused on outsider ways of knowing and elite priorities, providing only a partial view of what is occurring.

In the non-academic realm, the tendency has been to focus on isolated poverty and lack of environmental knowledge as the primary causes of environmental degradation in Haiti. It appears that most outsiders (but not all) depict Haiti as a helpless and generally isolated country that can only survive with outside indoctrination. This idea comes across in project websites, which tend to present photos and text depicting the education of local peoples on Western techniques. Schuller (2012) argues that such an emphasis often comes from outside pressures to present Haitians in a way that donors are comfortable with, focusing on the need for outside interaction and the role of poverty in Haiti.

While my research supports the idea that poverty plays a key role in deforestation, I argue here that the causes of such poverty extend further than the island of Hispaniola and include multiple impacting factors brought from centuries of outsider involvement in Haitian affairs. I also argue that honest recognition of such outsider-driven factors should occur before beginning project planning. While doing so may bring in less capital, I believe it can help alter donor perception of rural Haitians while promoting more effective partnerships.

Along with shifting the blame of Haitian poverty and environmental degradation away from rural Haitians, my field research refutes the notion that rural Haitians lack knowledge on the importance of trees or environmental issues. On the contrary, I have repeatedly found Haitians to possess a wealth of knowledge on Haitian tree species, uses of tree species, causes of deforestation, causes of poverty, and the connections between social and ecological processes across space and time. I have also found (to varying degrees) that outsiders working on reforestation projects in Haiti tend to possess limited knowledge on those topics that rural Haitians know so well. Outsiders seem to know little about the history of deforestation in Haiti, cultural uses of trees, and processes leading to deforestation. Instead, many reforestation projects in Haiti tend to focus only on those uses and processes that fit into Western understanding of business and agroforestry.

Understanding Haiti's complex deforestation dilemma requires new categories of knowledge and a mechanism to represent the connections between knowledge from all categories. For new categories of knowledge, my research contributes local knowledge on tree use and human-environmental interactions. To represent connections between humans and the environment impacting deforestation and quality of life in Haiti, I present the original *Pwoblem Pyebwa* Model (seen in Figure 3.2 and discussed below), which situates the *Pwoblem Pyebwa* Cycle in the local and historical context.

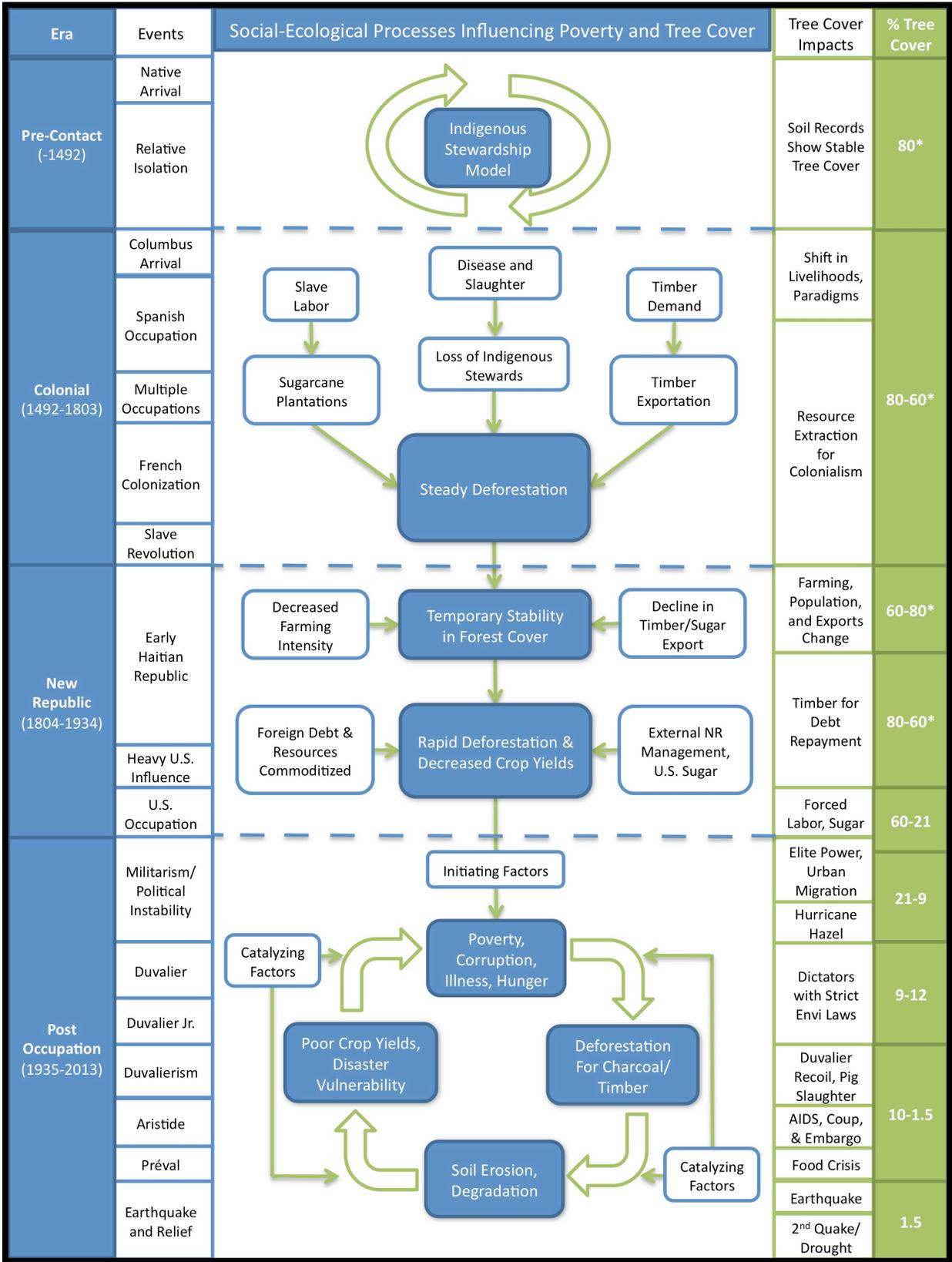


Figure 3.2. *Pwoblem Pyebwa* Model

### ***Pwoblem Pyebwa Model***

Realizing the lack of comprehensive knowledge on deforestation in Haiti and the need for such knowledge before attempting to address this dilemma, the *Pwoblem Pyebwa Model* represents social-ecological processes impacting deforestation. The central portion of the model shows the key processes impacting Haitian tree cover through history. I have broken these processes into four eras based on major political events and dominant types of human-environmental interaction: Pre-Contact (- 1491), Colonial (1492-1803), Early Republic (1804-1934), and Post-Occupation (1935-2013). Each era is separated by a dotted line, which represents that processes of each era impact the processes of the following era despite their differences.

Since authors note that Haitian issues must be understood in their historical context (Mintz 1995; Farmer 2003), I have included dates and major events in Haitian history on the left side of the model. These dates and events were not chosen at set intervals of time but rather at intervals that correspond with available data on tree cover and the factors impacting such tree cover. Since one source does not contain a comprehensive view of tree loss in Haiti, tree cover data comes from a combination of literature and the comparison of this data to field research.

The most recent figures on forest cover come from aerial imagery and geographic information systems (GIS). Despite increased accuracy of these methods compared to previous estimation techniques, statistics of tree cover still vary from study to study and even within some studies (for example, Williams (2011) says forest cover is currently 3% on page 20 and then that it is 1% on page 21). Most of the earlier trees cover figures in the model come from estimates found in early studies. Before the U.S. Occupation of Haiti in 1915, tree cover data comes primarily from triangulating pollen levels in literature on Haitian soil samples with historical events and rough estimates recorded from those times (Brenner and Binford 1988; Higuera-Gundy et al. 1999). While pollen samples demonstrate clear trends in forest cover change, they do not provide discrete numbers for tree cover percent. To represent this

uncertainty, I mark these numbers with asterisks in the model. Thus, while data on tree cover in the *Pwoblem Pyebwa* Model may not align exactly with actual tree cover, I believe this model provides the best possible approximation of trends in tree cover given the available literature on the subject and the continued variability in estimates.

For each interval of available forest cover data, I provide temporally specific impacts on tree cover that correspond with these numbers. Thus, while the central boxes of the *Pwoblem Pyebwa* Model provide an overview of social-ecological processes for each era, the green boxes to the right show processes specific to that smaller time frame and the tree cover data for the same time frame. For example, while certain processes continued throughout the Early Republic Era, the U.S. Occupation from 1915 to 1934 contributed certain specific impacts on forest cover. I present some of these impacts in the “Tree Cover Impacts” column. Doing so promotes the recognition of trends in human-environment interaction and forest cover loss, as seen by the loss of tree cover from 60 to 21% during this same time frame (Roc 2008).

Due to space limitations, the *Pwoblem Pyebwa* Model provides only words or small groups of words to represent complex social-ecological processes impacting deforestation in Haiti. The full value of this model comes from the understanding of what these words represent and how these processes combine to initiate and catalyze the cycle of poverty and deforestation currently underway in Haiti. I dedicate the remaining portions of this chapter to explicate those social-ecological processes represented in the *Pwoblem Pyebwa* Model, focusing on novel contributions from my research.

### **Initiating Factors and Catalyzing Factors**

Qualitative research on the *Pwoblem Pyebwa* Cycle of the Post-Occupation Era has provided two categories of results. Firstly, Haitian partners have helped uncover novel themes not given emphasis in literature on deforestation in Haiti. These themes include Initiating Factors (historical causes of the

cycle) and Catalyzing Factors (things that perpetuate the cycle). Secondly, this model provides a visual method with which to educate *blans* (outsiders) on social-ecological processes interacting in Haiti.

Table 3.2 shows those Initiating Factors already discussed in literature (not bold) and those that have arisen from this research (bold). Bold factors thus illustrate novel themes that can contribute to cultural understanding of those outsiders working with deforestation in Haiti. These novel themes include Post-Colonial Foreign Relations, Foreign Occupation, and Loss of Indigenous Stewardship. **Post-Colonial Foreign Relations** refers to outsider influence on Haiti during the New Republic Era. As discussed later in this chapter, outside governments required Haiti to pay reparations for damages associated with the Revolution of 1804, placed embargos on trade, and funded corrupt leaders. **Foreign Occupation** refers to the U.S. Occupation of Haiti from 1915 to 1935. During this time, outsiders forced Haitians into work parties. They also militarized the nation, forming the Haitian Army and giving power to corrupt leaders. **Loss of Indigenous Stewardship** refers to the death of native Haitians shortly after the arrival of Columbus. I argue that all of these factors contributed to the initiation of the *Pwoblem Pyebwa* Cycle in Haiti.

Table 3.2. Initiating Factors of *Pwoblem Pyebwa* Cycle (Bold= Novel or Modified Contribution)

Initiating Factor	Prominent in Deforestation Literature?	Prominent in Field Research?	Processes
<b>Post-Colonial Foreign Relations</b>	NO <b>But supported by linking literature and field work</b>	YES Discussed heavily	–Reparations/Embargos –Funding Corrupt Leaders
<b>Foreign Occupation</b>	NO <b>But supported by linking literature and field work</b>	YES Discussed moderately	–Forced Work Parties –Militarization/Corruption
<b>Loss of Indigenous Stewardship</b>	NO <b>But supported by linking soil data and ethnographic work</b>	NO	–Indigenous Disease/Slaughter
Shift in Farming Knowledge	YES	NO But occasionally mentioned	–Revolt Cleansing –Plantations, Subsistence, “Modern”
Sugarcane Plantations	YES	NO But occasionally mentioned	–Sugar to Europe –Destroyed, Parceled, Rebuilt by U.S.
Timber Exportation	YES	YES	–Mahogany to Europe –Debt Repayment

Table 3.3. Catalyzing Factors of *Pwoblem Pyebwa* Cycle (Bold= Novel or Modified Contribution)

Catalyzing Factor	Prominent in Deforestation Lit?	Prominent in Field Research?	Processes
Climate Variability	NO	<b>YES Most emphasized factor</b>	– <i>Lapli Pa Tonbe</i>
Water Tenure/ Water Access	NO	<b>YES Heavily emphasized/observed</b>	– <i>Gran Dom</i> /NGO Wells – Lack of local irrigation water
Commoditized Goods and Services	NO	<b>YES Heavily emphasized/observed</b>	– Medical, Education, Food – "Chemical Foods"
Dependency	NO Some, not linked to trees	<b>YES Heavily emphasized/observed</b>	– US Food Aid – "Republic of NGOs"
Pig Eradication	NO Some, not linked to trees	<b>YES Heavily emphasized/observed</b>	– "Peasant Stock Market Crash" (80's)
Corrupt Politicians	<b>YES Commonly blamed</b>	<b>YES Dictators good for trees</b> <b>NO Recoil bad</b>	– Post-Duvalier Recoil – Embargo & Fuel
Lack of Education	YES Commonly blamed	NO Extensive knowledge on trees	– Supposed Lack of Tree Knowledge
Land Tenure	YES Most emphasized factor	NO Scarcely emphasized/observed	– Less Investment in Conservation
Natural Disasters	YES Hurricane Hazel	YES Hurricane Jeanne/Earthquake	– Hazel ('54) Jeanne ('04) – Earthquake ('10)
Urbanization	YES Moderate emphasis	YES Moderate emphasis	– Increased Charcoal Demand
Population Growth	YES Moderate emphasis	YES Moderate Emphasis	– Increased Charcoal Demand

Table 3.3 shows Catalyzing Factors. Those factors most heavily discussed in interviews/focus groups or seen in observations were **Climate Variability** (*lapli pa tonbe* "the rain doesn't fall", changes in seasonal rainfall and temperature trends), **Water Tenure/Water Access** (lack of irrigation water leading to the need for income from charcoal in dry times), and **Commoditized Goods and Services** (things once found or made must now be purchased). The *Pwoblem Pyebwa* Cycle seems to also be catalyzed by **Dependency**, which I refer to as the dependence on foreign nations as promoted by U.S. Food Aid and the current status of Haiti as a "Republic of NGOs" with an undermined government (Schuller 2012).

These factors go against the idea in previous studies that Haiti lacks tree cover primarily because of land tenure issues, corruption, and lack of education (Zuvekas 1979; Dolisca et al. 2007; Dolisca et al. 2009).

The wealth of knowledge contributed by research partners also goes against the idea that Haitians lack environmental understanding and need training (Bannister and Josiah 1993; Dolisca et al. 2007). Instead, my qualitative research and studies elsewhere suggest that outsiders working in Haiti should receive education on social-ecological processes that have originated throughout history and continue to impact deforestation in Haiti (Berkes 2008). I argue that the *Pwoblem Pyebwa* Model can be used as a tool to facilitate this education and promote collaborative discussion on how to stop the cycle of deforestation and poverty.

This model also seeks to address the question many outsiders ask when considering the current conditions in Haiti: “Why Haiti?” One reason alone cannot be given to fully answer this question. Instead, numerous factors combine to explain “Why Haiti?” These factors include resource extraction early in the history of Hispaniola, the Haitian Revolution at a time when outsiders did not see slaves as fit to rule, trade embargos against the young nation, the need to pay of foreign debt, and the use of Haiti for outside gain. I discuss these and other factors in the following sections. In order to fully comprehend deforestation in Haiti, outsiders must begin by understanding the earliest European contact with Hispaniola.

## 1. Pre-Contact Era

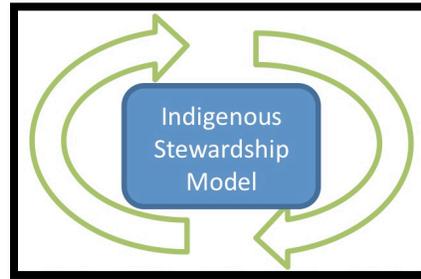


Figure 3.3. Pre-Contact Era excerpt from *Pwoblem Pyebwa* Model

Christopher Columbus first set foot on Hispaniola (later to be separated into Haiti and the Dominican Republic) in 1492. At the time of his arrival, tropical forests covered the majority of the island. Anywhere between 1 million and 8 million Arawak Indians also inhabited Hispaniola, only to die within the first few hundred years of contact (Farmer 2003). Due to their early eradication, little is known about Arawak culture, and my assumptions about this era come instead from pollen levels in soil samples and literature on other indigenous resource users of the New World.

Since the mid 1900's, pollen analysis, or palynology, has been used in archaeology and biology to learn about natural history and past interactions between humans and the environment in an area (Evans and O'Connor 2001). This includes using pollen levels in soil to test historical forest fires (Tinner 1998), analyzing climate change (Ivanov et al. 2002), and learning about past vegetation (Soepboer and Lotter 2009). While there have been critiques of pollen analysis, including that pollen deteriorates over time, studies making these critiques encourage the use of pollen analysis for understanding cultural use of plants when other means are not available (Bryant and Hall 1993). Soil studies in Haiti suggest that native Haitians had minimal impact on forest cover and support the idea that they used a method stewardship less damaging than outsider resource users, seen in later eras (Brenner and Binford 1988).

Many extant indigenous groups exhibit this sustainable use of resources when compared to outsider methods of resource extraction for capital gain. Examples include nomadic groups identifying and adjusting to feedbacks between vegetation and local weather in ways outsiders cannot (Marin

2010), indigenous fish and timber use compared to more destructive outsider methods (Brondizio et al. 2009), and the multi-generational use of animal populations compared to declining populations with outside management (Nadasdy 2003). Ross et al. (2012) also present empirically based discussions of collaborative stewardship from a variety of case studies. They use these case studies to present an Indigenous Stewardship Model (Ross et al. 2011) characteristic of North American native peoples that the Arawak of Hispaniola are thought to have originated from.

While some authors highlight examples of indigenous peoples negatively impacting natural resources, available data supports positive indigenous stewardship by Arawaks of pre-Colonial Haiti. Diamond (2005) presents instances of native forest use on other islands that resulted in environmental destruction and the downfall of indigenous cultures. Yet, analysis of population and forest cover in the Pre-Contact Era suggests that natives to Hispaniola used their environment in methods similar to the Indigenous Stewardship Model of natives inhabiting mainland North America. Arawak practices sustained at least one million people on a relatively small Caribbean island while retaining an estimated 80% forest cover (Roc 2008). Soil data also supports the presumed indigenous stewardship of the Arawak natives. By measuring pollen levels in soil preserved at the bottom of Lake Miragone, Haiti's largest body of freshwater, natural scientists have concluded that early inhabitants had minimal impact on the Haitian environment (Brenner and Binford 1988). Instead, Brenner and Binford have found two major periods of deforestation, the first of which coinciding with the arrival of Europeans in the 15<sup>th</sup> century and continuing through the Colonial Era (1988).

With the loss of the Arawak people so too was lost their systems of resource use in Haiti. Many of the plant and animal species of Haiti cannot be found anywhere else (Williams 2011). Therefore, native Haitians used these resources in ways that differ from outsiders not familiar with Haitian species. Berkes (2008) explains the negative impact of the loss of this and other indigenous cultures as follows:

*These communities are the repositories of vast accumulations of traditional knowledge... their disappearance is a loss for the larger society, which could learn a great deal from their traditional skills in sustainably managing very complex ecological systems (114-115).*

Haiti saw the loss of this indigenous culture in the Colonial Era, when timber exportation, sugarcane plantations, and loss of indigenous stewards prompted steady deforestation.

## 2. Colonial Era

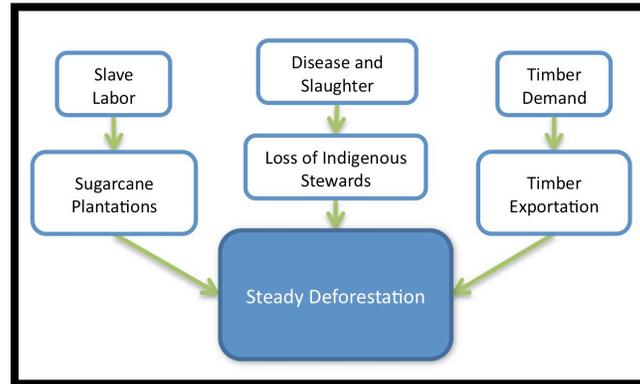


Figure 3.4. Colonial Era excerpt from *Pwoblem Pyebwa* Model

### 2a. European Conquest

While the first exchanges between Hispaniola natives and European explorers proved amiable, Columbus' presence began a process of cultural, environmental, and physical death. Scholars continue to debate the size of Hispaniola's native population prior to outside contact as well as the specific nature of European influence on the islanders. Most agree that at least one million Arawaks lived on the island, and some estimate numbers as high as eight million (Farmer 2003). Regardless of the original number, most of the native population disappeared in the first 25 years of European influence. In the 17<sup>th</sup> Century, the native population was completely annihilated (Smith 2001). At best, Columbus and his men inadvertently caused the downfall of natives through disease and occasional physical conflict. At worst, they actively pursued eradication of Hispaniola's inhabitants. The eradication of these people simultaneously acted as an eradication of cultural knowledge about human-environmental interaction.

The arrival of slaves in Haiti (whose descendents make up the majority of the country's current population) coincided with further separation from the rhythms of nature. As European markets determined what to grow and in what quantities, farming became detached from those dependent on the land for survival. Eriksen (2008) notes the danger of outsider control, since food systems "depend upon ecological variables for their most basic function, yet they are largely driven by social processes and policies" (6). Brondizio and others (2009) echo the dangers of this setup:

*Often, this leads to ownership or control of harvesting operations by distant decision makers who have little or no knowledge of local conditions, strong incentives to think in terms of commoditized products, and little interest in the maintenance of ecosystem services that are important to local users (267).*

## **2b. Colonialism**

Colonialism in Haiti shifted the stewardship of trees and other resources from Haitian inhabitants to distant decision makers removed from the local context. These outsiders acknowledged the natural wealth of Haiti, labeling it the “Pearl of the Antilles.” Now known as the poorest country in the Western Hemisphere, Europeans saw Haiti as the most profitable colony in the world throughout much of the Colonial Era (McClellan 2010). Colonizers eventually found many uses for Haiti, but what most impressed them was the abundance of lucrative trees. As Diamond puts it, “The first European visitors noted as Hispaniola’s most striking characteristic the exuberance of its forests, full of trees with valuable wood” (2005).

With colonialism came tree loss. Just as literature supports the idea that traditional resource users are often best suited to plan for sustainable use of the resources they depend on, it also warns of the dangers of resource management by those not dependent on the environment (Brondizio et al. 2009). Soil data shows that the first detectable loss of forest cover in Haiti corresponds with increasing European influence (Brenner and Binford 1988). This connection suggests that the colonial view of foreign lands as sources of European wealth resulted in the unsustainable extraction of resources once used sustainably.

While Haiti as a nation did not arise until 1804, this commoditization of nature came long before independence. Outsiders used timber exportation and sugar plantations as primary methods of resource extraction in colonial Haiti. Exporting timber began with European mahogany demand and the outsider perspective of natural resources as a source of gaining wealth (Gibbons 2010). This imported perspective continued as a means to pay back foreign debt and increase elite wealth long after Haitian

independence (Kennedy and Tiller 2010; White and Jickling 1995). Timber exportation thus initiated a process that would continue throughout Haitian history: the use of trees for the benefit of a select few (usually outsiders) at the expense of those dependent on trees in their daily life.

Colonial timber demand was surpassed only by demand for sugar. As seen in Mintz's *Sweetness and Power* (1985), the arrival of this crop tended to foreshadow subjugation of those of lower social status. Increases in European sugar use prompted expanded slave labor. Consumption of sugar in Europe swelled to the point that it was a necessity by 1800 and made up 20% of European calories consumed by 1900 (Mintz 1985). To satiate the changing European palate, French colonizers felled large swaths of trees and formed sugarcane plantations with slave labor as early as 1697 (Gibbons 2010). This practice impacted tree cover through both immediate tree loss and the long-term change of farming methods. These methods went from small-scale subsistence agriculture to large-scale planting and monocrop plantations.

Sugar production also initiated what can be viewed as the extraction of soil nutrients for export to other countries. Exporting timber and sugar removed nutrients from the biogeochemical cycles of Haiti that once replenished soil. This nutrient depletion, catalyzed by increased erosion without tree cover, has contributed to the loss of soil productivity in Haiti. Centuries after European colonizers first mined the land for its resources, only 20% of Haiti's surface area is considered arable even though 50% is currently being cultivated (McClintock 2004), as seen in Figure 3.5.



Figure 3.5. Farmers look over a farming plot considered too steep and not arable by outsider standards

Historical accounts and soil data support the idea that outside influence in the Colonial Era first initiated deforestation and soil loss in Haiti. Europeans perceived the mountainous forestland as

something to be controlled, altered, and used for input into international capitalism. Land (and the trees on that land) became a commodity. What began as the wealthiest colony in the world, the “Pearl of the Antilles,” rapidly degraded for the wealth of a select few (Roc 2008). In his assessment of the environmental disparity between the Dominican Republic and Haiti, Diamond notes that “Haiti's burst of agricultural wealth came at the expense of its environmental capital of forests and soils” and that “an impressive-looking bank account may conceal a negative cash flow” (2005). This “negative cash flow” continued to impact tree cover in eras to come. Haiti’s loss of environmental capital during the Colonial Era (an estimated decline from 80% to 60% tree cover over more than 300 years) was far surpassed by the repercussions of Haitian independence in the Early Republic Era, seen in Figure 3.6.

### 3. New Republic Era

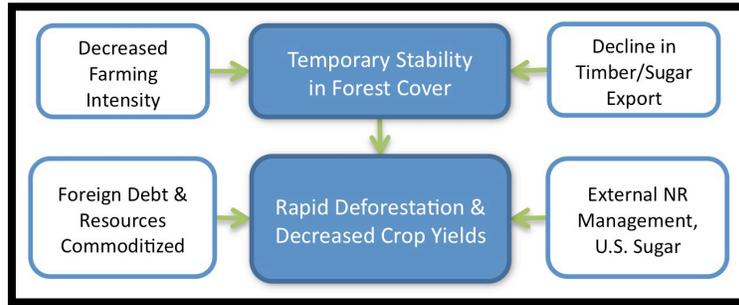


Figure 3.6. New Republic Era excerpt from *Pwoblem Pyebwa* Model

#### 3a. Haitian Independence

On January 1, 1804, The Republic of Haiti became the first and only country to arise from a slave revolt. After the United States' independence only 27 years prior, these slaves formed the second independent nation in the Western Hemisphere. While the New Republic Era saw more deforestation by area than any other, studies disagree on the impact of Haitian self-rule on tree cover loss. Some historical accounts argue that land tenure changes and farming on high altitude hillsides led to increased deforestation immediately after the revolution (Zuvekas 1979; Diamond 2005). However, with the support of studies on pollen levels in soil (Higuera-Gundy et al. 1999; Brenner and Binford 1988) and the insight of rural Haitians, I argue instead that the social-ecological processes impacting deforestation in this era were more complex and ultimately fueled by outsider influence.

When looking at available data since Haitian independence, tree cover seems to have dropped from 60% in 1804 to present day's 1.5%, with a decline to 21% in the Early Republic Era (Library of Congress 2006). At this temporal scale, assumptions have been made by outsiders about the role of Haitian rule, land tenure, and rural ignorance on environmental degradation. Such a mindset has been perpetuated by quantitative studies that focus exclusively on outsider categories like land tenure and lack of education (Bloch et al. 1988; Fischer and Levy 2011; Dolisca et al. 2009; Dolisca et al. 2007) and the popular emphasis on educating locals about outsider knowledge during reforestation projects (Comino 1988; Williams 2011). While land tenure, corruption, and other popularly cited impacts do

seem to impact deforestation in Haiti, I argue that outsiders have influenced these factors. Moreover, I argue that novel categories are needed to understand the complexity of Haitian deforestation. Looking at deforestation data from a smaller temporal scale supports this argument.

Contrary to the idea that Haitian rule and tenure systems primarily caused deforestation, soil analysis has shown that tree cover leveled out and actually increased following Haitian independence (Higuera-Gundy et al. 1999; Brenner and Binford 1988). Brenner and Binford note that historical evidence supports their findings and that “reestablishment of natural forests may have been aided by the demise of the plantation system and a return to subsistence practices on smaller plots” (1988: 95). Thus, the shift to parceling of land that researchers have used as an explanation for deforestation during the Early Republic Era may not have had a negative effect on tree cover. Instead, a shift to smaller plots and subsistence needs for trees may have increased forest cover before outsider influence caused massive deforestation. This outsider influence primarily took the form of trade embargos and imposed debt.

### **3b. Trade Embargos and Foreign Debt**

After gaining independence from France, Haiti was used as an example for why blacks should not rule themselves, and their eradication of slavery was met with European animosity. Farmer provides a summary of this paradox, “Perhaps it is ironic that Haiti, riddled with inequity, is considered by its people to be ‘the birthplace of freedom’- a heritage for which Haiti, and Haitians, would be repeatedly punished” (2003:61).

Trade embargos arose as the first of these punishments, with white-led countries not prepared to accept Haitian legitimacy. Still dependent on slavery, the United States refused to acknowledge Haiti as a country until 1862 (Smith 2001). Siding with France, they claimed that blacks were not fit to rule and subsequently restricted all trade. Such embargos left the young nation-state little hope of fostering a lasting economy. As seen a more recent embargo from 1991 to 1994, this type of event can increase

deforestation from lack of imported energy sources and an increased reliance on fuelwood and charcoal (Roc 2008). While Arawak natives seem to have survived without much international trade, the newly freed slaves had been exposed primarily to an economy with heavy emphasis on exporting. Slaves may have passed down environmental knowledge, but this knowledge originated in the savannahs of Eastern Africa and had little use in the Caribbean tropics. Deforestation also increased in the periods following Early Republic embargos. While direct causation is not known, I argue that these embargos (along with foreign debt) stifled Haiti's early economy and ultimately acted as Initiating Factors in the *Pwoblem Pyebwa* Cycle of poverty and deforestation.

While the United States refused to trade with Haiti, France took more drastic measures to hinder the Haitian economy. Despite actions by French slave-owners (who frequently tortured Haitians, skinned them, and forced them to eat their own excrements), France imposed a form of reverse reparations. As discussed by Kennedy and Tilly, "France wrought massive destruction in attempting to recapture its former colony, then extracted 150 million francs of reparations, only fully paid off in 1947" (2010:8). This debt resulted in 80 percent of the Haiti's national revenue going directly to its former slave owners (Farmer 2003). As a result, early Haitians were left with a damaged country, unappeasable debt, and no means of trade to develop their economy.

In order to begin paying off foreign debt and to fuel the economy, tree cutting increased. Haitian elites followed the imported perspective of the environment as a source of capital on the international scale. White and Jickling discuss deforestation for timber, noting, "This process continued after the revolution when the new governments let out extensive logging contracts to international firms in order to gain hard currency" (1995:9). Certain types of wood were selected over others. Gibbons (2010) points out that of the hardwoods, which outsiders first saw as the island's greatest resource, nearly all mahogany was logged for European furniture.

I argue that such logging came not out of rural Haitian ignorance or from isolated land tenure issues. Instead, my research suggests that deforestation at the hands of the Haitian peasantry has been and continues to be intertwined with international processes. While not popularly accepted by those outside organizations attempting to reforest Haiti, researchers have noted some of this connectedness. As Smith discusses in her ethnographic work on political songs of the Haitian peasantry, “in reality, Haiti's rural poor have never constituted an isolated population, nor have they been removed from larger political, economic, social, and cultural spheres” (2001:12).

Far from ignorant about the importance of trees, rural Haitians have taught me about the many uses they have for trees in their daily lives. Among the most common phrases I heard during interviews, people of both genders and all ages routinely exclaimed “*pyebwa yo se lavi!*” (meaning “trees are life!”). And just as early outsiders prized mahogany and other hardwoods, rural Haitians reiterated the

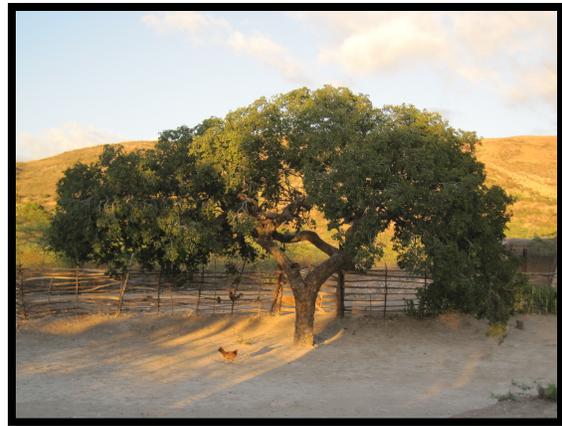


Figure 3.7. *Gayak* tree in Anse Rouge Area, considered one of “God’s Trees” by local peoples

importance of hardwoods in their lives and for environmental health. Because of uses for housing, furniture, cooking fuel, medicine, hurricane protection, and spirituality, partners actively preserved and planted mahogany and other hardwoods (like the prized *gayak* tree of the arid northwest, seen in Figure 3.7). Local names given to this group of trees support their importance. Haitians of Anse Rouge routinely referred to them as *Bwa Bondye*, or “God’s Trees.”

Without this ethnographic data, it is difficult to see the importance of this loss of forest cover from an estimated 80% to 60% in the late 1800’s and early 1900’s. Resource user insight shows that with the selective deforestation of the Early Republic Era, rural Haitians lost their supply of *Bwa Bondye*. Not only did they lose environmental capital in a monetary sense but also those trees they heavily relied

upon in daily life. I argue that this Initiating Factor impacted and continues to impact the cycle of poverty and deforestation currently at work in Haiti. Such selective deforestation still impacts Haiti, but it has been surpassed by the massive deforestation during and immediately following U.S. occupation.

### **3c. Return to Foreign Occupation**

The change in tree cover from 1915 to 1945 demonstrates the extent of Haiti's environmental destruction from outside influence. Through the first four centuries of European contact with Haiti, tree cover dropped 20% (from 80 to 60%)(Williams 2011). During the 20 years of U.S. occupation and 10 years of politically volatile aftermath, tree cover dropped from 60 to 21% (Roc 2008). Thus, American presence in Haiti fostered twice the deforestation of the previous 400 years combined. Few studies address why this unprecedented level of deforestation occurred during and immediately following U.S. presence in Haiti, but historical accounts of this time period provide some insight. These accounts suggest that deforestation accelerated so rapidly because of changes in land use, militarization, and increased inequality.

One possible reason for this deforestation is the forced labor of Haitians for mountain road building. Justified as a means to civilize the "savages" of Haiti, U.S. Military forced rural Haitians to build roads into the highlands through *corvee* work parties. Roads provided vehicle access to untouched forests and increased the rate of timber extraction. Rural Haitians forced to build these roads never saw wealth generated from their work, and this money ultimately went to the United States and a hand-selected group of mulatto elite (Smith 2001; Farmer 2003). This neocolonialist version of slavery can be seen in other societies as well. People living in rural Madagascar have experienced similar *corvee* systems of forced labor to fuel capitalistic endeavors, and these endeavors ultimately degraded the local environment (Seagle 2010). Forced labor in Haiti, as in Madagascar, continued the inter-era trend of environmental degradation for the benefit of outsiders and a small elite.

Studies also support the idea that U.S.-induced land use change for sugar production also accelerated deforestation in Haiti (Mintz 1995; Roc 2008). Haitians had shifted towards smaller subsistence plots (a shift that coincided with increased forest cover in Haiti (Brenner and Binford 1988)), but the United States attempted to shift back to the plantation agriculture of the Colonial Era. To do so, they cleared and burned large areas of land, oversaw the planting of cane, and installed sugar mills. Gibbons (2010) identifies sugar mills (which run on wood fuel like timber and charcoal) as a primary cause of deforestation during what I have identified as the Early



Figure 3.8. Sugar cane growing near Ti Bwa

Republic Era. Roc (2008) also connects deforestation to the U.S. concentration of landownership among a small elite. Such a process evicted rural Haitians who depended on the land for survival. While the plantation system fell apart soon after U.S. departure, the impact of this outside influence on deforestation continued long after a select few gained from the environmental degradation (Mintz 1995).

### **3d. U.S. Formation of the Haitian Army**

Above these labor regimes and land use changes, the most influential action of the United States was the creation of the Haitian Army. During the 1915-1935 occupation, the U.S. government installed, trained, and funded a novel Haitian Army. This army was created through an act of U.S. Congress, even though Haiti had little need or want for military. Anthropologist Mark Schuller provides a summary of the long-term negative effects of this initiative:

*The Marines propped up a series of light-skinned puppet regimes and established an Army that suppressed and killed the opposition, displaying the crucified corpse of resistance leader Charlemagne Peralte. By destroying resistance, the Occupation thus removed barriers and safeguards against future dictatorships (2007:149).*

Another culturally oppressive move by the U.S. during this period was the declaration by Franklin D. Roosevelt that French was to become the national language of Haiti (Schuller 2007). French, the language of Haitian elite, ensured that rural peasants (the vast majority of whom spoke Haitian Creole) would not be able to hold political office or partake in business transactions.

While the U.S. came to Haiti under the pretext of increasing stability, their actions ultimately fostered violence, instability, and the formation of the Duvalier dictatorship in the Post-Occupation Era.

Mintz reiterates the negative impact of U.S. Occupation on Haiti:

*The present situation (of class warfare and inequality) is the outcome of 200 years of a war of attrition against the people by a ruling class. U.S. rule early in this century confirmed, sustained, and underwrote that asymmetry (1995: 86).*

While such political aspects may not initially appear related to deforestation and soil loss, many connections can be drawn. The aforementioned international influences culminated in a dictatorship and increased disaster vulnerability that perpetuated a cycle of poverty and environmental degradation in rural Haiti during the Post-Occupation Era. Initiating Factors and Catalyzing Factors have influenced this cycle, which I call the Pwoblem Pyebwa Cycle, seen in Figure 3.3.

#### 4. Post-Occupation Era

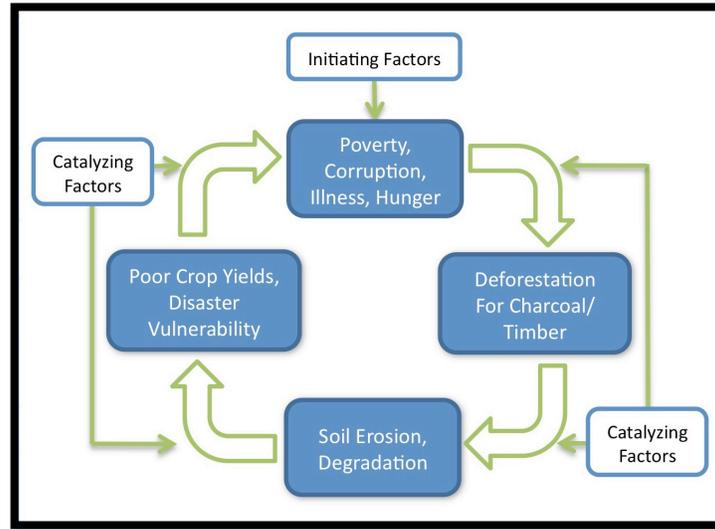


Figure 3.3. *Pwoblem Pyebwa* Cycle (excerpt from *Pwoblem Pyebwa* Model)

#### 4a. *Pwoblem Pyebwa* Cycle: Systematic Causation Through Initiating and Catalyzing Factors

The *Pwoblem Pyebwa* Cycle that has impacted Haiti throughout the Post-Occupation Era does not act independently of the historic influences discussed in previous eras. These influences, which I call Initiating Factors, still affect the lives of rural Haitians through systemic causation (Lakoff 2012). Direct causation cannot be drawn between the history of Haiti and its current status, but this is not because things like embargos and foreign occupation did not cause the environmental damage and poverty seen today. Instead, the systemic causation is more complex. Lakoff (2012) explains this type of causation as similar to smoking causing lung cancer or driving drunk causing car accidents. He argues for the importance of recognizing systemic causation when understanding connections between society and the environment:

*Systemic causation, because it is less obvious, is more important to understand. A systemic cause may be one of a number of multiple causes... It may be indirect, working through a network of more direct causes... It may require a feedback mechanism. In general, causation in ecosystems, biological systems, economic systems, and social systems tends not to be direct, but is no less causal. And because it is not direct causation, it requires all the greater attention if it is to be understood and its negative effects controlled (1).*

Under this mindset, Initiating Factors continue to cause environmental degradation and poverty through the *Pwoblem Pyebwa* Cycle of Haiti. These Initiating Factors, seen through the previous three eras, include Post-Colonial Foreign Relations (reparations, embargos, funding corrupt leaders), Foreign Occupation (forced work parties, sugar plantations, militarization), and Loss of Indigenous Stewardship (disease, slaughter). I argue that after these influences initiated the *Pwoblem Pyebwa* Cycle, Catalyzing Factors have continued systemic causation of the Cycle. Catalyzing Factors linked to deforestation in ethnographic literature include Hurricane Hazel, The Duvalier Dictatorship, Post-Duvalier Recoil, Changes in Livelihoods, and Urbanization. Novel categories of Catalyzing Factors identified by research partners include Water Tenure/Water Access, Commoditized Goods and Serves, Pig Eradication, and Climate Variability.

#### **4b. Hurricane Hazel and Disaster Vulnerability**

Of the Catalyzing Factors (those impacts that strengthen and accelerate the *Pwoblem Pyebwa* Cycle), I have found natural disasters and increasing environmental vulnerability to be among the most influential. At the simplest social-ecological level, tree loss leads to increased vulnerability to hurricanes and soil erosion. Soil erosion and poor crop yields then lead to a need to cut down more trees. Lastly, cutting down trees to sell for charcoal continues the cycle of tree loss and vulnerability. Along with soil, buildings, and livestock, hurricanes also sweep away trees themselves. This tree loss was particularly evident with Hurricane Hazel in 1954.

Hurricane Hazel hit Haiti on October 12, 1954 as a Category 2 storm. Moving north, it left an estimated 1000 Haitians dead. This toll compares to a loss of 95 lives in the United States, despite the storm rising to a Category 4 level before landfall. Such a disparity in impacts from Hurricane Hazel supports the idea that Haiti was particularly vulnerable to natural disasters by the 1950s. Moreover, this hurricane uprooted large areas of trees, and scholars have linked this tree loss to the beginning of increased deforestation following the storm (Williams 2011). Through processes of the *Pwoblem*

*Pyebwa* Cycle, this loss of tree cover (combined with economic strain and disease outbreaks) systemically increased disaster vulnerability in Haiti.

Hurricane Hazel impacted the Haitian economy through loss of crops. More specifically, 40% of coffee trees and 50% of cacao trees were destroyed, injuring two of Haiti's largest sources of export at the time (Rotberg 1971). Researchers have also linked Hurricane Hazel to increased disease vulnerability, seen through the typhoid outbreak that soon followed (Kennedy 1979). When looked at in conjunction with my qualitative research, in which research partners discussed medical costs and funerals as two of their most common reasons for cutting trees and making charcoal, Hurricane Hazel seems to have catalyzed the *Pwoblem Pyebwa* Cycle and increased disaster vulnerability.

Events since the 1950s have supported the idea of Haiti's high disaster vulnerability. In September of 2004, Hurricane Jeanne pummeled Northwest Haiti, killing 3000 people in one night in the city of Gonaives (Latortue and Vazquez 2006). Six years later, in 2010, a magnitude 7.0 earthquake decimated the nation's capitol city of Port-au-Prince, killing more than 300,000 people (Farmer 2011). These disasters appear like random happenings that fell upon an already burdened country, which is generally acknowledged as the poorest of the Western Hemisphere. Yet, looking at similar events across other countries demonstrates the heightened vulnerability of Haiti to disasters. For example: an average of 15 earthquakes of a 7.0 magnitude or higher occur each year, but the 2010 Haiti Earthquake remains the deadliest earthquake since 1556 (USGS 2012). Likewise, Hurricane Jeanne passed directly over Cuba and the Dominican Republic, but no lives were lost in Cuba, and only 18 were lost in the Dominican Republic, Haiti's only neighboring country (Bermejo 2006).

Not much has been written about Jeanne, possibly because it primarily attacked the sparsely populated Northwest. Yet, interviews with rural peoples of Anse Rouge (and other regions, to a lesser extent) demonstrate the far-reaching impacts of Hurricane Jeanne, which continue today. From my very first interview in Haiti, research partners discussed Jeanne without prompting. This Jeanne discussion

included interjections during discussions of life experiences, families, animals, crops, tree cover, and the need to make charcoal. The excerpts below (each from separate research partners) and Figure 3.9 show the impacts experienced from Hurricane Jeanne in

the Anse Rouge area:

*- So after Hurricane Jeanne I pretty much lost everything. So I do not really have any ways of living... That is when I started from scratch again.*

*- After the hurricane, I lost all I had. Before that, I had three farms with sugar cane, papaya, and plantains. But the hurricane destroyed everything. And then I was left with my two hands having nothing.*



Figure 3.9. One of many homes seen destroyed by Hurricane Jeanne along the Anse Rouge coast

More specifically, people linked this storm to their loss of livelihood. They focused on loss of livestock, which act as financial investments for liquidation in times of hardship:

*- I had six goats and the hurricane vanished them away.*

*- The hurricane swept away my livestock and also destroyed my house... it swept away my donkeys and my goats.*

Others identified the impact of Hurricane Jeanne on soil erosion. They linked this impact to decreased crop productivity, loss of livelihood, and a general state of misery:

*- Now I don't have any way of building a life because the hurricane even vanished my soil. So even my land now, it is not arable. Now I am only relying on God and (local NGO).*

When asked about why people cut down trees, partners often linked this idea back to hurricanes in general and Hurricane Jeanne more specifically:

*- I think there are a lot of issues because people don't have anything to do. That's why they are forced to cut down trees to make charcoal. And after Jeanne, I had eight plots of shallots, and I lost them. I did not have anything the next day to cook food. That is why a lot of people believe it may have been God will, but they do not have anything more to survive.*

Along with discussion of the negative impacts of hurricanes, many rural Haitians I interviewed acknowledged the importance of trees to protect against such hurricanes. They informed me of how having trees on their land means protection of their house, livestock, and crops during storms. This discussed this fluidly, not making distinction between social and environmental systems. They also explained the role of trees in holding soil, acknowledging that during these storms “trees stand strong and protect the environment.” When asked further about soil loss, research partners assured me that soil erosion began long before Hurricane Jeanne. Some cited shifting environmental regulation, political turmoil, and economic decline following the reign of “Papa Doc” and “Baby Doc” Duvalier.

#### **4c. Duvalier Dictatorship and Post-Duvalier Recoil**

Most sources agree that the Duvalier dictatorship from 1957 to 1986 left a negative mark on Haiti through fear, violence, corruption, inequality, and the erosion of the national economy (Abbott 1998; Farmer 2003; Farmer 2004; Smith 2001; Schuller 2007). These negative aspects include 20,000 to 50,000 political killings attributed to the reign of Papa Doc and thousands more during the reign of his son (Smith 2001). Sources also discuss the role of outsiders, particularly the U.S., in this regime. Farmer (2004) notes how international donors funneled millions of dollars to the Duvalier’s, Papa Doc and Baby Doc (who declared himself “President for Life” at age 19). Anthropologists devote whole books to the Duvalier dictatorship and political violence (see Trouillot 1990 and Abbott 1998). Instead, I focus here on an aspect not commonly addressed in the literature: how the dictatorship and its aftermath impacted environmental health and deforestation.

Little has been written on the direct impact of this time in Haiti’s history on the environment, but research partners have expressed both predicted and unexpected opinions on the matter. Some rural Haitians claimed that the rule of Papa Doc and Baby Doc was good for the environment, since everyone was required to get written governmental permission to cut trees on their land. Yet, most people lamented the negative aspects of the dictatorship and its aftermath. Partners commonly cited

this time period as the economic downfall of Haiti, when the rural way of life became unviable and cutting trees for charcoal sale became a necessity in response to the economic damage done by the regime. This suggests that deforestation slowed during the rule of Papa Doc and Baby Doc but ultimately accelerated after regulations were lifted.

Literature and knowledge from rural Haitians support the idea that the time period following the Duvalier dictatorship led to urbanization, loss of land, increased inequality, shifts in fuel use, and increased vulnerability. These factors acted as a set of interconnected processes that I call the Post-Duvalier Recoil. Authors have attributed this turmoil partly to the self-centered policies that began with Papa Doc, who increased personal wealth at the expense of a nation. Diamond, when exploring why Haitian deforestation has far surpassed that in the Dominican Republic, explains the different types of rulers involved, "Papa Doc Duvalier differed from Trujillo (Dominican dictator) in his lack of interest in modernizing his country or in developing an industrial economy for his country" (2005).

This self-interest continued throughout the time of Baby Doc and ultimately led to lack of social services, hospitals, and schools. In response, rural Haitians increasingly found they could not provide for their families through farming, and a mass migration to cities began. Estimates for Port-au-Prince support this trend, with the capital city's population doubling from 500,000 in the 1970s to over one million by the late 1980s. This shift came largely from an economic decline, with households averaging an annual income of only \$100 by the ousting of Baby Doc in 1986 (Dash 2001).

Government-sponsored violence during the Duvalier regime also contributed to this exodus from rural areas. *Tonton Macoutes* (named after a Haitian character similar to the Boogeyman) became notorious for their violent ways. This violence caused property owners to leave dangerous areas, many of which fleeing to the United States. Those migrating included rural business owners involved in large-scale coffee farming, and their departure has been linked to the declining rural economy (Fischer and Levy 2011). *Tonton Macoutes* used this exodus and the lack of officially acknowledged land tenure to

acquire rural land and push farmers off their property (Dash 2001). Fear and declining productivity replaced the once peaceful and productive agricultural lifestyle of rural Haiti in many areas. My qualitative research supports this trend in the decreasing viability of rural livelihoods, which continues to this day and systemically increases deforestation.

#### **4d. Changes in Livelihoods**

One of the main themes to emerge during my research was the change in livelihood activities over the lifetimes of research partners. Research partners identified a few key ways in which their livelihoods were changing. These changes include less viability of the farming lifestyle, an increased need for alternatives to crop production, and eventual urbanization when the agricultural lifestyle becomes too difficult to support families. Research partners commonly linked these changes to changes in the environment and cited livelihood changes as causes and/or effects of deforestation in their lifetime.

Partners frequently spoke of the changing viability of their lifestyle as a farmer. They used examples from the time of their parents to reiterate the increasing difficulty. Most commonly, the previous ease of finding or growing food was given emphasis, with some people explicitly discussing the role of deforestation and soil erosion. One middle-aged woman with toned arms and braided grey hair used a specific example from her life to explain these changes. She described the difficulty in losing her shallot crops (which she depended on to pay all of her expenses) to decreased soil quality and erratic rainfall.

*In May, I planted shallots again. I lost them. Back in the days, life used to be good. But now, even though you spend a lot of money to try to cultivate, you spend more than the outcome you will get... But back then, if you could have a penny you could make something out of it... Back then, before ten years ago, if you plant a can of beans you would get twenty out of it, but now, even if you plant one can, you get lucky if you get one and a half back.*

A middle-aged Voodoo priest/farmer used similar examples, saying, "There is a big difference, a big gap, because previously a smaller proportion of shallot would give a lot but now it is not the same."

The recognition of these changes traversed across generations, as seen in the similar responses from respondents aged 18 to 90. One 90-year-old woman, who spoke with surprising vigor and humor, explained the changes:

*You could find everything you needed, and you could just pick them up from the floor (of the garden). Mmm hmm. You could go to the land and get bananas, plantains, and you could go and get potatoes. You could get bags of oranges. But now it is not the same.*

While outsiders may argue that these memories are just exaggerations and nostalgic thoughts of older generations, the consistency of these reports across all age groups supports their validity, as seen in the words of this 18-year-old farmer when he described his memories of early childhood:

*Back in the days things were easier because sometimes you would walk along the street and find stuff that you had not even planted. So now even though you take the time to plant it, you can't get anything from it.*

Not only farmers, but merchant woman also discussed the decreased viability of rural life in Haiti. One mother of nine described the increased difficulty in supporting a family as a vendor: “Back in the day I used to go to the market and make 50 goudes (about 1 USD) and then come back home, but now I only go because I do not want to stay at home and get sad.” This and other discussions with vendors suggest that changes in land productivity spread to the wider economy of rural Haiti.

Triangulating these locally defined changes with changes in soil productivity supports the validity of this qualitative research. Researchers cite massive soil erosion in Haiti as early as 1938 (Lundahl 1979) and exponential increase in this erosion over the last 25 years (Brenner and Binford 1988). Currently, Haiti loses an estimated 36.6 million tons of soil (12,000 hectares) every year (USAID 2010). This occurs despite barriers installed to prevent soil loss (seen in Figure 3.10). This loss compares to an



Figure 3.10. Barrier used to prevent erosion near Deschapelles

estimate of 7 million tons in the 1930s, leading researchers to conclude, “The soil loss experienced in Haiti far exceeds that which can be considered sustainable soil loss that would allow for soil regeneration” (Jolly et al. 2007). These outsider-observed trends, when combined with the lived experiences of rural Haitians, support the idea that decreased soil productivity over the Post-Occupation Era has limited the viability of the farming lifestyle in rural Haiti. My research also supports the idea that these trends result in increased urbanization, increased need to cut trees for charcoal, and decreased tree cover in rural Haiti.

#### **4e. Urbanization, Population Growth, Decreased Agricultural Output, And The Rise of Charcoal**

Currently, 85% of Haitians rely on wood fuels (charcoal and firewood) as their primary fuel source (Dolisca et al. 2007). Many factors have impacted charcoal use in Haiti, and my research supports the idea in literature that urbanization has heavily catalyzed deforestation for charcoal production. This impact of urbanization on deforestation comes from the high reliance on charcoal in urban areas. Swartley and Toussaint (2006) support this idea by noting that 90% of households in Port-au-Prince and other cities in Haiti use charcoal for cooking, since dried wood cannot be found. Comparing this high reliance on charcoal to historical causes of urbanization and the lived experiences of research partners illuminates connections between urbanization, population growth, decreased agricultural output, and deforestation for charcoal production.

Williams (2011) connects the rise of charcoal in Haiti to increased urbanization beginning in 1954. Qualitative research with rural Haitians suggest that this urbanization came largely from Hurricane Hazel (also in 1954), the Post-Duvalier Recoil, and the changes in soil productivity that have made sustaining a rural livelihood more difficult. Decreased agricultural output simultaneously catalyzes urbanization (which increases the demand for charcoal) and increases the need for cash in rural Haiti. Population growth, at a rate of 2.5% overall and 3.6% in urban areas like Port-au-Prince, has also

increased the demand for charcoal (USAID 2007). Left with no other option, rural Haitians have been forced to turn to their last available resource: trees.

When I talked about charcoal production with research partners, I could sense pain in their words and gestures. Even getting people to discuss the topic was sometimes difficult. This difficulty was especially true for those farmers that had been chastised by outsiders for cutting trees. Only after accepting that I did not come to their village to change their ways but only to learn from them did some individuals feel comfortable enough to tell me they practiced charcoal production in times of need. As a whole, research partners simultaneously expressed the importance of trees and the unfortunate need to produce charcoal as their only means of survival.

Throughout my interviews, one of the most common phrase I encountered when talking with Haitians about trees was “*pyebwa yo se lavi!*” meaning “trees are life!” Research partners typically included energetic hand gestures and voice inflections to accentuate this point. While this phrase could be seen as a colloquialism used when discussing trees, the inseparability between trees and life radiates throughout rural Haitian culture. Some partners used examples and even a sort of fictive kin relationship to describe their appreciation for and connection with trees. One mother of nine with dimpled cheeks and a contagious smile described her connection, “I don’t know for everybody, but for me, if I go and plant two trees and then someone goes and cuts them, it is like they are hurting me, because I treat them (the trees) as my children.” This and similar local input challenges the notion that Haitians cut trees out of ignorance or apathy.

Instead, spending time listening to rural Haitians shows that cutting trees for charcoal comes as an unfortunate last resort for most charcoal producers. Research partners frequently used the terms “surviving”, “being in misery”, and “trying to get by” to explain their charcoal production in desperate times. People gave emphasis to examples of financial need, including paying for school, funerals, medical care, or house repair after hurricanes. The lack of alternative income sources in times of poor

crop yields was also cited. According to locals, all such influences increase deforestation (thus acting as Catalyzing Factors for the *Pwoblem Pyebwa* Cycle). One man described charcoal and deforestation as follows:

*People don't have any other means. If we had other stuff to do I'm pretty sure we would not be cutting trees. For example, I am not going to cut down trees because I have other activities (temporary employment), but if people do not have any other activities, they do not have any other way. They have to rely on what they have, and then what they have is to cut trees so they can make a living.*

Such local input provides insight into the social-ecological processes impacting deforestation in Haiti. Improved understanding of Catalyzing Factors in the cycle of Haitian deforestation can help Haitians and outsiders collaborate to slow tree loss by targeting those factors that perpetuate this cycle. Research partners from my time in Haiti have contributed to this knowledge by assisting in the identification of Catalyzing Factors not previously associated with deforestation in outsider literature.

#### **Novel Categories of Catalyzing Factors**

My research with rural Haitians has supported some outsider conclusions about Haitian tree loss. These include Murray and Bannister's (2004) discussion of lack of alternate income sources, Williams' (2011) discussion of urbanization, and Lundahl's (1989) discussion of embargos. In addition to these insights, my iterative research on the *Pwoblem Pyebwa* Cycle provides novel categories of Catalyzing Factors that broaden understanding of deforestation in Haiti. The novel categories most stressed by residents include commoditized goods and services, water tenure, pig eradication, and climate variability.

#### **4f. Commoditized Goods and Services**

Many research partners, when asked about changing relationships between humans and trees during their lifetime, highlighted the increased reliance on purchased goods and services that they once found in the environment and traditional social interdependence. Neoliberal agricultural policies and food aid have resulted in drastic changes in purchasing of foreign food. This reliance can be seen

through the percentage of food imported in Haiti, switching from 19% in 1970 to its current level of 51% (Dupuy 2012). Such a change means that money must be used to purchase food instead of growing crops for consumption and monetary gain.

Farmers frequently discussed with me the changing food situation in Haiti. They lamented the increase in foreign “chemical foods,” as they call them. Looking at post-earthquake events shows the recognition of these potentially harmful trends by rural Haitians, with thousands of farmers burning genetically modified seeds given by agribusiness giant Monsanto (Bell 2010). Locals also discussed the impacts of this commoditization of food and the consumption of processed food goods. Many people linked this change to increases in illness among their villages. Such a shift in diet has become so pervasive that many research partners note how their children will not eat the nutritious *pitimil* grain (millet) grown around the *jaden lakou*. Instead, they prefer the taste of U.S. rice, which sells for significantly cheaper than local grain products and is less nutritious.

Increases in food purchase, the commoditization of services like education and medicine, and decreasing economic value of locally grown foods has resulted in increased need to cut trees for charcoal and subsequent vulnerability to disaster. Outsiders have used such vulnerability as a justification for more food aid, the promotion of Western farming methods, and outside intervention. These outside interventions, regardless of intention, have sometimes caused increased poverty and increased deforestation (Smith 2001; Schuller 2012). To most rural Haitians in my research, the most notorious of these interventions has been the extermination of Haiti’s pig population during the 1980s.



Figure 3.11. Can from imported oil in a dry field where *pitimi* no longer grows

#### 4g. Pig Eradication

In 1982, the U.S. Government led a “development” initiative in rural Haiti to protect people from the African swine fever. Even though Haiti’s Creole pigs demonstrated a resistance to the illness, nearly all 1.3 million Creole pigs were slaughtered (Farmer 2003). These swine, specifically adapted for the mountains of Haiti, were replaced with white pigs from America that quickly died in the harsh terrain. Since rural Haitians relied heavily on these pigs both for sustenance and as a method of saving capital, authors have since referred to this event as the “Haitian peasant’s Great Stock Market Crash” (Smith 2001). Smith’s (2001) ethnographic study in the Central Plateau presents peasant songs recalling this event and its impact on the livelihoods of rural Haitians. Smith replicates the following song about The United States:

*The Americans have us by the throat, ohhh,  
Uncle Sam is strangling us, ohhh  
Because we’re small, they take us for nothin’,  
But we solemnly swear we won’t live like zombies!  
They killed our Creole pigs and gave us their old white pigs  
They force us to get rid of our little chickens and then hand us chicken feet to sell  
Who’s doing this to us? Uncle Sam, ohhh! (2001:59)*

The event does not live on in song alone. Since the swine flu slaughter, peasants in rural Haiti have relied heavily on goats as livestock. While these small ruminants provide meat and milk, their voracious foraging habits have led to loss of crops and repeated failure of tree planting efforts (Baro 2002; McClintock 2004). To reduce this destruction, farmers have begun tying up goats to small thickets of brush, but “Because the animals are generally not tethered in cropping areas, manure nutrients are not cycled back to the areas of the highest nutrient uptake” (McClintock 2004:15). Through this social-ecological system, an international influence from 1982 continues to systemically impact both the livelihoods and environment of rural Haiti.

The impact of the United States on Haitian livelihoods also stretches past pig killings. American influence includes creating embargos (early 1800’s and 1991-1994) that harmed the rural poor,

financially supporting murderous leaders, training and funding the corrupt Haitian Army, occupying the country for two decades, and playing significant roles in coups of democratically elected presidents (Farmer 2003; Farmer 2004; Dash 2001). Roc (2008) relates the 1991-1994 embargo to a rapid increase in deforestation, but research has not shown direct causation between these events and human-environmental interaction. Yet, since political instability and degraded economics leads to increased environmental degradation and decreased food security (Baro 2002), history suggests that international influences have had large impacts on Haiti's environment and the way people interact with it through systematic causation (Lakoff 2012).

Academic sources have repeatedly discussed the impact of this pig eradication on the Haitian economy (Smith 2001; Dash 2001; Kidder 2003), but only when connecting this event with the lived experiences of rural Haitians can social-ecological connections be drawn. Research partners repeatedly gave emphasis to the issue of goats eating crops and intentionally planted tree saplings compared to the less destructive eating habits of pigs. In a response to this issue, one partner made the following recommendations, "if I was president, I would say everybody should just put a rope on the neck of the animals to keep them away from the garden, out of others."

I observed the uncanny ability of goats to enter the most protected of gardens. Despite seven strands of barbed wire fence (a resource too expensive for the average farmer), goats entered the NGO funded tree nursery and ate saplings during one of my trips to a town near Tiplaz. Some villages, including Lagon, had stricter norms about tying up goats. These norms varied across locations, but all areas complained of tree and crop loss from stay goats. The majority of research partners discussed this novel category, which was unknown to me before my field research. Most people discussed goats, but every person I met with in the Anse Rouge region talked about water, either in terms of water tenure/water access or climate variability.

#### **4h. *Pwoblem Dlo*- Water Tenure/ Water Access**

Land tenure did not seem to pose much of a threat to forest cover in the regions visited during my research, and it was particularly not an issue in the Anse Rouge area. Nearly all people owned land, and those that did often owned multiple parcels of land. Some owned more than ten parcels and actively planted trees on those plots that were furthest from their home. One man in his 80s had covered his land in trees so that he would have an income even when he became too old to farm. And yet, despite this high availability of land in the Northwest, 36% of the charcoal in Port-au-Prince comes from this area (Smucker 1981). Learning from Haitians showed that the impact of water tenure (ownership of rights to irrigation water use) and water access (availability of irrigation water in the area) in rural Haiti surpassed the impact of land tenure on deforestation. This impact was seen in all study sites, but it was most pronounced in the remote and dry Anse Rouge area.

Research partners gave emphasis to this issue (often referred to as *pwoblem dlo* or the “water problem”) in nearly all Anse Rouge interviews and many interviews of other regions. At the most general level, those who owned rights to irrigation water did not rely solely on rainfall. This diversification allowed for the production of crops and the planting of trees regardless of natural conditions. Those without ownership of water rights either had to purchase allotments of water (for which they needed cash and often resorted to charcoal production) or simply rely on natural conditions. According to research partners, reliance on natural conditions has become difficult with increasing unpredictability of climate.

#### **4i. Climate Variability**

For most of their lives, research partners who relied solely on rainfall for crop production could feed their families through generally predictable patterns in climate. Decades of soil erosion have slowed their crop productivity, but the soil generally allowed for enough food to eat and some to sell each year. Participants in my research reported that this productivity has decreased over the past 5 to

10 years to the point where they can no longer provide enough food to eat, let alone sell. They discussed multiple factors contributing to this decrease, such as soil loss, *cheni* (caterpillars), *AIDS* (the local name given to shallot-eating grubs, because “They are the worst!”), and crop loss to livestock. More often than all of these factors combined, research partners in the Anse Rouge area identified lack of rain as the primary cause of poor crops yields and the need to cut down trees. This year may seem like an anomaly, but many rural Haitians also discussed unpredictable changes in climate, in which rain only comes at bizarre times and in extreme amounts.

When asked about empty plots of cropland or groups of saplings sitting in reused plastic bags, ready to plant, farmers would explain they were “waiting for the rain” or “*lapli pa tonbe*” (the rain doesn’t fall). I quickly identified the trend of this Creole phrase in conversation, and remained alert to its presence. While transcribing interviews, it became obvious that “*lapli pa tonbe*” was spoken more than any other phrase with “*pyebwa yo se lavi*” or “trees are life” coming in a close second. Many research partners also addressed the connection between these phrases, linking less rainfall and higher temperatures to tree loss and such climatic changes to increased need for cutting trees. One farmer explained this cyclic deforestation as follows:

*When I was born, it was very good around here. There was a lot of food... a lot of food. It was real green, and there was more shade and more water. The temperature was cooler. So, as a result of what happened to the environment, its different now. Life is harder because of wind, less water, and less trees. Back in the days people did not cut trees the way they have been cutting them down right now, and that is the reason why the environment has changed.*

Other research partners elaborated on the many ways lack of rain, hotter temperatures, and varied precipitation patterns have impacted their life. On each of my visits to different areas, they would impress me by recalling the exact date of the last rainfall. Even when we discussed other issues, rain would enter the conversation. One Lagon man, who was quite tall (rare in Haiti) and donned a large beard (also rare), replied to my by saying, “This year there is no rain and *all* that we planted is lost! And now, we do not know where to find seeds to plant this year.” Another man, who I called “Peppy” in my

notes because of his chipper attitude and abundance of energy, ran the local tree nursery. He explained to me quite emphatically how every seedling had died from lack of rain. In Deschapelles, an older farmer explained that the drought had slowed the growth of fruit and he could not sell his unripe mangoes that he depended on for income. In Ti Bwa, a woman who cleaned NGO buildings to make up for her lost income explained, “The sun is burning the garden, the *cheni* attacks our plants, and I do not have enough money to buy what I want to plant.”

Just as Berkes (2008) explains the connection of resource users to feedback loops from the environment, rural Haitians demonstrated their awareness of the impact human actions had on natural processes and visa versa. This awareness was particularly evident during one day of field research in Lagon. While walking the steep farming plots that surround the town, the farmer to my left pointed to a patch of burned land and explained the cycle of land drying, “When you burn it, this year you can find more food on it, *but*, it is not good for the land because it makes the land become really dry. Drier and drier.” One of his neighbors, an elder man named Franz, then contributed to the conversation, “And people are cutting down a lot of trees and that is why it is getting warmer, too.”

Later that evening, we took the last hour of light to meet as a group and informally talk on the hillside. Five others joined us, including Peppy, who described a reforestation project beginning in the area:

*We know the trees allow rain to fall. And if we have rain, we can grow a lot of things in our gardens. So, we pray to God constantly to make this project benefit for us by planting a lot of trees, not cutting them down, and we will have rain to farm.*

The bearded man and Franz then exchanged thoughts about what they would do if another dry season came. The former said he would leave the country. Mistaking his meaning, I asked which country he would go to. To which he replied:

*If it does not rain in this area, it is not that I will leave the country like that but leave this area. Because I do not have money for a passport, visa, or a means to go to other countries. I can live in a city. I can go to Gonaives or Port-au-Prince to try to find something to do.*

Before parting ways, jokes made their way around the group. The circle of farmers reminisced on some of my silly questions, like when I asked if palm trees could be used for charcoal. They corrected me on my overuse of the word “*bon*” (good) in response to each question and mimicked my voice, saying “*bon, bon, bon!*” We then talked about facial hair, and they made fun of the bearded man. I tossed back that they were just jealous of our fertile faces (me with a thick red/brown beard by this point). I said we just had the best land and asked the bearded man what kind of crops he was trying to grow on his chin. The group erupted in a fit of laughter, and I felt surprisingly welcomed by these rural farmers for a *blan*.

I asked for a joke, telling them I heard Haitians knew the best jokes. Franz spoke up and told a story that demonstrated the concerning nature of the drought and the Haitian *jwa de viv* (joy of life). He said, “A little while ago, maybe last month, I talked to somebody and he said ‘It is not raining this year, maybe God forgot us.’ and I said ‘No, God is here, because I saw him in *Okap*.’” I did not think the joke had finished, but the group once again erupted in laughter. Noticing that I was only laughing because everyone else was, Peppy explained that *Okap* was slang for Cap Haitian, a city to the North, and that it has rained some there over the last month. Peppy then added the joke’s second punch line, “And he was probably only there because he was in Dominican Republic and decided to stop by for a quick visit.” We parted ways, and I left Lagon thinking of the Haitian joy for life, the abundant rain and forests of the Dominican Republic, and the complex factors influencing Haiti’s historical deforestation.

## Conclusions

*"Of course background facts do not tell us what to do about Haiti. But not knowing them has led to some plans for Haiti that make relatively little sense of what is possible. Haiti's current crisis then, is historical."*  
(Mintz 1995:73)

I have been trying to figure out why Haiti has lost so much of its tree cover since I first walked the denuded mountains of Haiti's Central Plateau in 2007. Early on in this journey, my outsider mindset and explanations from people with similar life experiences impacted my view of deforestation in Haiti. Without understanding Creole and with training in positivistic Western science, I relied on only one type of knowledge source: outsider-generated content. Through qualitative research, I have found rural Haitians to possess a wealth of knowledge about their environment.

I witnessed this knowledge through my daily interviews and my nightly walks. I would "*fe yon ti vire*" ("take a little turn") down the streets of Tiplaz, Lagon, Bonnal, Ti Bwa, and Deschapelles, point to trees, and ask people what species they were. Everyone knew. Not only that, but they could tell me what that particular tree was good for, what it was not good for, what conditions it grew best in, and why it was important in their life. In retrospect, I now notice just how impressive this knowledge is. While rural Americans may have similar knowledge for trees in the United States, the results would be much different if I were asked about the uses of such trees. This supports the idea that local Haitians possess a wealth of locally specific knowledge.

My research in rural Haiti supports the idea that this local knowledge of the environment should be included in project planning if reforestation initiatives are to have lasting impact on tree cover. I also argue that outsiders must understand the systemic historical causes of deforestation and look past the common explanations used to explain Haiti's tree problem. I present the *Pwoblem Pyebwa* Model as an educational tool to understand this problem. To me, this model represents collaboration between two types of knowledge. Publications from outsiders contribute soil data, figures on tree loss, and synthesis from Haitian deforestation experts. The *Pwoblem Pyebwa* Model also contributes knowledge from the

other experts on this deforestation: rural Haitians. Through experiential learning and generations of informal experiments, Haitian farmers possess knowledge on trees and human interaction with trees that have contributed to this model. The *Pwoblem Pyebwa* Model, a product of iterative field research, both explains Haitian deforestation and supports the idea that Haitians and outsiders can work together to improve the tree problem in Haiti.

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